

Actuarial Report (29th)

supplementing the 27th and 28th Actuarial Reports on the

CANADA PENSION PLAN

As at 31 December 2015



Office of the Superintendent of
Financial Institutions Canada

Office of the Chief Actuary

Bureau du surintendant des
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Canada 

To obtain a copy of this report, please contact:
Office of the Chief Actuary
Office of the Superintendent of Financial Institutions Canada
12th Floor, Kent Square Building
255 Albert Street Ottawa, Ontario K1A 0H2

Facsimile: (613) 990-9900
E-mail: oca-bac@osfi-bsif.gc.ca

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20 April 2018

The Honourable William F. Morneau, P.C., M.P.
Minister of Finance
House of Commons
Ottawa, Canada
K1A 0A6

Dear Minister:

In accordance with subsections 115(2) and 115(3) of the *Canada Pension Plan*, which provides that an actuarial report shall be prepared whenever a Bill is introduced in the House of Commons to amend the *Canada Pension Plan*, I am pleased to submit the 29th Actuarial Report on the Canada Pension Plan.

Yours sincerely,

A handwritten signature in black ink that reads "Jean-Claude Ménard". The signature is written in a cursive style with a large initial 'J' and a distinct 'M'.

Jean-Claude Ménard, F.S.A., F.C.I.A.
Chief Actuary

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Executive Summary

This is the 29th Actuarial Report on the Canada Pension Plan since the inception of the Canada Pension Plan (CPP or the Plan) in 1966. It has been prepared in compliance with subsections 115(2) and (3) of the *Canada Pension Plan*, which provide that:

“(2) In addition to any report required under subsection (1) and in accordance with a request of the Minister of Finance, whenever any Bill is introduced in the House of Commons to amend this Act in a manner that would in the opinion of the Chief Actuary materially affect any of the estimates contained in the most recent report made under that subsection, the Chief Actuary shall prepare a report as set out in subsection (3).

(3) A report that is prepared under subsection (2) in respect of a Bill shall set out the extent to which the Bill would, if enacted by Parliament, materially affect any of the estimates contained in the most recent report made under subsection (1), using the same actuarial assumptions and basis that were used in that report and using, in addition, other actuarial assumptions and another basis if the Chief Actuary is of the opinion that these other actuarial assumptions and the other basis more accurately reflect a change in demographic or economic circumstances since the most recent report made under subsection (1) was prepared.”

The most recent report made pursuant to Section 115(1) was the 27th Actuarial Report on the Canada Pension Plan as at 31 December 2015, which was tabled in the House of Commons on 27 September 2016, with a subsequent report with minor revisions published 13 February 2017. The most recent report made pursuant to Section 115(2) was the 28th Actuarial Report on the Canada Pension Plan as at 31 December 2015, which was tabled in the House of Commons on 28 October 2016. The 28th Actuarial Report on the Canada Pension Plan was prepared to show the estimates for the Plan in respect of the introduction of the additional Canada Pension Plan as provided by Bill C-26, *An Act to Amend the Canada Pension Plan, the Canada Pension Plan Investment Board Act and the Income Tax Act*.

This 29th Actuarial Report supplementing the 27th and 28th Actuarial Reports on the Canada Pension Plan as at 31 December 2015 has been prepared on the bases of the 27th and 28th CPP Actuarial Reports to show the effect on the long-term financial state of the base and additional CPP of Division 19 of Part 6 of Bill C-74, the *Budget Implementation Act, 2018, No. 1*.

Bill C-74 amends the base and additional components of the CPP to:

- Remove the reductions in survivor benefits in both the base and additional CPP for individuals who are neither disabled nor have dependent children and who become survivors before age 45;
- Introduce child-rearing and disability drop-in provisions in the additional CPP;
- Provide a post-retirement disability benefit to early retirees (before age 65) who are deemed to be disabled and provide children’s benefits for children of disabled retirees in the base CPP;
- Make the death benefit a flat \$2,500 for all eligible deceased contributors in the base CPP;
- Maintain portability of benefits between the Canada Pension Plan and the Québec Pension Plan; and
- Make technical amendments to the enabling provisions for the forthcoming regulations to preserve the financial sustainability of the additional CPP.

Main Findings

Base CPP:

- The minimum contribution rate of the amended base CPP, which is the lowest rate sufficient to financially sustain the amended base CPP is 9.82% for years 2019 to 2033 and 9.80% for the year 2034 and thereafter.
- In 2019, the removal of the age restrictions for the base CPP survivor's pension is expected to result in around 19,000 more base CPP survivor beneficiaries who become eligible to receive their survivor's pension before age 65. Another 21,000 survivor beneficiaries who become eligible for the survivor's pension before age 45 will see their survivor pension increased by the removal of the reductions due to the age restrictions. A total of 40,000 individuals will be affected by this change in 2019. By 2050, it is projected that base CPP survivor benefits will increase by \$170 million.
- In 2019, it is projected that around 3,000 base CPP retirement beneficiaries who are deemed disabled before age 65 would receive the post-retirement disability benefit. This number is projected to increase to about 5,200 by 2050. By 2050, it is projected that base CPP disability expenditures would increase by \$58 million. Further, it is projected that there would be an additional 200 disabled contributors' children beneficiaries in 2019. This number is projected to increase to 500 by 2050.
- In 2019, it is projected that about 29,000 estates of eligible deceased contributors will see an increase in death benefit payments, and that this will result in a projected increase in death benefit expenditures that year of \$21 million.
- By 2050, all proposed amendments to the base CPP are projected to increase total base CPP expenditures by \$230 million or by 0.1% as compared to the projections under the 27th CPP Actuarial Report.
- Under the base CPP legislated contribution rate of 9.9% for 2016 and thereafter, it is projected that by 2050, the amended base CPP assets will reach \$1,442 billion or be \$15.6 billion lower than projected under the 27th CPP Actuarial Report. The assets to expenditures ratio in 2050 is projected to be 7.19 or 0.09 lower than projected under the 27th CPP Actuarial Report.

This report confirms that if the base CPP is amended as per Division 19 of Part 6 of Bill C-74, the legislated contribution rate of 9.9% for the year 2016 and thereafter is sufficient to finance the base CPP over the long term.

Additional CPP:

- For the amended additional CPP, the first additional minimum contribution rate is 1.98% applicable for the year 2023 and thereafter, and the second additional minimum contribution rate is 7.92% applicable for 2024 and thereafter. The additional CPP assets, determined under an open group approach, are projected to represent 106% of the additional CPP open group actuarial liability as at 1 January 2019.
- The number of disability beneficiaries in pay is projected to increase from 42,000 in 2019 to more than 500,000 by 2050, and it is projected that all these beneficiaries will benefit from the disability drop-in when they retire. Also, in 2050, it is projected that about 170,000 new female retirement beneficiaries will have a child-rearing period in their earnings histories.
- As a result of introducing the child-rearing and disability drop-ins, by 2030 the additional CPP retirement benefit expenditures are projected to increase by \$24 million. By 2050, the increase in retirement benefit expenditures is projected to be \$627 million.
- As a result of introducing the child-rearing drop-in, by 2030 the additional CPP disability benefit expenditures are projected to increase by \$1 million. By 2050, the increase in disability benefit expenditures is projected to be \$14 million.
- As a result of introducing the child-rearing and disability drop-ins and the removal of age restrictions on survivor benefits, by 2030 the additional CPP survivor benefit expenditures are projected to increase by \$2 million. By 2050, the increase in survivor benefit expenditures is projected to be \$38 million.
- By 2030, all proposed amendments to the additional CPP are projected to increase total additional CPP expenditures by \$26 million as compared to the projections under the 28th CPP Actuarial Report. By 2050, total additional CPP expenditures are projected to increase by \$679 million or 2.4% as compared to the projections under the 28th CPP Actuarial Report.
- Under the legislated additional contribution rates, by 2030, the amended additional CPP assets are projected to reach \$196 billion or \$94 million lower than projected under the 28th CPP Actuarial Report. By 2050, the amended additional CPP assets are projected to reach \$1,322 billion or \$7.9 billion lower than projected under the 28th CPP Actuarial Report.
- Over the long term, the amended additional CPP assets to expenditures ratio under the legislated contribution rates is projected to stabilize at a level around 26.5 as compared to 28.5 projected under the 28th CPP Actuarial Report.

This report confirms that if the additional CPP is amended as per Division 19 of Part 6 of Bill C-74, the legislated first additional contribution rate of 2.0% for the year 2023 and thereafter, and the legislated second additional contribution rate of 8.0% for the year 2024 and thereafter, result in projected contributions and investment income that are sufficient to fully pay the projected expenditures of the additional Plan over the long term.

I. Introduction

This report has been prepared in compliance with subsections 115(2) and (3) of the *Canada Pension Plan*, which provide that:

“(2) In addition to any report required under subsection (1) and in accordance with a request of the Minister of Finance, whenever any Bill is introduced in the House of Commons to amend this Act in a manner that would in the opinion of the Chief Actuary materially affect any of the estimates contained in the most recent report made under that subsection, the Chief Actuary shall prepare a report as set out in subsection (3).

(3) A report that is prepared under subsection (2) in respect of a Bill shall set out the extent to which the Bill would, if enacted by Parliament, materially affect any of the estimates contained in the most recent report made under subsection (1), using the same actuarial assumptions and basis that were used in that report and using, in addition, other actuarial assumptions and another basis if the Chief Actuary is of the opinion that these other actuarial assumptions and the other basis more accurately reflect a change in demographic or economic circumstances since the most recent report made under subsection (1) was prepared.”

The most recent report made pursuant to Section 115(1) was the 27th Actuarial Report on the Canada Pension Plan as at 31 December 2015, which was tabled in the House of Commons on 27 September 2016, with a subsequent report with minor revisions published 13 February 2017. The most recent report made pursuant to Section 115(2) was the 28th Actuarial Report on the Canada Pension Plan as at 31 December 2015, which was tabled in the House of Commons on 28 October 2016. The 28th Actuarial Report on the Canada Pension Plan was prepared to show the estimates for the Plan in respect of the introduction of the additional Canada Pension Plan as provided by Bill C-26, *An Act to Amend the Canada Pension Plan, the Canada Pension Plan Investment Board Act and the Income Tax Act*.

This 29th Actuarial Report supplementing the 27th and 28th Actuarial Reports on the Canada Pension Plan as at 31 December 2015 has been prepared on the bases of the 27th and 28th CPP Actuarial Reports to show the effect on the long-term financial state of the base and additional CPP of Division 19 of Part 6 of Bill C-74, the *Budget Implementation Act, 2018, No. 1*.

In accordance with subsection 114(4) of the *Canada Pension Plan*, the provisions of an amending Bill shall come into force:

“...only on a day to be fixed by order of the Governor in Council, which order may not be made and shall not in any case have any force or effect unless the lieutenant governor in council of each of at least two thirds of the included provinces, having in the aggregate not less than two thirds of the population of all of the included provinces, has signified the consent of that province to the enactment.”

II. Description of Division 19 of Part 6 of Bill C-74

In this report, Division 19 of Part 6 of Bill C-74 amends the *Canada Pension Plan* in respect of the following:

A. Child Rearing Drop-In Provision (Amends Additional CPP)

The proposed amendments to the additional CPP included in Division 19 of Part 6 of Bill C-74 will protect the value of the additional retirement, survivor and disability benefits in respect of periods of low or no earnings for parents of children under the age of seven on or after 1 January 2019.

The mechanism used will take the form of a “drop-in” during child-rearing periods of low or no earnings. An imputed income will be assigned for these periods for the purposes of calculating the additional CPP benefits. For children younger than age seven on or after 1 January 2019, the additional CPP will “drop in” an amount equal to the parent’s average earnings during the five years prior to the birth or adoption of the child if that amount is higher than their actual earnings during the period the child was younger than age seven.

The child-rearing drop-in amount will be calculated based on months of earnings after 2018 and prior to birth or adoption of a child. If, however, there are fewer than 60 such months (5 years), then the drop-in will be calculated based on the actual number of earnings months, but not lower than 36. If there are less than 36 such months of earnings, the drop-in will be calculated using imputed earnings of 40% of the Year’s Maximum Pensionable Earnings for the number of months missing from the minimum of 36.

This amendment only applies to the additional CPP.

B. Disability Drop-In Provision (Amends Additional CPP)

The proposed amendments to the additional CPP included in Division 19 of Part 6 of Bill C-74 will protect the value of additional retirement and survivor benefits in respect of periods of low or no earnings for individuals who become disabled after 1 January 2019.

The mechanism used will take the form of a “drop-in” during disability periods of low or no earnings. An imputed income will be assigned for these periods for the purposes of calculating the additional CPP retirement and survivor benefits. The drop-in amount will be equal to 70 per cent of an individual’s average earnings in the six years prior to the onset of the disability.

The disability drop-in amount will be calculated based on months of earnings after 2018 and prior to the onset of disability. If, however, there are fewer than 72 months (6 years) of such earnings, then the drop-in will be calculated based on the actual number of earnings months after 2018, prior to the onset of disability.

This amendment only applies to the additional CPP.

C. Removal of the Age-Based Restrictions on Survivor Benefits for Individuals who Become Survivors before Age 45 (Amends Base and Additional CPP)

Effective 1 January 2019, reductions will no longer be applied to the survivor's pension for survivors under age 45. Under the current provisions, survivors who are not disabled and do not have dependent children have their survivor's pension reduced by 10 per cent for each year they were under the age of 45 when their spouse or common-law partner died. This reduction lasts until age 65, when the survivor's pension is recalculated. This means that survivors under the age of 35 who are not disabled and do not have dependent children do not receive a survivor's pension until age 65.

With the proposed measure, survivors would no longer have their survivor's pension reduced or eliminated due to their age at the time their spouse or common-law partner died. This means that the surviving partner or spouse of any CPP contributor who made enough contributions would receive an unreduced survivor's pension.

This amendment applies to both the base and additional CPP.

D. Provide a Post-Retirement Disability Benefit to Early Retirees who are Deemed Disabled and Meet Disability Eligibility Requirements (Amends Base CPP)

Effective 1 January 2019, the amendments will provide disability protection for CPP retirement pension recipients under age 65. Under the current provisions, recipients of the CPP retirement pension who are deemed disabled after the start of the retirement pension cannot receive the CPP disability pension, even if they are still under age 65 and otherwise meet eligibility requirements. With the proposed measure, the CPP would provide an additional payment (equivalent to the disability benefit flat-rate amount) to recipients of the retirement pension who are deemed disabled while under the age of 65, and dependent children of disabled retirees would receive children's benefits.

This amendment only applies to the base CPP.

E. Extend the Maximum Value of the Death Benefit (\$2,500) to All Eligible Deceased Contributors (Amends Base CPP)

Effective 1 January 2019, the amendments will provide a flat-rate payment of \$2,500 to the estates of all eligible CPP deceased contributors, regardless of the earnings history of the deceased contributor. Currently, the CPP death benefit is a one-time, lump sum payment made to the eligible CPP contributor's estate. It is equal to six months of the deceased contributor's CPP retirement pension at age 65, up to a maximum of \$2,500.

This amendment only applies to the base CPP.

III. Methodology and Assumptions

The financial estimates are based on the methodologies and best-estimate assumptions of the 27th and 28th CPP Actuarial Reports as at 31 December 2015 modified, as required, to reflect the proposed amendments in Division 19 of Part 6 of Bill C-74, the *Budget Implementation Act, 2018, No. 1*. The changes made to the methodologies and assumptions for the financial estimates in respect of the benefit provisions are described below.

A. Child-Rearing and Disability Drop-ins (Additional CPP)

The assumptions specifically developed for child-rearing and disability drop-ins are based on an analysis of new retirement beneficiaries between 2006 and 2015.

Using records of earnings, the child-rearing provision period data, the disability benefit, and the retirement benefit files from Service Canada, the best average forty years of past earnings of new retirees were compared before and after applying the proposed child-rearing and disability drop-ins. Based on the ratios of the adjusted to original earnings, factors were developed to reflect the impact on earnings and thus the additional benefits. In developing the factors, both the progression of earnings over time and the projection of future labour force participation rates were taken into account.

For the child-rearing drop-in, it was assumed that these factors will reach their ultimate value in 2041 to reflect that the child-rearing drop-ins would provide credits only to parents of children born or adopted in 2012 and thereafter. These assumed child-rearing drop-in factors result in an increase in the best average forty years of earnings of 2% for all female contributors who take their retirement benefit at ages 60 or older. In order to determine increases in survivor and disability benefits, these factors were interpolated for all ages between 18 and 60. Finally, interpolations were made to obtain factors for years between 2019 and the ultimate year 2041.

For the disability drop-in, it was assumed that for retirement pension take-up at age 65 (the age when the vast majority of disabled beneficiaries have their disability pension converted to the retirement pension) the best average forty years of earnings will increase by 3.5% for all male contributors and 5.5% for all female contributors for the year 2019 and thereafter.

B. Removal of the Age-Based Restrictions on Survivor Benefits for Individuals who Become Survivors before Age 45 (Base and Additional CPP)

No special assumptions were required since this amendment simply removes all reductions for new survivors younger than 45 who are not disabled and do not have dependent children, effective 1 January 2019.

C. Provide a Post-Retirement Disability Benefit to Early Retirees who are Deemed Disabled and Meet Disability Eligibility Requirements (Base CPP)

For this amendment, assumptions are required for the eligibility and disability incidence rates of early retirement beneficiaries (at ages less than 65). Such eligible disabled retirement beneficiaries will receive the flat-rate disability benefit in addition to their retirement pension effective 1 January 2019.

The assumed proportions of CPP early retirees who meet the eligibility rules for disability benefits (i.e., of having contributed in 4 of the last 6 years or 3 of the last 6 years if they have 25 years of contributions or more) were developed using historical data from 2012 through 2016 based on the CPP records of earnings and CPP retirement beneficiaries files from Service Canada. Table 1 shows the resulting assumed eligibility rates per hundred of early retirees by age and sex for the year 2019. These eligibility rates are assumed to evolve thereafter as a function of the labour force participation of CPP early retirees.

Since no CPP data were available to develop the disability incidence rate assumption for this new base CPP provision at the time of this report, data from the Québec Pension Plan (QPP), which has a similar provision, have been used. Once CPP data become available, it will be used to develop this assumption for future CPP actuarial reports.

Under the QPP, there is a provision for an additional amount for disability payable to retirement beneficiaries younger than 65. Specifically, under the QPP, if a retirement beneficiary younger than 65 is deemed disabled within six months of starting his/her retirement pension, he/she can switch to a disability benefit. Effective January 2013, QPP retirement beneficiaries younger than 65 who are deemed disabled after the first six months of their retirement pension start date may now be eligible to receive an additional amount for disability, which is added to the retirement pension. The additional amount equals the flat-rate portion of the QPP disability benefit. The additional amount ceases to be paid once an individual turns 65.

Given the similarity of the QPP additional amount for disability to the proposed post-retirement disability benefit that would be provided under Division 19 of Part 6 of Bill C-74, the assumption for the disability incidence rates in respect of the QPP additional amount for disability were used, as given in Table 36 of the Actuarial Valuation Report on the QPP as at 31 December 2015. These incidence rates are shown in Table 1. The incidence rates are applicable to the population of in-pay retirement beneficiaries ages 61 to 64, i.e. excluding new beneficiaries who emerge during the year. Although the QPP disability contributory eligibility is more stringent than for the CPP, the QPP disability definition is less stringent at ages 60 to 64 than for the CPP. As such, the incidence rates are deemed to be a reasonable proxy to apply to the CPP.

Table 1 Eligibility and Disability Incidence Rates for the Post-Retirement Disability Benefit for CPP Early Retirees

| Age | Eligibility Rate (2019) (per 100 of early retirees) | | Incidence Rate (2019+) (per 1,000 eligible early retirees) ⁽¹⁾ | |
|-----|--|---------|--|---------|
| | Males | Females | Males | Females |
| 61 | 60.7 | 51.2 | 2.9 | 2.2 |
| 62 | 65.6 | 54.1 | 5.6 | 5.2 |
| 63 | 57.7 | 45.7 | 8.3 | 6.1 |
| 64 | 29.0 | 24.3 | 8.5 | 4.6 |

(1) These incidence rates are set equal to those assumed for the Actuarial Valuation of the Québec Pension Plan as at 31 December 2015, as shown in Table 36 of that report.

The amendment would result in additional new disability beneficiaries younger than 65. These individuals would be considered to be both retirement and disability beneficiaries since they would continue to receive their retirement pension along with the new post-retirement flat-rate amount for disability. These individuals would also give rise to disabled retirement beneficiaries children's benefits if they have qualifying children.

D. Extend the Maximum Value of the Death Benefit (\$2,500) to All Eligible Contributors (Base CPP)

For this proposed amendment, no special assumptions are required since this amendment simply provides a flat-rate death benefit of \$2,500 to the estates of all eligible deceased contributors.

E. Methodology to Determine the Additional Minimum Contribution Rates

In accordance with paragraph 113.1(4)(d) of the *Canada Pension Plan*, the additional retirement, survivor, and disability benefits provided by the additional Plan are expected to be financed through additional contribution rates that are no lower than the rates

“... (i) that, beginning with the year 2024, are the lowest constant rates that can be maintained over the foreseeable future, and

(ii) that result in projected contributions and investment income that are sufficient to fully pay the projected expenditures of the additional Canada Pension Plan over the foreseeable future...”

The rates referred to in subparagraphs 113.1(4)(d)(i) and (ii) of the *Canada Pension Plan* are to be determined by the Chief Actuary of the Office of the Superintendent of Financial Institutions in accordance with paragraphs 115(1.1)(d) and (e) of the *Canada Pension Plan* and the prescribed regulations. At the time of the preparation of the 28th and 29th CPP Actuarial Reports, such regulations did not exist. A methodology was developed for the 28th CPP Actuarial Report to determine the rates (the first and second additional minimum contribution rates), which was slightly modified for the purpose of this 29th CPP Actuarial Report. The modification provides a more robust measure of the stability of the rates. The approach is described as follows.

The first and second additional minimum contribution rates (FAMCR and SAMCR) were determined as the minimum constant contribution rates applicable, respectively, for years 2023 and 2024 and thereafter, that meet the following two conditions:

- a) At the valuation date, assets are at least 100% of obligations, on an open group basis (sufficiency); and
- b) The projected assets to expenditures ratio is not lower in the 60th year after the review period than in the 50th year after the review period, with the added condition that this 10-year stabilization period cannot start before the year 2088 (stability).

The FAMCR for years 2019 to 2021 is equal to the legislated first additional contribution rate of 0.3% for the year 2019, 0.6% for 2020, and 1.0% for 2021. The FAMCR for the year 2022 is obtained by multiplying the rate for the year 2023 by 0.75.

For an open group, all current and future participants of a plan are included, where the plan is considered to be ongoing into the future. To determine the actuarial obligations of the amended additional CPP on an open group basis, future additional expenditures with respect to current and future additional CPP participants are projected using the best-estimate assumptions of this 29th CPP Actuarial Report. The open group actuarial liability is then the present value of these projected additional CPP expenditures discounted using the assumed nominal rate of return on the additional CPP assets.

To determine the open group assets of the amended additional CPP, future additional CPP contributions of current and future contributors are projected using the best-estimate assumptions of this report. In order to determine their present value, these total projected additional CPP contributions are discounted using the assumed nominal rate of return on the amended additional CPP assets. This present value is added to the invested assets of the amended additional Plan to obtain the total open group assets.

IV. Results - Base CPP

This section presents the projections in respect of the base CPP as amended by Division 19 of Part 6 of Bill C-74. The key observations and findings of the actuarial projections of the financial state of the base CPP presented in this report are as follows.

A. Beneficiaries

The projected number of beneficiaries under the base CPP and amended base CPP are presented in Tables 2 and 3, respectively. Table 4 shows the difference between Tables 3 and 2. The following can be observed from Table 4:

- In 2019, the removal of the age restrictions for the base CPP survivor's pension is expected to result in around 19,000 more base CPP survivor beneficiaries who would become eligible to receive their survivor's pension before age 65. This number includes individuals who were previously deemed ineligible to survivor benefits at the time of death of their spouses or common-law partners. As well, it is projected that there will be 21,000 individuals without dependent children and not disabled who will see their survivor's pension increased as a result of removal of the age restrictions. A total of 40,000 individuals will be affected by this change in 2019. By 2050, it is projected that the number of base CPP survivor beneficiaries will increase by around 10,000 due to the amendment.
- In 2019, it is projected that around 3,000 base CPP retirement beneficiaries who are deemed disabled before age 65 will receive the post-retirement disability benefit. By 2050, the number of base CPP disability beneficiaries is projected to increase to about 5,200 due to the amendment. Moreover, it is projected that there would be 200 additional disabled contributors' children beneficiaries in 2019. This number is projected to increase to 500 by 2050.

Table 2 Base CPP Beneficiaries before Amendments (27th Report)
(thousands)

| Year | Retirement ^{(1),(2)} | Disability ⁽³⁾ | Survivor ^{(2),(3)} | Children | Death ⁽⁴⁾ |
|------|-------------------------------|---------------------------|-----------------------------|----------|----------------------|
| 2016 | 5,073 | 394 | 1,246 | 216 | 142 |
| 2017 | 5,270 | 400 | 1,265 | 219 | 146 |
| 2018 | 5,492 | 404 | 1,285 | 222 | 150 |
| 2019 | 5,722 | 408 | 1,306 | 226 | 154 |
| 2020 | 5,965 | 412 | 1,327 | 231 | 158 |
| 2021 | 6,201 | 415 | 1,349 | 234 | 163 |
| 2022 | 6,437 | 417 | 1,371 | 237 | 167 |
| 2025 | 7,138 | 419 | 1,443 | 251 | 183 |
| 2030 | 8,104 | 416 | 1,579 | 276 | 214 |
| 2035 | 8,766 | 438 | 1,729 | 302 | 250 |
| 2040 | 9,264 | 470 | 1,874 | 320 | 285 |
| 2050 | 10,247 | 524 | 2,076 | 325 | 335 |
| 2075 | 12,579 | 596 | 2,273 | 357 | 388 |

- (1) The number given for retirement beneficiaries does not take into account that the retirement pension can be shared between spouses, i.e. those who split their pension are counted only once.
- (2) A beneficiary who receives concurrently a retirement and a survivor's benefit is counted in each category.
- (3) A beneficiary who receives concurrently a disability and survivor's benefit is counted in each category.
- (4) This is the number of deceased contributors entitled to a death benefit during the given year.

Table 3 Base CPP Beneficiaries after Amendments
 (thousands)

| Year | Retirement^{(1),(2)} | Disability⁽³⁾ | Survivor^{(2),(3)} | Children | Death⁽⁴⁾ |
|-------------|-------------------------------------|---------------------------------|-----------------------------------|-----------------|----------------------------|
| 2016 | 5,073 | 394 | 1,246 | 216 | 142 |
| 2017 | 5,270 | 400 | 1,265 | 219 | 146 |
| 2018 | 5,492 | 404 | 1,285 | 222 | 150 |
| 2019 | 5,722 | 411 | 1,325 | 227 | 154 |
| 2020 | 5,965 | 416 | 1,346 | 231 | 158 |
| 2021 | 6,201 | 419 | 1,367 | 234 | 163 |
| 2022 | 6,437 | 421 | 1,388 | 238 | 167 |
| 2025 | 7,138 | 423 | 1,458 | 251 | 183 |
| 2030 | 8,104 | 421 | 1,592 | 277 | 214 |
| 2035 | 8,766 | 442 | 1,741 | 302 | 250 |
| 2040 | 9,264 | 474 | 1,885 | 320 | 285 |
| 2050 | 10,247 | 530 | 2,086 | 326 | 335 |
| 2075 | 12,579 | 601 | 2,283 | 357 | 388 |

- (1) The number given for retirement beneficiaries does not take into account that the retirement pension can be shared between spouses, i.e. those who split their pension are counted only once.
 (2) A beneficiary who receives concurrently a retirement and a survivor's benefit is counted in each category.
 (3) A beneficiary who receives concurrently a disability and survivor's benefit or a retirement and a post-retirement disability benefit is counted in each category.
 (4) This is the number of deceased contributors entitled to a death benefit during the given year.

Table 4 Change in Base CPP Beneficiaries after Amendments^(*)
 (thousands)

| Year | Retirement^{(1),(2)} | Disability⁽³⁾ | Survivor^{(2),(3)} | Children | Death⁽⁴⁾ |
|-------------|-------------------------------------|---------------------------------|-----------------------------------|-----------------|----------------------------|
| 2016 | - | - | - | - | - |
| 2017 | - | - | - | - | - |
| 2018 | - | - | - | - | - |
| 2019 | - | 3.0 | 19.3 | 0.2 | - |
| 2020 | - | 3.8 | 18.6 | 0.2 | - |
| 2021 | - | 3.9 | 17.9 | 0.2 | - |
| 2022 | - | 4.0 | 17.2 | 0.2 | - |
| 2025 | - | 4.3 | 15.4 | 0.3 | - |
| 2030 | - | 4.1 | 13.0 | 0.3 | - |
| 2035 | - | 4.2 | 11.7 | 0.4 | - |
| 2040 | - | 4.3 | 10.9 | 0.4 | - |
| 2050 | - | 5.2 | 10.2 | 0.5 | - |
| 2075 | - | 5.7 | 9.7 | 0.6 | - |

- (*) The projections shown are the differences between the projections in Tables 3 and 2.
 (1) The number given for retirement beneficiaries does not take into account that the retirement pension can be shared between spouses, i.e. those who split their pension are counted only once.
 (2) A beneficiary who receives concurrently a retirement and a survivor's benefit is counted in each category.
 (3) A beneficiary who receives concurrently a disability and survivor's benefit or a retirement and a post-retirement disability benefit is counted in each category.
 (4) This is the number of deceased contributors entitled to a death benefit during the given year.

B. Benefit Expenditures

The projected benefit expenditures under the current base CPP and amended base CPP are presented in Tables 5 and 6, respectively. Table 7 shows the difference between Tables 6 and 5. The following can be observed from Table 7:

- In 2019, the removal of age restrictions for the base CPP survivor's pension is projected to increase survivor benefit expenditures by \$127 million. By 2050, survivor benefit expenditures are projected to be \$170 million or 1.2% higher than projected in the 27th CPP Actuarial Report.
- In 2019, allowing eligible retirement beneficiaries who are deemed disabled before age 65 to receive a post-retirement disability benefit is projected to increase disability benefit expenditures by \$18 million. By 2050, disability benefit expenditures are projected to be \$58 million or 0.5% higher than projected in the 27th CPP Actuarial Report. This amendment is also projected to increase disabled contributors' children benefits by \$2 million by 2050.
- In 2019, it is projected that about 29,000 estates of eligible deceased contributors will see an increase in death benefit payments, and that this will result in a projected increase in death benefit expenditures that year of \$21 million or 5.8%.
- By 2050, all proposed amendments to the base CPP are projected to increase total annual base CPP expenditures by \$230 million or 0.1% as compared to the projections under the 27th CPP Actuarial Report.

Table 5 Base CPP Benefit Expenditures before Amendments (27th Report)
 (\$ million)

| Year | Retirement⁽¹⁾ | Disability | Survivor | Children | Death | Operating Expenses⁽²⁾ | Total |
|-------------|---------------------------------|-------------------|-----------------|-----------------|--------------|---|--------------|
| 2016 | 32,950 | 4,058 | 4,433 | 496 | 329 | 612 | 42,877 |
| 2017 | 34,950 | 4,181 | 4,513 | 510 | 340 | 635 | 45,129 |
| 2018 | 37,207 | 4,314 | 4,613 | 528 | 351 | 659 | 47,673 |
| 2019 | 39,697 | 4,447 | 4,718 | 548 | 363 | 684 | 50,457 |
| 2020 | 42,362 | 4,571 | 4,827 | 572 | 376 | 709 | 53,416 |
| 2021 | 45,137 | 4,702 | 4,940 | 591 | 388 | 736 | 56,493 |
| 2022 | 47,986 | 4,821 | 5,060 | 612 | 401 | 764 | 59,644 |
| 2023 | 50,955 | 4,939 | 5,190 | 636 | 415 | 793 | 62,927 |
| 2024 | 54,035 | 5,060 | 5,331 | 661 | 430 | 823 | 66,340 |
| 2025 | 57,201 | 5,179 | 5,485 | 687 | 445 | 854 | 69,851 |
| 2026 | 60,425 | 5,295 | 5,652 | 714 | 461 | 885 | 73,432 |
| 2027 | 63,668 | 5,416 | 5,834 | 742 | 478 | 917 | 77,055 |
| 2028 | 66,949 | 5,536 | 6,031 | 772 | 496 | 951 | 80,735 |
| 2029 | 70,284 | 5,668 | 6,246 | 804 | 515 | 986 | 84,501 |
| 2030 | 73,638 | 5,819 | 6,480 | 838 | 534 | 1,022 | 88,331 |
| 2031 | 76,986 | 6,007 | 6,733 | 872 | 551 | 1,059 | 92,210 |
| 2032 | 80,306 | 6,225 | 7,005 | 906 | 569 | 1,099 | 96,111 |
| 2033 | 83,630 | 6,461 | 7,295 | 941 | 587 | 1,141 | 100,054 |
| 2034 | 87,012 | 6,710 | 7,604 | 976 | 605 | 1,184 | 104,093 |
| 2035 | 90,477 | 6,974 | 7,932 | 1,013 | 624 | 1,229 | 108,249 |
| 2036 | 94,044 | 7,242 | 8,278 | 1,048 | 641 | 1,275 | 112,528 |
| 2037 | 97,680 | 7,540 | 8,639 | 1,081 | 659 | 1,323 | 116,923 |
| 2038 | 101,379 | 7,861 | 9,016 | 1,114 | 677 | 1,374 | 121,421 |
| 2039 | 105,181 | 8,206 | 9,409 | 1,148 | 694 | 1,426 | 126,064 |
| 2040 | 109,139 | 8,558 | 9,817 | 1,181 | 711 | 1,480 | 130,885 |
| 2041 | 113,277 | 8,923 | 10,238 | 1,211 | 727 | 1,536 | 135,911 |
| 2042 | 117,589 | 9,299 | 10,670 | 1,241 | 742 | 1,594 | 141,134 |
| 2043 | 122,097 | 9,686 | 11,113 | 1,269 | 757 | 1,654 | 146,576 |
| 2044 | 126,833 | 10,081 | 11,567 | 1,298 | 771 | 1,716 | 152,264 |
| 2045 | 131,822 | 10,477 | 12,031 | 1,325 | 784 | 1,779 | 158,220 |
| 2050 | 161,100 | 12,462 | 14,450 | 1,460 | 836 | 2,124 | 192,433 |
| 2055 | 198,874 | 14,440 | 16,968 | 1,611 | 865 | 2,520 | 235,278 |
| 2060 | 244,892 | 16,399 | 19,673 | 1,805 | 877 | 2,987 | 286,634 |
| 2065 | 296,868 | 19,146 | 22,886 | 2,053 | 892 | 3,556 | 345,401 |
| 2070 | 357,536 | 22,996 | 27,013 | 2,334 | 924 | 4,265 | 415,068 |
| 2075 | 431,203 | 27,474 | 32,267 | 2,631 | 970 | 5,124 | 499,669 |
| 2080 | 520,919 | 32,751 | 38,548 | 2,944 | 1,015 | 6,139 | 602,316 |
| 2085 | 631,524 | 38,512 | 45,656 | 3,284 | 1,046 | 7,336 | 727,360 |
| 2090 | 766,198 | 44,896 | 53,464 | 3,682 | 1,058 | 8,748 | 878,046 |

(1) Retirement expenditures include expenditures related to post-retirement benefits for working beneficiaries.

(2) Plan operating expenses exclude CPPIB operating expenses, which are accounted for separately in the investment expenses assumption.

Table 6 Base CPP Benefit Expenditures after Amendments
 (\$ million)

| Year | Retirement⁽¹⁾ | Disability⁽²⁾ | Survivor | Children | Death | Operating Expenses⁽³⁾ | Total |
|-------------|---------------------------------|---------------------------------|-----------------|-----------------|--------------|---|--------------|
| 2016 | 32,950 | 4,058 | 4,433 | 496 | 329 | 612 | 42,877 |
| 2017 | 34,950 | 4,181 | 4,513 | 510 | 340 | 635 | 45,129 |
| 2018 | 37,207 | 4,314 | 4,613 | 528 | 351 | 659 | 47,673 |
| 2019 | 39,697 | 4,465 | 4,845 | 549 | 384 | 684 | 50,624 |
| 2020 | 42,362 | 4,594 | 4,953 | 572 | 395 | 709 | 53,585 |
| 2021 | 45,137 | 4,726 | 5,065 | 591 | 406 | 736 | 56,661 |
| 2022 | 47,986 | 4,846 | 5,183 | 613 | 417 | 764 | 59,809 |
| 2023 | 50,955 | 4,966 | 5,312 | 636 | 429 | 793 | 63,092 |
| 2024 | 54,035 | 5,089 | 5,452 | 661 | 443 | 823 | 66,503 |
| 2025 | 57,201 | 5,209 | 5,605 | 688 | 456 | 854 | 70,012 |
| 2026 | 60,425 | 5,325 | 5,771 | 714 | 470 | 885 | 73,591 |
| 2027 | 63,668 | 5,447 | 5,952 | 742 | 485 | 917 | 77,213 |
| 2028 | 66,949 | 5,567 | 6,149 | 773 | 501 | 951 | 80,890 |
| 2029 | 70,284 | 5,699 | 6,363 | 804 | 518 | 986 | 84,653 |
| 2030 | 73,638 | 5,850 | 6,598 | 838 | 535 | 1,022 | 88,480 |
| 2031 | 76,986 | 6,038 | 6,851 | 873 | 552 | 1,059 | 92,360 |
| 2032 | 80,306 | 6,256 | 7,124 | 907 | 569 | 1,099 | 96,262 |
| 2033 | 83,630 | 6,493 | 7,416 | 942 | 587 | 1,141 | 100,209 |
| 2034 | 87,012 | 6,744 | 7,726 | 977 | 606 | 1,184 | 104,250 |
| 2035 | 90,477 | 7,008 | 8,056 | 1,014 | 624 | 1,229 | 108,408 |
| 2036 | 94,044 | 7,277 | 8,403 | 1,049 | 642 | 1,275 | 112,690 |
| 2037 | 97,680 | 7,576 | 8,766 | 1,083 | 659 | 1,323 | 117,087 |
| 2038 | 101,379 | 7,898 | 9,146 | 1,115 | 677 | 1,374 | 121,589 |
| 2039 | 105,181 | 8,244 | 9,541 | 1,149 | 695 | 1,426 | 126,236 |
| 2040 | 109,139 | 8,597 | 9,952 | 1,182 | 711 | 1,480 | 131,060 |
| 2041 | 113,277 | 8,963 | 10,375 | 1,212 | 727 | 1,536 | 136,091 |
| 2042 | 117,589 | 9,342 | 10,810 | 1,242 | 742 | 1,594 | 141,318 |
| 2043 | 122,097 | 9,730 | 11,256 | 1,270 | 757 | 1,654 | 146,765 |
| 2044 | 126,833 | 10,127 | 11,714 | 1,300 | 771 | 1,716 | 152,459 |
| 2045 | 131,822 | 10,526 | 12,182 | 1,327 | 784 | 1,779 | 158,420 |
| 2050 | 161,100 | 12,520 | 14,620 | 1,462 | 836 | 2,124 | 192,663 |
| 2055 | 198,874 | 14,509 | 17,162 | 1,613 | 865 | 2,520 | 235,543 |
| 2060 | 244,892 | 16,473 | 19,894 | 1,807 | 877 | 2,987 | 286,931 |
| 2065 | 296,868 | 19,223 | 23,137 | 2,055 | 892 | 3,556 | 345,731 |
| 2070 | 357,536 | 23,085 | 27,298 | 2,337 | 924 | 4,265 | 415,445 |
| 2075 | 431,203 | 27,577 | 32,589 | 2,634 | 970 | 5,124 | 500,098 |
| 2080 | 520,919 | 32,872 | 38,912 | 2,948 | 1,015 | 6,139 | 602,805 |
| 2085 | 631,524 | 38,653 | 46,066 | 3,289 | 1,046 | 7,336 | 727,915 |
| 2090 | 766,198 | 45,054 | 53,926 | 3,687 | 1,058 | 8,748 | 878,671 |

- (1) Retirement expenditures include expenditures related to post-retirement benefits for working beneficiaries.
 (2) Disability expenditures include expenditures related to the post-retirement disability benefit for retirement beneficiaries.
 (3) Plan operating expenses exclude CPPIB operating expenses, which are accounted for separately in the investment expenses assumption.

Table 7 Change in Base CPP Benefit Expenditures after Amendments^(*)
 (\$ million)

| Year | Retirement⁽¹⁾ | Disability⁽²⁾ | Survivor | Children | Death | Operating Expenses⁽³⁾ | Total |
|-------------|---------------------------------|---------------------------------|-----------------|-----------------|--------------|---|--------------|
| 2016 | - | - | - | - | - | - | - |
| 2017 | - | - | - | - | - | - | - |
| 2018 | - | - | - | - | - | - | - |
| 2019 | - | 18.1 | 127.0 | 0.5 | 21.1 | - | 166.7 |
| 2020 | - | 23.1 | 126.1 | 0.4 | 19.4 | - | 169.0 |
| 2021 | - | 24.4 | 124.9 | 0.4 | 17.8 | - | 167.6 |
| 2022 | - | 25.7 | 123.6 | 0.4 | 16.0 | - | 165.7 |
| 2023 | - | 27.0 | 122.5 | 0.5 | 14.4 | - | 164.4 |
| 2024 | - | 28.3 | 121.3 | 0.5 | 12.6 | - | 162.6 |
| 2025 | - | 29.2 | 120.3 | 0.5 | 11.0 | - | 161.1 |
| 2026 | - | 30.1 | 119.3 | 0.6 | 9.0 | - | 159.0 |
| 2027 | - | 31.2 | 118.6 | 0.6 | 7.0 | - | 157.4 |
| 2028 | - | 31.6 | 117.8 | 0.7 | 4.8 | - | 154.9 |
| 2029 | - | 31.2 | 117.4 | 0.7 | 2.8 | - | 152.1 |
| 2030 | - | 30.6 | 117.5 | 0.7 | 0.3 | - | 149.1 |
| 2031 | - | 30.4 | 118.1 | 0.7 | 0.2 | - | 149.4 |
| 2032 | - | 31.2 | 119.2 | 0.8 | 0.2 | - | 151.3 |
| 2033 | - | 32.5 | 120.6 | 0.9 | 0.2 | - | 154.1 |
| 2034 | - | 33.8 | 122.1 | 0.9 | 0.2 | - | 157.0 |
| 2035 | - | 34.5 | 123.8 | 1.0 | 0.1 | - | 159.5 |
| 2036 | - | 34.7 | 125.5 | 1.0 | 0.1 | - | 161.3 |
| 2037 | - | 35.4 | 127.3 | 1.1 | 0.1 | - | 163.9 |
| 2038 | - | 36.6 | 129.7 | 1.1 | 0.1 | - | 167.5 |
| 2039 | - | 38.1 | 132.0 | 1.2 | 0.1 | - | 171.3 |
| 2040 | - | 39.3 | 134.6 | 1.2 | 0.1 | - | 175.2 |
| 2041 | - | 40.5 | 137.3 | 1.3 | 0.1 | - | 179.1 |
| 2042 | - | 42.2 | 140.2 | 1.3 | 0.1 | - | 183.8 |
| 2043 | - | 44.3 | 143.3 | 1.4 | 0.1 | - | 189.1 |
| 2044 | - | 46.5 | 146.8 | 1.5 | 0.1 | - | 194.9 |
| 2045 | - | 48.5 | 150.3 | 1.5 | 0.0 | - | 200.4 |
| 2050 | - | 57.7 | 170.3 | 1.8 | 0.0 | - | 229.8 |
| 2055 | - | 69.2 | 194.1 | 2.2 | 0.0 | - | 265.5 |
| 2060 | - | 74.3 | 221.0 | 2.4 | - | - | 297.6 |
| 2065 | - | 76.4 | 250.8 | 2.4 | - | - | 329.6 |
| 2070 | - | 89.2 | 284.7 | 2.8 | - | - | 376.8 |
| 2075 | - | 102.8 | 322.5 | 3.3 | - | - | 428.6 |
| 2080 | - | 121.1 | 363.9 | 3.9 | - | - | 488.8 |
| 2085 | - | 140.8 | 410.2 | 4.5 | - | - | 555.5 |
| 2090 | - | 158.3 | 462.2 | 5.0 | - | - | 625.5 |

(*) The projections shown are the differences between the projections in Tables 6 and 5.

(1) Retirement expenditures include expenditures related to post-retirement benefits for working beneficiaries.

(2) Disability expenditures include expenditures related to the post-retirement disability benefit for retirement beneficiaries.

(3) Plan operating expenses exclude CPPIB operating expenses, which are accounted for separately in the investment expenses assumption.

C. Financial Projections of Base CPP with Legislated Contribution Rate

Tables 8 and 9 present the projected financial state of the base CPP and amended base CPP, respectively, using the legislated contribution rate of 9.9%. Table 10 shows the difference between Tables 9 and 8. The following can be observed from these tables:

- By 2030, the amended base CPP assets are projected to be \$598 billion or \$2.8 billion lower than prior to the amendments. By 2050, the assets reach \$1,442 billion or \$15.6 billion lower than prior to the amendments.
- By 2030, the amended base CPP assets to expenditures ratio is projected to be 6.47 or 0.04 lower than prior to the amendments. By 2050, the amended base CPP assets to expenditures ratio is projected to be 7.19 or 0.09 lower than prior to the amendments.
- If the base CPP is amended as per Division 19 of Part 6 of Bill C-74, it is expected that, under the legislated contribution rate of 9.9% for the year 2016 and thereafter, the base CPP will be able to meet its obligations over the projection period (the next 75 years).

Table 8 Financial Projections Base CPP before Amendments (27th Report)
 (9.9% contribution rate)

| Year | PayGo Rate (%) | Contribution Rate (%) | Contributory Earnings (\$ million) | Contributions (\$ million) | Expenditures (\$ million) | Net Cash Flow (\$ million) | Investment Income (\$ million) | Assets at 31 Dec. (\$ million) | Return ⁽¹⁾ (%) | Asset/Expenditure Ratio |
|------|----------------|-----------------------|------------------------------------|----------------------------|---------------------------|----------------------------|--------------------------------|--------------------------------|---------------------------|-------------------------|
| 2016 | 9.13 | 9.9 | 469,849 | 46,515 | 42,877 | 3,638 | 5,835 | 294,831 | 2.00 | 6.53 |
| 2017 | 9.30 | 9.9 | 485,068 | 48,022 | 45,129 | 2,893 | 15,110 | 312,834 | 5.02 | 6.56 |
| 2018 | 9.45 | 9.9 | 504,277 | 49,923 | 47,673 | 2,250 | 15,638 | 330,723 | 4.90 | 6.55 |
| 2019 | 9.61 | 9.9 | 524,960 | 51,971 | 50,457 | 1,514 | 17,069 | 349,306 | 5.07 | 6.54 |
| 2020 | 9.79 | 9.9 | 545,491 | 54,004 | 53,416 | 588 | 19,093 | 368,986 | 5.38 | 6.53 |
| 2021 | 9.96 | 9.9 | 567,494 | 56,182 | 56,493 | -311 | 20,412 | 389,087 | 5.45 | 6.52 |
| 2022 | 10.11 | 9.9 | 590,033 | 58,413 | 59,644 | -1,231 | 21,842 | 409,699 | 5.54 | 6.51 |
| 2023 | 10.25 | 9.9 | 614,202 | 60,806 | 62,927 | -2,121 | 23,097 | 430,675 | 5.57 | 6.49 |
| 2024 | 10.38 | 9.9 | 638,920 | 63,253 | 66,340 | -3,087 | 25,298 | 452,886 | 5.81 | 6.48 |
| 2025 | 10.52 | 9.9 | 664,010 | 65,737 | 69,851 | -4,114 | 27,605 | 476,377 | 6.03 | 6.49 |
| 2026 | 10.65 | 9.9 | 689,518 | 68,262 | 73,432 | -5,170 | 29,014 | 500,221 | 6.03 | 6.49 |
| 2027 | 10.76 | 9.9 | 715,971 | 70,881 | 77,055 | -6,174 | 30,439 | 524,485 | 6.03 | 6.50 |
| 2028 | 10.86 | 9.9 | 743,765 | 73,633 | 80,735 | -7,102 | 31,883 | 549,266 | 6.03 | 6.50 |
| 2029 | 10.93 | 9.9 | 772,832 | 76,510 | 84,501 | -7,991 | 33,363 | 574,639 | 6.03 | 6.51 |
| 2030 | 11.00 | 9.9 | 803,264 | 79,523 | 88,331 | -8,808 | 34,886 | 600,717 | 6.03 | 6.51 |
| 2031 | 11.05 | 9.9 | 834,862 | 82,651 | 92,210 | -9,559 | 36,447 | 627,605 | 6.03 | 6.53 |
| 2032 | 11.07 | 9.9 | 868,555 | 85,987 | 96,111 | -10,124 | 38,063 | 655,544 | 6.03 | 6.55 |
| 2033 | 11.07 | 9.9 | 903,980 | 89,494 | 100,054 | -10,560 | 39,746 | 684,730 | 6.02 | 6.58 |
| 2034 | 11.07 | 9.9 | 940,350 | 93,095 | 104,093 | -10,998 | 41,492 | 715,224 | 6.02 | 6.61 |
| 2035 | 11.06 | 9.9 | 978,913 | 96,912 | 108,249 | -11,337 | 43,322 | 747,209 | 6.02 | 6.64 |
| 2036 | 11.07 | 9.9 | 1,016,680 | 100,651 | 112,528 | -11,877 | 45,241 | 780,573 | 6.02 | 6.68 |
| 2037 | 11.07 | 9.9 | 1,056,703 | 104,614 | 116,923 | -12,309 | 47,246 | 815,510 | 6.02 | 6.72 |
| 2038 | 11.05 | 9.9 | 1,098,605 | 108,762 | 121,421 | -12,659 | 49,357 | 852,207 | 6.01 | 6.76 |
| 2039 | 11.03 | 9.9 | 1,142,737 | 113,131 | 126,064 | -12,933 | 51,588 | 890,862 | 6.01 | 6.81 |
| 2040 | 11.02 | 9.9 | 1,187,616 | 117,574 | 130,885 | -13,311 | 53,929 | 931,480 | 6.01 | 6.85 |
| 2041 | 11.01 | 9.9 | 1,233,988 | 122,165 | 135,911 | -13,746 | 56,391 | 974,124 | 6.02 | 6.90 |
| 2042 | 11.01 | 9.9 | 1,282,122 | 126,930 | 141,134 | -14,204 | 58,990 | 1,018,910 | 6.02 | 6.95 |
| 2043 | 11.00 | 9.9 | 1,332,514 | 131,919 | 146,576 | -14,657 | 61,723 | 1,065,976 | 6.02 | 7.00 |
| 2044 | 11.01 | 9.9 | 1,383,565 | 136,973 | 152,264 | -15,291 | 64,569 | 1,115,254 | 6.02 | 7.05 |
| 2045 | 11.02 | 9.9 | 1,436,430 | 142,207 | 158,220 | -16,013 | 67,547 | 1,166,788 | 6.02 | 7.09 |
| 2050 | 11.17 | 9.9 | 1,722,602 | 170,538 | 192,433 | -21,895 | 84,405 | 1,457,678 | 6.02 | 7.28 |
| 2055 | 11.46 | 9.9 | 2,052,424 | 203,190 | 235,278 | -32,088 | 104,335 | 1,799,883 | 6.02 | 7.35 |
| 2060 | 11.74 | 9.9 | 2,442,454 | 241,803 | 286,634 | -44,831 | 127,089 | 2,189,836 | 6.02 | 7.35 |
| 2065 | 11.80 | 9.9 | 2,926,409 | 289,714 | 345,401 | -55,687 | 153,538 | 2,644,967 | 6.02 | 7.38 |
| 2070 | 11.78 | 9.9 | 3,524,950 | 348,970 | 415,068 | -66,098 | 185,553 | 3,197,264 | 6.02 | 7.42 |
| 2075 | 11.78 | 9.9 | 4,241,948 | 419,953 | 499,669 | -79,716 | 224,534 | 3,869,318 | 6.02 | 7.46 |
| 2080 | 11.83 | 9.9 | 5,092,133 | 504,121 | 602,316 | -98,195 | 271,520 | 4,678,391 | 6.02 | 7.48 |
| 2085 | 11.94 | 9.9 | 6,091,572 | 603,066 | 727,360 | -124,294 | 327,105 | 5,633,298 | 6.02 | 7.46 |
| 2090 | 12.07 | 9.9 | 7,276,562 | 720,380 | 878,046 | -157,666 | 391,621 | 6,739,676 | 6.02 | 7.39 |

(1) Returns are net of all investment expenses.

Table 9 Financial Projections Base CPP after Amendments
 (9.9% contribution rate)

| Year | PayGo Rate (%) | Contribution Rate (%) | Contributory Earnings (\$ million) | Contributions (\$ million) | Expenditures (\$ million) | Net Cash Flow (\$ million) | Investment Income (\$ million) | Assets at 31 Dec. (\$ million) | Return ⁽¹⁾ (%) | Asset/Expenditure Ratio |
|------|----------------|-----------------------|------------------------------------|----------------------------|---------------------------|----------------------------|--------------------------------|--------------------------------|---------------------------|-------------------------|
| 2016 | 9.13 | 9.9 | 469,849 | 46,515 | 42,877 | 3,638 | 5,835 | 294,831 | 2.00 | 6.53 |
| 2017 | 9.30 | 9.9 | 485,068 | 48,022 | 45,129 | 2,893 | 15,110 | 312,834 | 5.02 | 6.56 |
| 2018 | 9.45 | 9.9 | 504,277 | 49,923 | 47,673 | 2,250 | 15,638 | 330,723 | 4.90 | 6.53 |
| 2019 | 9.64 | 9.9 | 524,960 | 51,971 | 50,624 | 1,347 | 17,065 | 349,135 | 5.07 | 6.52 |
| 2020 | 9.82 | 9.9 | 545,491 | 54,004 | 53,585 | 419 | 19,079 | 368,633 | 5.38 | 6.51 |
| 2021 | 9.98 | 9.9 | 567,494 | 56,182 | 56,661 | -479 | 20,389 | 388,543 | 5.45 | 6.50 |
| 2022 | 10.14 | 9.9 | 590,033 | 58,413 | 59,809 | -1,396 | 21,808 | 408,955 | 5.54 | 6.48 |
| 2023 | 10.27 | 9.9 | 614,202 | 60,806 | 63,092 | -2,286 | 23,052 | 429,721 | 5.57 | 6.46 |
| 2024 | 10.41 | 9.9 | 638,920 | 63,253 | 66,503 | -3,250 | 25,238 | 451,709 | 5.81 | 6.45 |
| 2025 | 10.54 | 9.9 | 664,010 | 65,737 | 70,012 | -4,275 | 27,529 | 474,964 | 6.03 | 6.45 |
| 2026 | 10.67 | 9.9 | 689,518 | 68,262 | 73,591 | -5,329 | 28,924 | 498,559 | 6.03 | 6.46 |
| 2027 | 10.78 | 9.9 | 715,971 | 70,881 | 77,213 | -6,332 | 30,334 | 522,562 | 6.03 | 6.46 |
| 2028 | 10.88 | 9.9 | 743,765 | 73,633 | 80,890 | -7,257 | 31,763 | 547,067 | 6.03 | 6.46 |
| 2029 | 10.95 | 9.9 | 772,832 | 76,510 | 84,653 | -8,143 | 33,226 | 572,151 | 6.03 | 6.47 |
| 2030 | 11.02 | 9.9 | 803,264 | 79,523 | 88,480 | -8,957 | 34,732 | 597,927 | 6.03 | 6.47 |
| 2031 | 11.06 | 9.9 | 834,862 | 82,651 | 92,360 | -9,709 | 36,275 | 624,493 | 6.03 | 6.49 |
| 2032 | 11.08 | 9.9 | 868,555 | 85,987 | 96,262 | -10,275 | 37,871 | 652,089 | 6.03 | 6.51 |
| 2033 | 11.09 | 9.9 | 903,980 | 89,494 | 100,209 | -10,715 | 39,534 | 680,908 | 6.02 | 6.53 |
| 2034 | 11.09 | 9.9 | 940,350 | 93,095 | 104,250 | -11,155 | 41,257 | 711,010 | 6.02 | 6.56 |
| 2035 | 11.07 | 9.9 | 978,913 | 96,912 | 108,408 | -11,496 | 43,064 | 742,579 | 6.02 | 6.59 |
| 2036 | 11.08 | 9.9 | 1,016,680 | 100,651 | 112,690 | -12,039 | 44,958 | 775,498 | 6.02 | 6.62 |
| 2037 | 11.08 | 9.9 | 1,056,703 | 104,614 | 117,087 | -12,473 | 46,936 | 809,960 | 6.02 | 6.66 |
| 2038 | 11.07 | 9.9 | 1,098,605 | 108,762 | 121,589 | -12,827 | 49,018 | 846,151 | 6.01 | 6.70 |
| 2039 | 11.05 | 9.9 | 1,142,737 | 113,131 | 126,236 | -13,105 | 51,219 | 884,265 | 6.01 | 6.75 |
| 2040 | 11.04 | 9.9 | 1,187,616 | 117,574 | 131,060 | -13,486 | 53,527 | 924,306 | 6.01 | 6.79 |
| 2041 | 11.03 | 9.9 | 1,233,988 | 122,165 | 136,091 | -13,926 | 55,954 | 966,334 | 6.02 | 6.84 |
| 2042 | 11.02 | 9.9 | 1,282,122 | 126,930 | 141,318 | -14,388 | 58,516 | 1,010,462 | 6.02 | 6.88 |
| 2043 | 11.01 | 9.9 | 1,332,514 | 131,919 | 146,765 | -14,846 | 61,209 | 1,056,825 | 6.02 | 6.93 |
| 2044 | 11.02 | 9.9 | 1,383,565 | 136,973 | 152,459 | -15,486 | 64,013 | 1,105,352 | 6.02 | 6.98 |
| 2045 | 11.03 | 9.9 | 1,436,430 | 142,207 | 158,420 | -16,213 | 66,946 | 1,156,084 | 6.02 | 7.02 |
| 2050 | 11.18 | 9.9 | 1,722,602 | 170,538 | 192,663 | -22,125 | 83,527 | 1,442,084 | 6.02 | 7.19 |
| 2055 | 11.48 | 9.9 | 2,052,424 | 203,190 | 235,543 | -32,353 | 103,076 | 1,777,547 | 6.02 | 7.25 |
| 2060 | 11.75 | 9.9 | 2,442,454 | 241,803 | 286,931 | -45,128 | 125,307 | 2,158,272 | 6.02 | 7.24 |
| 2065 | 11.81 | 9.9 | 2,926,409 | 289,714 | 345,731 | -56,017 | 151,044 | 2,600,864 | 6.02 | 7.25 |
| 2070 | 11.79 | 9.9 | 3,524,950 | 348,970 | 415,445 | -66,475 | 182,094 | 3,136,130 | 6.02 | 7.27 |
| 2075 | 11.79 | 9.9 | 4,241,948 | 419,953 | 500,098 | -80,145 | 219,765 | 3,785,076 | 6.02 | 7.29 |
| 2080 | 11.84 | 9.9 | 5,092,133 | 504,121 | 602,805 | -98,684 | 264,977 | 4,562,875 | 6.02 | 7.29 |
| 2085 | 11.95 | 9.9 | 6,091,572 | 603,066 | 727,915 | -124,849 | 318,165 | 5,475,518 | 6.02 | 7.24 |
| 2090 | 12.08 | 9.9 | 7,276,562 | 720,380 | 878,671 | -158,291 | 379,446 | 6,524,893 | 6.02 | 7.15 |

(1) Returns are net of all investment expenses.

Table 10 Change in Financial Projections Base CPP after Amendments^(*)
 (9.9% contribution rate)

| Year | PayGo Rate (%) | Contribution Rate (%) | Contributory Earnings (\$ million) | Contributions (\$ million) | Expenditures (\$ million) | Net Cash Flow (\$ million) | Investment Income (\$ million) | Assets at 31 Dec. (\$ million) | Return ⁽¹⁾ (%) | Asset/ Expenditure Ratio |
|------|-------------------|--------------------------|---------------------------------------|-------------------------------|------------------------------|-------------------------------|-----------------------------------|-----------------------------------|------------------------------|--------------------------------|
| 2016 | - | - | - | - | - | - | - | - | - | - |
| 2017 | - | - | - | - | - | - | - | - | - | - |
| 2018 | - | - | - | - | - | - | - | - | - | -0.02 |
| 2019 | 0.03 | - | - | - | 167 | -167 | -4 | -171 | - | -0.02 |
| 2020 | 0.03 | - | - | - | 169 | -169 | -14 | -353 | - | -0.02 |
| 2021 | 0.03 | - | - | - | 168 | -168 | -23 | -544 | - | -0.02 |
| 2022 | 0.03 | - | - | - | 165 | -165 | -34 | -744 | - | -0.03 |
| 2023 | 0.03 | - | - | - | 165 | -165 | -45 | -954 | - | -0.03 |
| 2024 | 0.03 | - | - | - | 163 | -163 | -60 | -1,177 | - | -0.03 |
| 2025 | 0.02 | - | - | - | 161 | -161 | -76 | -1,413 | - | -0.04 |
| 2026 | 0.02 | - | - | - | 159 | -159 | -90 | -1,662 | - | -0.03 |
| 2027 | 0.02 | - | - | - | 158 | -158 | -105 | -1,923 | - | -0.04 |
| 2028 | 0.02 | - | - | - | 155 | -155 | -120 | -2,199 | - | -0.04 |
| 2029 | 0.02 | - | - | - | 152 | -152 | -137 | -2,488 | - | -0.04 |
| 2030 | 0.02 | - | - | - | 149 | -149 | -154 | -2,790 | - | -0.04 |
| 2031 | 0.02 | - | - | - | 150 | -150 | -172 | -3,112 | - | -0.04 |
| 2032 | 0.02 | - | - | - | 151 | -151 | -192 | -3,455 | - | -0.04 |
| 2033 | 0.02 | - | - | - | 155 | -155 | -212 | -3,822 | - | -0.05 |
| 2034 | 0.02 | - | - | - | 157 | -157 | -235 | -4,214 | - | -0.05 |
| 2035 | 0.02 | - | - | - | 159 | -159 | -258 | -4,630 | - | -0.05 |
| 2036 | 0.02 | - | - | - | 162 | -162 | -283 | -5,075 | - | -0.06 |
| 2037 | 0.02 | - | - | - | 164 | -164 | -310 | -5,550 | - | -0.06 |
| 2038 | 0.02 | - | - | - | 168 | -168 | -339 | -6,056 | - | -0.06 |
| 2039 | 0.02 | - | - | - | 172 | -172 | -369 | -6,597 | - | -0.06 |
| 2040 | 0.01 | - | - | - | 175 | -175 | -402 | -7,174 | - | -0.06 |
| 2041 | 0.02 | - | - | - | 180 | -180 | -437 | -7,790 | - | -0.06 |
| 2042 | 0.01 | - | - | - | 184 | -184 | -474 | -8,448 | - | -0.07 |
| 2043 | 0.01 | - | - | - | 189 | -189 | -514 | -9,151 | - | -0.07 |
| 2044 | 0.01 | - | - | - | 195 | -195 | -556 | -9,902 | - | -0.07 |
| 2045 | 0.01 | - | - | - | 200 | -200 | -601 | -10,704 | - | -0.07 |
| 2050 | 0.01 | - | - | - | 230 | -230 | -878 | -15,594 | - | -0.09 |
| 2055 | 0.01 | - | - | - | 265 | -265 | -1,259 | -22,336 | - | -0.10 |
| 2060 | 0.01 | - | - | - | 297 | -297 | -1,782 | -31,564 | - | -0.11 |
| 2065 | 0.01 | - | - | - | 330 | -330 | -2,494 | -44,103 | - | -0.13 |
| 2070 | 0.01 | - | - | - | 377 | -377 | -3,459 | -61,134 | - | -0.15 |
| 2075 | 0.01 | - | - | - | 429 | -429 | -4,769 | -84,242 | - | -0.17 |
| 2080 | 0.01 | - | - | - | 489 | -489 | -6,543 | -115,516 | - | -0.19 |
| 2085 | 0.01 | - | - | - | 555 | -555 | -8,940 | -157,780 | - | -0.22 |
| 2090 | 0.01 | - | - | - | 625 | -625 | -12,175 | -214,783 | - | -0.24 |

(*) The projections shown are the differences between the projections in Tables 9 and 8.

(1) Returns are net of all investment expenses.

D. Financial Projections of Base CPP after Amendments with Minimum Contribution Rate

The minimum contribution rate (MCR) of the base CPP is the sum of the base Plan's steady-state contribution rate and the full funding rate for new or increased benefits. Subparagraph 115(1.1)(c)(ii), requires the Chief Actuary to specify in the report a contribution rate in respect of any new or increased benefits in accordance with the requirements of paragraph 113.1(4)(e).

Since amended survivor, disability and death benefits that will come into pay after 1 January 2019 are based on contributors' CPP participation both before and after the effective date of the proposed amendments, there is a portion of the projected increase in liabilities that relates to Plan participation prior to the effective date. For this report, the increase in past liabilities is calculated as the present value as at the effective date of 1 January 2019 of the projected increase in expenditures relating to Plan participation prior to that date and is estimated at \$1.9 billion.

The temporary full funding contribution rate in respect of this period is determined to be 0.0275%. The temporary full funding rate is equal to the ratio of the increase in past liabilities to the present value as at 1 January 2019 of contributory earnings over the period 2019 through 2033.

The increased liability due to the base CPP amendments in respect of participation after 1 January 2019 is estimated to be \$1.7 billion and is fully funded with a permanent contribution rate of 0.007%. This rate is referred to as the "current service cost" of the amendment. The current service cost is equal to the ratio of the increase in liabilities due to future participation to the present value of future contributory earnings as at 1 January 2019.

The sum of the temporary and permanent full funding rates for the first fifteen years (2019-2033) is 0.0345% (0.0275% plus 0.007%) and 0.007% for 2034 and thereafter. The rounded full funding rates are 0.03% for years 2019 to 2033 and 0.01% for the year 2034 and thereafter. The results are summarized in Table 11.

For this report, the steady-state contribution rate is determined to be 9.79% for the year 2019 and thereafter. The MCR, which is the sum of the steady-state and full funding rate, is then determined to be 9.82% for years 2019 to 2033 and 9.80% for 2034 and thereafter. This compares to the MCR under the 27th CPP Actuarial Report of 9.79% for the year 2019 and thereafter.

Table 11 Full Funding Rates in Respect of the Amendments to the Base CPP

| Present Value of Contributory Earnings (2019-2033) | Increase in Liability due to Participation Prior to Effective Date | Temporary Full Funding Rate (2019-2033) | Present Value of Contributory Earnings (2019+) | Increase in Liability due to Participation on or After the Effective Date | Permanent Full Funding Rate or "Current Service Cost" (2019+) | Permanent and Temporary Rate (2019-2033) | Permanent and Temporary Rate, after Application of Regulations (2019-2033) |
|---|---|--|---|--|--|---|---|
| (A)⁽¹⁾ | (B)⁽²⁾ | (C) = (B)/(A) | (D)⁽¹⁾ | (E)⁽²⁾ | (F) = (E)/(D) | (G) = (C) + (F) | (G) after Regulations applied |
| (\$ billion) | (\$ million) | | (\$ billion) | (\$ million) | | | |
| 6,863 | 1,889 | 0.0275% | 24,091 | 1,682 | 0.0070% | 0.0345% | 0.03% |

- (1) As at 1/1/2019 based on the contributory earnings as projected under this report and using a discount rate equal to the assumed overall rate of return on base CPP assets.
- (2) Present values are taken as at 1/1/2019 for the increase in benefits due to participation prior to the effective date (B) and on or after the effective date (E) using a discount rate equal to the assumed overall rate of return on base CPP assets.

The results next presented in Table 12 are based on the best-estimate assumptions of the amended base CPP but use the MCR of 9.82% for years 2019 to 2033 and 9.80% for 2034 and thereafter as opposed to the currently scheduled contribution rate of 9.9% for those years. The financial projections of the amended base CPP under the legislated rate of 9.9% were previously presented in Table 9, and include projections of the asset/expenditure ratios under that rate.

**Table 12 Financial Projections Base CPP after Amendments
 using MCR 9.82% (2019-2033), 9.80% (2034+)**

| Year | PayGo Rate (%) | Contribution Rate (%) | Contributory Earnings (\$ million) | Contributions (\$ million) | Expenditures (\$ million) | Net Cash Flow (\$ million) | Investment Income (\$ million) | Assets at 31 Dec. (\$ million) | Return ⁽¹⁾ (%) | Asset/Expenditure Ratio |
|------|----------------|-----------------------|------------------------------------|----------------------------|---------------------------|----------------------------|--------------------------------|--------------------------------|---------------------------|-------------------------|
| 2016 | 9.13 | 9.90 | 469,849 | 46,515 | 42,877 | 3,638 | 5,835 | 294,831 | 2.00 | 6.53 |
| 2017 | 9.30 | 9.90 | 485,068 | 48,022 | 45,129 | 2,893 | 15,110 | 312,834 | 5.02 | 6.56 |
| 2018 | 9.45 | 9.90 | 504,277 | 49,923 | 47,673 | 2,250 | 15,638 | 330,723 | 4.90 | 6.53 |
| 2019 | 9.64 | 9.82 | 524,960 | 51,551 | 50,624 | 927 | 17,054 | 348,703 | 5.07 | 6.51 |
| 2020 | 9.82 | 9.82 | 545,491 | 53,567 | 53,585 | -18 | 19,043 | 367,729 | 5.38 | 6.49 |
| 2021 | 9.98 | 9.82 | 567,494 | 55,728 | 56,661 | -933 | 20,326 | 387,122 | 5.45 | 6.47 |
| 2022 | 10.14 | 9.82 | 590,033 | 57,941 | 59,809 | -1,868 | 21,715 | 406,969 | 5.54 | 6.45 |
| 2023 | 10.27 | 9.82 | 614,202 | 60,315 | 63,092 | -2,777 | 22,926 | 427,118 | 5.57 | 6.42 |
| 2024 | 10.41 | 9.82 | 638,920 | 62,742 | 66,503 | -3,761 | 25,070 | 448,427 | 5.81 | 6.41 |
| 2025 | 10.54 | 9.82 | 664,010 | 65,206 | 70,012 | -4,806 | 27,314 | 470,935 | 6.03 | 6.40 |
| 2026 | 10.67 | 9.82 | 689,518 | 67,711 | 73,591 | -5,880 | 28,663 | 493,718 | 6.03 | 6.39 |
| 2027 | 10.78 | 9.82 | 715,971 | 70,308 | 77,213 | -6,905 | 30,024 | 516,837 | 6.03 | 6.39 |
| 2028 | 10.88 | 9.82 | 743,765 | 73,038 | 80,890 | -7,852 | 31,399 | 540,384 | 6.03 | 6.38 |
| 2029 | 10.95 | 9.82 | 772,832 | 75,892 | 84,653 | -8,761 | 32,804 | 564,427 | 6.03 | 6.38 |
| 2030 | 11.02 | 9.82 | 803,264 | 78,881 | 88,480 | -9,599 | 34,246 | 589,073 | 6.03 | 6.38 |
| 2031 | 11.06 | 9.82 | 834,862 | 81,983 | 92,360 | -10,377 | 35,720 | 614,416 | 6.03 | 6.38 |
| 2032 | 11.08 | 9.82 | 868,555 | 85,292 | 96,262 | -10,970 | 37,242 | 640,688 | 6.03 | 6.39 |
| 2033 | 11.09 | 9.82 | 903,980 | 88,771 | 100,209 | -11,438 | 38,824 | 668,074 | 6.02 | 6.41 |
| 2034 | 11.09 | 9.80 | 940,350 | 92,154 | 104,250 | -12,096 | 40,454 | 696,432 | 6.02 | 6.42 |
| 2035 | 11.07 | 9.80 | 978,913 | 95,933 | 108,408 | -12,475 | 42,154 | 726,111 | 6.02 | 6.44 |
| 2036 | 11.08 | 9.80 | 1,016,680 | 99,635 | 112,690 | -13,055 | 43,933 | 756,988 | 6.02 | 6.47 |
| 2037 | 11.08 | 9.80 | 1,056,703 | 103,557 | 117,087 | -13,530 | 45,787 | 789,245 | 6.01 | 6.49 |
| 2038 | 11.07 | 9.80 | 1,098,605 | 107,663 | 121,589 | -13,926 | 47,735 | 823,054 | 6.01 | 6.52 |
| 2039 | 11.05 | 9.80 | 1,142,737 | 111,988 | 126,236 | -14,248 | 49,791 | 858,597 | 6.01 | 6.55 |
| 2040 | 11.04 | 9.80 | 1,187,616 | 116,386 | 131,060 | -14,674 | 51,942 | 895,865 | 6.01 | 6.58 |
| 2041 | 11.03 | 9.80 | 1,233,988 | 120,931 | 136,091 | -15,160 | 54,201 | 934,906 | 6.02 | 6.62 |
| 2042 | 11.02 | 9.80 | 1,282,122 | 125,648 | 141,318 | -15,670 | 56,582 | 975,818 | 6.02 | 6.65 |
| 2043 | 11.01 | 9.80 | 1,332,514 | 130,586 | 146,765 | -16,179 | 59,080 | 1,018,719 | 6.02 | 6.68 |
| 2044 | 11.02 | 9.80 | 1,383,565 | 135,589 | 152,459 | -16,870 | 61,673 | 1,063,523 | 6.02 | 6.71 |
| 2045 | 11.03 | 9.80 | 1,436,430 | 140,770 | 158,420 | -17,650 | 64,380 | 1,110,253 | 6.02 | 6.74 |
| 2050 | 11.18 | 9.80 | 1,722,602 | 168,815 | 192,663 | -23,848 | 79,557 | 1,371,384 | 6.02 | 6.84 |
| 2055 | 11.48 | 9.80 | 2,052,424 | 201,138 | 235,543 | -34,405 | 97,120 | 1,671,729 | 6.02 | 6.82 |
| 2060 | 11.75 | 9.80 | 2,442,454 | 239,360 | 286,931 | -47,571 | 116,571 | 2,003,303 | 6.02 | 6.72 |
| 2065 | 11.81 | 9.80 | 2,926,409 | 286,788 | 345,731 | -58,943 | 138,437 | 2,377,489 | 6.02 | 6.63 |
| 2070 | 11.79 | 9.80 | 3,524,950 | 345,445 | 415,445 | -70,000 | 164,119 | 2,817,929 | 6.02 | 6.54 |
| 2075 | 11.79 | 9.80 | 4,241,948 | 415,711 | 500,098 | -84,387 | 194,376 | 3,335,980 | 6.02 | 6.43 |
| 2078 | 11.81 | 9.80 | 4,735,335 | 464,063 | 559,256 | -95,193 | 214,828 | 3,685,473 | 6.02 | 6.35 |
| 2080 | 11.84 | 9.80 | 5,092,133 | 499,029 | 602,805 | -103,776 | 229,394 | 3,933,835 | 6.02 | 6.28 |
| 2085 | 11.95 | 9.80 | 6,091,572 | 596,974 | 727,915 | -130,941 | 268,615 | 4,600,013 | 6.02 | 6.09 |
| 2090 | 12.08 | 9.80 | 7,276,562 | 713,103 | 878,671 | -165,568 | 310,820 | 5,312,843 | 6.02 | 5.82 |

(1) Returns are net of all investment expenses.

V. Results - Additional CPP

This section presents the projections in respect of the additional CPP as amended by Division 19 of Part 6 of Bill C-74. The key observations and findings of the actuarial projections of the financial state of the additional CPP presented in this report are as follows.

A. Beneficiaries

The projected number of beneficiaries under the additional CPP and amended additional CPP are presented in Table 13. Table 13 also shows the difference between the amended additional CPP and the projections of the 28th CPP Actuarial Report.

By 2030, the removal of the age restrictions for the additional CPP survivor's pension is expected to result in about 4,000 more additional CPP survivor beneficiaries who would become eligible to receive their survivor's pension before age 65. By 2050, it is projected that the number of additional CPP survivor beneficiaries will increase by 9,000 due to the amendment.

The number of disability beneficiaries in pay is projected to increase from 42,000 in 2019 to more than 500,000 by 2050, and it is projected that all these beneficiaries will benefit from the disability drop-in when they retire. Also, in 2050, it is projected that about 170,000 new female retirement beneficiaries will have a child-rearing period in their earnings histories.

Table 13 Additional CPP Beneficiaries
(thousands)

| Year | Retirement ^{(1),(2)} | | | Disability ⁽³⁾ | | | Survivor ^{(2),(3)} | | |
|------|-------------------------------|---------|------------|---------------------------|---------|------------|-----------------------------|---------|------------|
| | 28 th Report | Amended | Difference | 28 th Report | Amended | Difference | 28 th Report | Amended | Difference |
| 2016 | - | - | - | - | - | - | - | - | - |
| 2017 | - | - | - | - | - | - | - | - | - |
| 2018 | - | - | - | - | - | - | - | - | - |
| 2019 | 201 | 201 | - | 42 | 42 | - | 81 | 81 | 0 |
| 2020 | 449 | 449 | - | 81 | 81 | - | 160 | 161 | 1 |
| 2021 | 713 | 713 | - | 117 | 117 | - | 239 | 240 | 1 |
| 2022 | 989 | 989 | - | 150 | 150 | - | 317 | 318 | 1 |
| 2025 | 1,892 | 1,892 | - | 233 | 233 | - | 546 | 549 | 2 |
| 2030 | 3,412 | 3,412 | - | 323 | 323 | - | 913 | 917 | 4 |
| 2035 | 4,983 | 4,983 | - | 391 | 391 | - | 1,254 | 1,259 | 5 |
| 2040 | 6,502 | 6,502 | - | 448 | 448 | - | 1,550 | 1,556 | 6 |
| 2050 | 9,261 | 9,261 | - | 522 | 522 | - | 1,950 | 1,959 | 9 |
| 2075 | 12,579 | 12,579 | - | 596 | 596 | - | 2,271 | 2,280 | 10 |

- (1) The number given for retirement beneficiaries does not take into account that the retirement pension can be shared between spouses, i.e. those who split their pension are counted only once.
- (2) A beneficiary who receives concurrently a retirement and a survivor's benefit is counted in each category.
- (3) A beneficiary who receives concurrently a disability and survivor's benefit is counted in each category.

B. Benefit Expenditures

The projected benefit expenditures under the additional CPP and amended additional CPP are presented in Tables 14 and 15, respectively. Table 16 shows the difference between Tables 15 and 14. The following can be observed from Table 16:

- As a result of introducing the child-rearing and disability drop-ins, by 2030 the additional CPP retirement benefit expenditures are projected to increase by \$24 million. By 2050, the increase in retirement benefit expenditures is projected to be \$627 million.
- As a result of introducing the child-rearing drop-in, by 2030 the additional CPP disability benefit expenditures are projected to increase by \$1 million. By 2050, the increase in disability benefit expenditures is projected to be \$14 million.
- As a result of introducing the child-rearing and disability drop-ins and the removal of age restrictions on survivor benefits, by 2030 the additional CPP survivor benefit expenditures are projected to increase by \$2 million. By 2050, the increase in survivor benefit expenditures is projected to be \$38 million.
- By 2030, total additional CPP expenditures are projected to increase by \$26 million. By 2050, the increase in total additional CPP expenditures is projected to be \$679 million or 2.4% higher than prior to the amendments.

Table 14 Additional CPP Benefit Expenditures before Amendments (28th Report)^(*)
 (\$ million)

| Year | Retirement⁽¹⁾ | Disability | Survivor | Operating Expenses⁽²⁾ | Total |
|-------------|---------------------------------|-------------------|-----------------|---|--------------|
| 2016 | - | - | - | - | - |
| 2017 | - | - | - | - | - |
| 2018 | - | - | - | - | - |
| 2019 | 1 | 0 | 0 | 105 ⁽³⁾ | 106 |
| 2020 | 9 | 1 | 0 | 50 | 60 |
| 2021 | 28 | 2 | 0 | 52 | 82 |
| 2022 | 63 | 4 | 1 | 54 | 122 |
| 2023 | 120 | 8 | 2 | 73 | 204 |
| 2024 | 209 | 15 | 4 | 89 | 318 |
| 2025 | 321 | 25 | 6 | 93 | 445 |
| 2026 | 460 | 38 | 10 | 96 | 603 |
| 2027 | 635 | 54 | 15 | 100 | 803 |
| 2028 | 852 | 75 | 21 | 103 | 1,051 |
| 2029 | 1,111 | 99 | 29 | 107 | 1,346 |
| 2030 | 1,409 | 127 | 39 | 111 | 1,685 |
| 2031 | 1,753 | 158 | 50 | 115 | 2,077 |
| 2032 | 2,152 | 193 | 64 | 119 | 2,528 |
| 2033 | 2,614 | 231 | 80 | 124 | 3,049 |
| 2034 | 3,147 | 274 | 99 | 129 | 3,648 |
| 2035 | 3,750 | 320 | 121 | 134 | 4,325 |
| 2036 | 4,424 | 370 | 147 | 139 | 5,080 |
| 2037 | 5,172 | 425 | 177 | 144 | 5,918 |
| 2038 | 5,998 | 484 | 210 | 149 | 6,842 |
| 2039 | 6,908 | 549 | 249 | 155 | 7,861 |
| 2040 | 7,914 | 618 | 293 | 161 | 8,985 |
| 2041 | 9,026 | 692 | 342 | 167 | 10,227 |
| 2042 | 10,248 | 770 | 398 | 173 | 11,590 |
| 2043 | 11,590 | 852 | 462 | 180 | 13,084 |
| 2044 | 13,064 | 940 | 533 | 186 | 14,723 |
| 2045 | 14,683 | 1,031 | 612 | 193 | 16,520 |
| 2050 | 25,252 | 1,531 | 1,164 | 231 | 28,178 |
| 2055 | 40,795 | 2,059 | 2,034 | 274 | 45,162 |
| 2060 | 61,573 | 2,542 | 3,304 | 325 | 67,744 |
| 2065 | 85,765 | 3,062 | 5,060 | 387 | 94,273 |
| 2070 | 113,083 | 3,759 | 7,370 | 464 | 124,676 |
| 2075 | 144,917 | 4,603 | 10,296 | 557 | 160,373 |
| 2080 | 182,139 | 5,613 | 13,819 | 667 | 202,239 |
| 2085 | 226,065 | 6,737 | 17,846 | 797 | 251,446 |
| 2090 | 277,519 | 7,987 | 22,213 | 951 | 308,669 |

(*) The projections shown are those of the 28th CPP Actuarial Report adjusted for methodological improvements in rounding approaches. These adjustments have no material impact on the projected results.

(1) Retirement expenditures include expenditures related to post-retirement benefits for working beneficiaries.

(2) Plan operating expenses exclude CPPIB operating expenses, which are accounted for separately in the investment expenses assumption.

(3) It is assumed that operating expenses incurred in calendar years preceding 2019 will be charged to the additional CPP Account in the calendar year 2019, along with the expenses incurred in that year.

Table 15 Additional CPP Benefit Expenditures after Amendments
 (\$ million)

| Year | Retirement⁽¹⁾ | Disability | Survivor | Operating Expenses⁽²⁾ | Total |
|-------------|---------------------------------|-------------------|-----------------|---|--------------|
| 2016 | - | - | - | - | - |
| 2017 | - | - | - | - | - |
| 2018 | - | - | - | - | - |
| 2019 | 1 | 0 | 0 | 105 ⁽³⁾ | 106 |
| 2020 | 9 | 1 | 0 | 50 | 60 |
| 2021 | 28 | 2 | 0 | 52 | 82 |
| 2022 | 63 | 4 | 1 | 54 | 122 |
| 2023 | 121 | 9 | 2 | 73 | 205 |
| 2024 | 211 | 15 | 4 | 89 | 320 |
| 2025 | 324 | 25 | 7 | 93 | 449 |
| 2026 | 465 | 38 | 10 | 96 | 609 |
| 2027 | 643 | 55 | 15 | 100 | 813 |
| 2028 | 864 | 75 | 22 | 103 | 1,065 |
| 2029 | 1,128 | 100 | 30 | 107 | 1,366 |
| 2030 | 1,432 | 128 | 40 | 111 | 1,712 |
| 2031 | 1,784 | 159 | 52 | 115 | 2,111 |
| 2032 | 2,192 | 194 | 67 | 119 | 2,572 |
| 2033 | 2,664 | 233 | 84 | 124 | 3,105 |
| 2034 | 3,210 | 276 | 104 | 129 | 3,718 |
| 2035 | 3,827 | 323 | 127 | 134 | 4,411 |
| 2036 | 4,519 | 374 | 153 | 139 | 5,185 |
| 2037 | 5,286 | 429 | 184 | 144 | 6,042 |
| 2038 | 6,132 | 489 | 219 | 149 | 6,988 |
| 2039 | 7,065 | 554 | 259 | 155 | 8,032 |
| 2040 | 8,096 | 624 | 304 | 161 | 9,184 |
| 2041 | 9,235 | 698 | 356 | 167 | 10,456 |
| 2042 | 10,489 | 777 | 413 | 173 | 11,852 |
| 2043 | 11,864 | 860 | 479 | 180 | 13,383 |
| 2044 | 13,376 | 948 | 552 | 186 | 15,063 |
| 2045 | 15,036 | 1,041 | 634 | 193 | 16,904 |
| 2050 | 25,879 | 1,545 | 1,202 | 231 | 28,857 |
| 2055 | 41,829 | 2,078 | 2,096 | 274 | 46,277 |
| 2060 | 63,171 | 2,566 | 3,399 | 325 | 69,460 |
| 2065 | 88,029 | 3,091 | 5,189 | 387 | 96,696 |
| 2070 | 116,093 | 3,794 | 7,548 | 464 | 127,898 |
| 2075 | 148,797 | 4,646 | 10,536 | 557 | 164,537 |
| 2080 | 187,033 | 5,666 | 14,138 | 667 | 207,505 |
| 2085 | 232,158 | 6,801 | 18,253 | 797 | 258,009 |
| 2090 | 285,022 | 8,062 | 22,714 | 951 | 316,749 |

- (1) Retirement expenditures include expenditures related to post-retirement benefits for working beneficiaries.
 (2) Plan operating expenses exclude CPPIB operating expenses, which are accounted for separately in the investment expenses assumption.
 (3) It is assumed that operating expenses incurred in calendar years preceding 2019 will be charged to the additional CPP Account in the calendar year 2019, along with the expenses incurred in that year.

Table 16 Change in Additional CPP Benefit Expenditures after Amendments^(*)
 (\$ million)

| Year | Retirement⁽¹⁾ | Disability | Survivor | Operating Expenses⁽²⁾ | Total |
|-------------|---------------------------------|-------------------|-----------------|---|--------------|
| 2016 | - | - | - | - | - |
| 2017 | - | - | - | - | - |
| 2018 | - | - | - | - | - |
| 2019 | 0 | - | - | - | 0 |
| 2020 | 0 | - | 0 | - | 0 |
| 2021 | 0 | 0 | 0 | - | 0 |
| 2022 | 0 | 0 | 0 | - | 1 |
| 2023 | 1 | 0 | 0 | - | 1 |
| 2024 | 2 | 0 | 0 | - | 2 |
| 2025 | 3 | 0 | 0 | - | 4 |
| 2026 | 5 | 0 | 0 | - | 6 |
| 2027 | 8 | 1 | 1 | - | 9 |
| 2028 | 12 | 1 | 1 | - | 14 |
| 2029 | 17 | 1 | 1 | - | 20 |
| 2030 | 24 | 1 | 2 | - | 26 |
| 2031 | 31 | 1 | 2 | - | 35 |
| 2032 | 40 | 2 | 3 | - | 44 |
| 2033 | 50 | 2 | 3 | - | 56 |
| 2034 | 63 | 3 | 4 | - | 70 |
| 2035 | 78 | 3 | 5 | - | 86 |
| 2036 | 95 | 3 | 6 | - | 104 |
| 2037 | 113 | 4 | 7 | - | 124 |
| 2038 | 134 | 4 | 9 | - | 147 |
| 2039 | 157 | 5 | 10 | - | 172 |
| 2040 | 182 | 6 | 12 | - | 199 |
| 2041 | 210 | 6 | 13 | - | 229 |
| 2042 | 240 | 7 | 15 | - | 262 |
| 2043 | 274 | 8 | 17 | - | 299 |
| 2044 | 312 | 9 | 19 | - | 339 |
| 2045 | 353 | 10 | 22 | - | 384 |
| 2050 | 627 | 14 | 38 | - | 679 |
| 2055 | 1,034 | 19 | 62 | - | 1,116 |
| 2060 | 1,598 | 24 | 95 | - | 1,716 |
| 2065 | 2,264 | 29 | 129 | - | 2,422 |
| 2070 | 3,009 | 35 | 178 | - | 3,223 |
| 2075 | 3,880 | 43 | 240 | - | 4,163 |
| 2080 | 4,895 | 53 | 319 | - | 5,267 |
| 2085 | 6,093 | 64 | 407 | - | 6,563 |
| 2090 | 7,503 | 76 | 501 | - | 8,080 |

(*) The projections shown are the differences between the projections in Tables 15 and 14.

(1) Retirement expenditures include expenditures related to post-retirement benefits for working beneficiaries.

(2) Plan operating expenses exclude CPPIB operating expenses, which are accounted for separately in the investment expenses assumption.

C. Financial Projections of Additional CPP with Legislated Contribution Rates

Tables 17 and 18 present the projected financial state of the additional CPP and amended additional CPP, respectively, using the legislated first additional contribution rate of 2.0% and legislated second additional contribution rate of 8.0%. Table 19 shows the difference between Tables 18 and 17. The following can be observed from these tables:

- By 2030, the amended additional CPP assets are projected to reach \$196 billion or \$94 million lower than prior to the amendments. By 2050, the assets reach \$1,322 billion or \$7.9 billion lower than prior to the amendments.
- Over the long term, the amended additional CPP assets to expenditures ratio is projected to stabilize at a level around 26.5 compared to 28.5 prior to the amendments.
- If the additional CPP is amended as per Division 19 of Part 6 of Bill C-74, it is expected that, under the legislated first additional contribution rate of 2.0% for the year 2023 and thereafter and the legislated second additional contribution rate of 8.0% for the year 2024 and thereafter, contributions and investment income will be sufficient to fully pay the expenditures of the additional Plan over the long term.

Table 17 Financial Projections Additional CPP before Amendments (28th Report)^(*)
 (2.0% first additional contribution rate, 8.0% second additional contribution rate)

| Year | First Additional Contribution Rate | Second Additional Contribution Rate | Contributory Earnings | Contributions | Expenditures | Net Cash Flow | Investment Income | Assets at 31 Dec. | Return ⁽¹⁾ | Asset/ Expenditure Ratio |
|------|---|--|--------------------------|---------------|--------------------|------------------|----------------------|----------------------|-----------------------|--------------------------------|
| | (%) | (%) | (\$ million) | (\$ million) | (\$ million) | (\$ million) | (\$ million) | (\$ million) | (%) | |
| 2016 | - | - | - | - | - | - | - | - | - | - |
| 2017 | - | - | - | - | - | - | - | - | - | - |
| 2018 | - | - | - | - | - | - | - | - | - | - |
| 2019 | 0.3 | - | 524,960 | 1,575 | 106 ⁽²⁾ | 1,469 | 34 | 1,503 | 4.12 | 25.3 |
| 2020 | 0.6 | - | 545,491 | 3,273 | 59 | 3,213 | 146 | 4,863 | 4.45 | 59.4 |
| 2021 | 1.0 | - | 567,494 | 5,675 | 82 | 5,593 | 361 | 10,817 | 4.53 | 88.7 |
| 2022 | 1.5 | - | 590,033 | 8,850 | 122 | 8,729 | 738 | 20,284 | 4.71 | 99.5 |
| 2023 | 2.0 | - | 614,202 | 12,284 | 204 | 12,080 | 1,283 | 33,646 | 4.75 | 106.1 |
| 2024 | 2.0 | 8.0 | 662,713 | 14,682 | 317 | 14,365 | 2,177 | 50,188 | 5.23 | 112.8 |
| 2025 | 2.0 | 8.0 | 712,036 | 17,122 | 445 | 16,677 | 3,348 | 70,214 | 5.63 | 116.4 |
| 2026 | 2.0 | 8.0 | 739,246 | 17,769 | 603 | 17,166 | 4,492 | 91,871 | 5.63 | 114.3 |
| 2027 | 2.0 | 8.0 | 767,516 | 18,443 | 804 | 17,639 | 5,728 | 115,239 | 5.63 | 109.7 |
| 2028 | 2.0 | 8.0 | 797,132 | 19,145 | 1,050 | 18,094 | 7,059 | 140,392 | 5.63 | 104.3 |
| 2029 | 2.0 | 8.0 | 828,479 | 19,908 | 1,346 | 18,562 | 8,492 | 167,447 | 5.63 | 99.4 |
| 2030 | 2.0 | 8.0 | 860,727 | 20,662 | 1,685 | 18,977 | 10,031 | 196,454 | 5.63 | 94.6 |
| 2031 | 2.0 | 8.0 | 894,744 | 21,488 | 2,076 | 19,411 | 11,680 | 227,545 | 5.63 | 90.0 |
| 2032 | 2.0 | 8.0 | 930,439 | 22,322 | 2,528 | 19,794 | 13,445 | 260,785 | 5.63 | 85.5 |
| 2033 | 2.0 | 8.0 | 968,383 | 23,232 | 3,049 | 20,183 | 15,332 | 296,300 | 5.63 | 81.2 |
| 2034 | 2.0 | 8.0 | 1,007,408 | 24,172 | 3,649 | 20,523 | 17,346 | 334,169 | 5.63 | 77.3 |
| 2035 | 2.0 | 8.0 | 1,048,562 | 25,150 | 4,325 | 20,825 | 19,492 | 374,486 | 5.63 | 73.7 |
| 2036 | 2.0 | 8.0 | 1,088,928 | 26,113 | 5,081 | 21,033 | 21,773 | 417,291 | 5.63 | 70.5 |
| 2037 | 2.0 | 8.0 | 1,131,625 | 27,128 | 5,918 | 21,210 | 24,194 | 462,695 | 5.63 | 67.6 |
| 2038 | 2.0 | 8.0 | 1,176,748 | 28,224 | 6,841 | 21,382 | 26,761 | 510,839 | 5.63 | 65.0 |
| 2039 | 2.0 | 8.0 | 1,223,531 | 29,318 | 7,861 | 21,458 | 29,481 | 561,777 | 5.63 | 62.5 |
| 2040 | 2.0 | 8.0 | 1,271,683 | 30,478 | 8,986 | 21,492 | 32,357 | 615,626 | 5.63 | 60.2 |
| 2041 | 2.0 | 8.0 | 1,321,352 | 31,669 | 10,227 | 21,442 | 35,395 | 672,462 | 5.63 | 58.0 |
| 2042 | 2.0 | 8.0 | 1,372,835 | 32,899 | 11,590 | 21,310 | 38,599 | 732,371 | 5.63 | 56.0 |
| 2043 | 2.0 | 8.0 | 1,426,514 | 34,170 | 13,084 | 21,086 | 41,974 | 795,432 | 5.63 | 54.0 |
| 2044 | 2.0 | 8.0 | 1,480,985 | 35,465 | 14,723 | 20,742 | 45,524 | 861,698 | 5.63 | 52.2 |
| 2045 | 2.0 | 8.0 | 1,537,177 | 36,788 | 16,519 | 20,269 | 49,251 | 931,218 | 5.63 | 50.4 |
| 2050 | 2.0 | 8.0 | 1,842,976 | 44,082 | 28,178 | 15,904 | 70,659 | 1,329,648 | 5.63 | 42.7 |
| 2055 | 2.0 | 8.0 | 2,195,459 | 52,491 | 45,162 | 7,329 | 96,834 | 1,815,104 | 5.63 | 36.8 |
| 2060 | 2.0 | 8.0 | 2,612,088 | 62,420 | 67,744 | -5,325 | 127,924 | 2,390,339 | 5.63 | 32.8 |
| 2065 | 2.0 | 8.0 | 3,129,007 | 74,736 | 94,274 | -19,538 | 164,544 | 3,068,225 | 5.63 | 30.7 |
| 2070 | 2.0 | 8.0 | 3,767,678 | 89,917 | 124,676 | -34,759 | 208,135 | 3,876,045 | 5.63 | 29.5 |
| 2075 | 2.0 | 8.0 | 4,533,702 | 108,179 | 160,373 | -52,194 | 260,379 | 4,844,629 | 5.63 | 28.8 |
| 2080 | 2.0 | 8.0 | 5,441,299 | 129,776 | 202,238 | -72,463 | 323,211 | 6,009,946 | 5.63 | 28.4 |
| 2085 | 2.0 | 8.0 | 6,508,854 | 155,214 | 251,445 | -96,231 | 398,963 | 7,415,296 | 5.63 | 28.3 |
| 2090 | 2.0 | 8.0 | 7,773,709 | 185,303 | 308,670 | -123,367 | 490,619 | 9,116,670 | 5.63 | 28.4 |

(*) The projections shown are those of the 28th CPP Actuarial Report adjusted for methodological improvements in rounding approaches. These adjustments have no material impact on the projected results.

(1) Returns are net of all investment expenses.

(2) It is assumed that operating expenses incurred in calendar years preceding 2019 will be charged to the additional CPP Account in the calendar year 2019, along with the expenses incurred in that year.

Table 18 Financial Projections Additional CPP after Amendments
 (2.0% first additional contribution rate, 8.0% second additional contribution rate)

| Year | First Additional Contribution Rate (%) | Second Additional Contribution Rate (%) | Contributory Earnings (\$ million) | Contributions (\$ million) | Expenditures (\$ million) | Net Cash Flow (\$ million) | Investment Income (\$ million) | Assets at 31 Dec. (\$ million) | Return ⁽¹⁾ (%) | Asset/ Expenditure Ratio |
|------|--|---|--|-------------------------------|------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|------------------------------|--------------------------------|
| 2016 | - | - | - | - | - | - | - | - | - | - |
| 2017 | - | - | - | - | - | - | - | - | - | - |
| 2018 | - | - | - | - | - | - | - | - | - | - |
| 2019 | 0.3 | - | 524,960 | 1,575 | 106 ⁽²⁾ | 1,469 | 34 | 1,503 | 4.12 | 25.3 |
| 2020 | 0.6 | - | 545,491 | 3,273 | 60 | 3,213 | 146 | 4,863 | 4.45 | 59.2 |
| 2021 | 1.0 | - | 567,494 | 5,675 | 82 | 5,593 | 361 | 10,817 | 4.53 | 88.3 |
| 2022 | 1.5 | - | 590,033 | 8,850 | 122 | 8,728 | 738 | 20,283 | 4.71 | 99.0 |
| 2023 | 2.0 | - | 614,202 | 12,284 | 205 | 12,079 | 1,283 | 33,645 | 4.75 | 105.4 |
| 2024 | 2.0 | 8.0 | 662,713 | 14,682 | 319 | 14,363 | 2,176 | 50,184 | 5.23 | 111.9 |
| 2025 | 2.0 | 8.0 | 712,036 | 17,122 | 449 | 16,674 | 3,348 | 70,205 | 5.63 | 115.3 |
| 2026 | 2.0 | 8.0 | 739,246 | 17,769 | 609 | 17,159 | 4,492 | 91,856 | 5.63 | 113.0 |
| 2027 | 2.0 | 8.0 | 767,516 | 18,443 | 813 | 17,630 | 5,727 | 115,213 | 5.63 | 108.3 |
| 2028 | 2.0 | 8.0 | 797,132 | 19,145 | 1,064 | 18,080 | 7,058 | 140,351 | 5.63 | 102.8 |
| 2029 | 2.0 | 8.0 | 828,479 | 19,908 | 1,366 | 18,543 | 8,489 | 167,383 | 5.63 | 97.8 |
| 2030 | 2.0 | 8.0 | 860,727 | 20,662 | 1,712 | 18,951 | 10,026 | 196,360 | 5.63 | 93.0 |
| 2031 | 2.0 | 8.0 | 894,744 | 21,488 | 2,111 | 19,377 | 11,674 | 227,410 | 5.63 | 88.4 |
| 2032 | 2.0 | 8.0 | 930,439 | 22,322 | 2,572 | 19,750 | 13,436 | 260,597 | 5.63 | 83.9 |
| 2033 | 2.0 | 8.0 | 968,383 | 23,232 | 3,105 | 20,127 | 15,320 | 296,044 | 5.63 | 79.6 |
| 2034 | 2.0 | 8.0 | 1,007,408 | 24,172 | 3,718 | 20,453 | 17,330 | 333,827 | 5.63 | 75.7 |
| 2035 | 2.0 | 8.0 | 1,048,562 | 25,150 | 4,411 | 20,739 | 19,470 | 374,036 | 5.63 | 72.1 |
| 2036 | 2.0 | 8.0 | 1,088,928 | 26,113 | 5,185 | 20,928 | 21,745 | 416,710 | 5.63 | 69.0 |
| 2037 | 2.0 | 8.0 | 1,131,625 | 27,128 | 6,042 | 21,085 | 24,158 | 461,953 | 5.63 | 66.1 |
| 2038 | 2.0 | 8.0 | 1,176,748 | 28,224 | 6,988 | 21,236 | 26,716 | 509,904 | 5.63 | 63.5 |
| 2039 | 2.0 | 8.0 | 1,223,531 | 29,318 | 8,032 | 21,286 | 29,424 | 560,614 | 5.63 | 61.0 |
| 2040 | 2.0 | 8.0 | 1,271,683 | 30,478 | 9,185 | 21,293 | 32,286 | 614,193 | 5.63 | 58.7 |
| 2041 | 2.0 | 8.0 | 1,321,352 | 31,669 | 10,456 | 21,213 | 35,308 | 670,714 | 5.63 | 56.6 |
| 2042 | 2.0 | 8.0 | 1,372,835 | 32,899 | 11,852 | 21,047 | 38,494 | 730,255 | 5.63 | 54.6 |
| 2043 | 2.0 | 8.0 | 1,426,514 | 34,170 | 13,383 | 20,787 | 41,847 | 792,890 | 5.63 | 52.6 |
| 2044 | 2.0 | 8.0 | 1,480,985 | 35,465 | 15,062 | 20,403 | 45,372 | 858,665 | 5.63 | 50.8 |
| 2045 | 2.0 | 8.0 | 1,537,177 | 36,788 | 16,903 | 19,885 | 49,070 | 927,620 | 5.63 | 49.0 |
| 2050 | 2.0 | 8.0 | 1,842,976 | 44,082 | 28,857 | 15,225 | 70,260 | 1,321,792 | 5.63 | 41.5 |
| 2055 | 2.0 | 8.0 | 2,195,459 | 52,491 | 46,277 | 6,214 | 96,035 | 1,799,500 | 5.63 | 35.6 |
| 2060 | 2.0 | 8.0 | 2,612,088 | 62,420 | 69,461 | -7,041 | 126,436 | 2,361,493 | 5.63 | 31.6 |
| 2065 | 2.0 | 8.0 | 3,129,007 | 74,736 | 96,696 | -21,960 | 161,944 | 3,018,134 | 5.63 | 29.4 |
| 2070 | 2.0 | 8.0 | 3,767,678 | 89,917 | 127,899 | -37,981 | 203,838 | 3,793,670 | 5.63 | 28.2 |
| 2075 | 2.0 | 8.0 | 4,533,702 | 108,179 | 164,537 | -56,357 | 253,576 | 4,714,754 | 5.63 | 27.3 |
| 2080 | 2.0 | 8.0 | 5,441,299 | 129,776 | 207,505 | -77,729 | 312,794 | 5,811,675 | 5.63 | 26.8 |
| 2085 | 2.0 | 8.0 | 6,508,854 | 155,214 | 258,009 | -102,795 | 383,417 | 7,120,119 | 5.63 | 26.5 |
| 2090 | 2.0 | 8.0 | 7,773,709 | 185,303 | 316,749 | -131,446 | 467,888 | 8,685,890 | 5.63 | 26.4 |

(1) Returns are net of all investment expenses.

(2) It is assumed that operating expenses incurred in calendar years preceding 2019 will be charged to the additional CPP Account in the calendar year 2019, along with the expenses incurred in that year.

Table 19 Change in Financial Projections Additional CPP after Amendments^(*)
 (2.0% first additional contribution rate, 8.0% second additional contribution rate)

| Year | First Additional Contribution Rate (%) | Second Additional Contribution Rate (%) | Contributory Earnings (\$ million) | Contributions (\$ million) | Expenditures (\$ million) | Net Cash Flow (\$ million) | Investment Income (\$ million) | Assets at 31 Dec. (\$ million) | Return (%) | Asset/ Expenditure Ratio |
|------|--|---|--|-------------------------------|------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|---------------|--------------------------------|
| 2016 | - | - | - | - | - | - | - | - | - | - |
| 2017 | - | - | - | - | - | - | - | - | - | - |
| 2018 | - | - | - | - | - | - | - | - | - | - |
| 2019 | - | - | - | - | - | - | - | - | - | 0.0 |
| 2020 | - | - | - | - | - | - | - | - | - | -0.2 |
| 2021 | - | - | - | - | 0 | 0 | 0 | 0 | - | -0.4 |
| 2022 | - | - | - | - | 0 | -1 | 0 | -1 | - | -0.5 |
| 2023 | - | - | - | - | 1 | -1 | 0 | -1 | - | -0.7 |
| 2024 | - | - | - | - | 2 | -2 | -1 | -4 | - | -1.0 |
| 2025 | - | - | - | - | 4 | -3 | 0 | -9 | - | -1.2 |
| 2026 | - | - | - | - | 6 | -7 | 0 | -15 | - | -1.3 |
| 2027 | - | - | - | - | 9 | -9 | -1 | -26 | - | -1.5 |
| 2028 | - | - | - | - | 14 | -14 | -1 | -41 | - | -1.5 |
| 2029 | - | - | - | - | 20 | -19 | -3 | -64 | - | -1.6 |
| 2030 | - | - | - | - | 27 | -26 | -5 | -94 | - | -1.6 |
| 2031 | - | - | - | - | 35 | -34 | -6 | -135 | - | -1.6 |
| 2032 | - | - | - | - | 44 | -44 | -9 | -188 | - | -1.6 |
| 2033 | - | - | - | - | 56 | -56 | -12 | -256 | - | -1.6 |
| 2034 | - | - | - | - | 69 | -70 | -16 | -342 | - | -1.6 |
| 2035 | - | - | - | - | 86 | -86 | -22 | -450 | - | -1.6 |
| 2036 | - | - | - | - | 104 | -105 | -28 | -581 | - | -1.6 |
| 2037 | - | - | - | - | 124 | -125 | -36 | -742 | - | -1.5 |
| 2038 | - | - | - | - | 147 | -146 | -45 | -935 | - | -1.5 |
| 2039 | - | - | - | - | 171 | -172 | -57 | -1,163 | - | -1.5 |
| 2040 | - | - | - | - | 199 | -199 | -71 | -1,433 | - | -1.5 |
| 2041 | - | - | - | - | 229 | -229 | -87 | -1,748 | - | -1.4 |
| 2042 | - | - | - | - | 262 | -263 | -105 | -2,116 | - | -1.4 |
| 2043 | - | - | - | - | 299 | -299 | -127 | -2,542 | - | -1.4 |
| 2044 | - | - | - | - | 339 | -339 | -152 | -3,033 | - | -1.4 |
| 2045 | - | - | - | - | 384 | -384 | -181 | -3,598 | - | -1.4 |
| 2050 | - | - | - | - | 679 | -679 | -399 | -7,856 | - | -1.3 |
| 2055 | - | - | - | - | 1,115 | -1,115 | -799 | -15,604 | - | -1.2 |
| 2060 | - | - | - | - | 1,717 | -1,716 | -1,488 | -28,846 | - | -1.2 |
| 2065 | - | - | - | - | 2,422 | -2,422 | -2,600 | -50,091 | - | -1.3 |
| 2070 | - | - | - | - | 3,223 | -3,222 | -4,297 | -82,375 | - | -1.4 |
| 2075 | - | - | - | - | 4,164 | -4,163 | -6,803 | -129,875 | - | -1.5 |
| 2080 | - | - | - | - | 5,267 | -5,266 | -10,417 | -198,271 | - | -1.6 |
| 2085 | - | - | - | - | 6,564 | -6,564 | -15,546 | -295,177 | - | -1.8 |
| 2090 | - | - | - | - | 8,079 | -8,079 | -22,731 | -430,780 | - | -2.0 |

(*) The projections shown are the differences between the projections in Tables 18 and 17.

D. Financial Projections of Additional CPP after Amendments with Additional Minimum Contribution Rates

The FAMCR for the year 2023 and thereafter is determined to be 1.98%. It is further determined to be 1.49% in 2022 in accordance with the phase-in of the legislated first additional contribution rate. The SAMCR for the year 2024 and thereafter is determined to be 7.92%.

Table 20 demonstrates that these AMCRs satisfy condition (a) formulated in section III.E of this report. It shows that, as at 1 January 2019, the additional CPP assets under the open group approach are projected to be 106% of the open group actuarial liability and 105% as at 1 January 2029. There are no invested assets as at 1 January 2019, and the total assets are equal to the present value of future additional contributions of current CPP participants and future participants of the amended additional Plan. The actuarial liability is equal to the present value of future additional benefits for current and future participants of the amended additional CPP.

Table 20 Additional CPP Balance Sheet after Amendments as at 1 January 2019 and 2029 (open group approach using AMCRs 1.98%/7.92%)

| | As at 1 January 2019 | As at 1 January 2029 |
|---|----------------------|----------------------|
| | (\$billion) | (\$billion) |
| Assets | | |
| Current Assets | - | 139 |
| Future Contributions | <u>691</u> | <u>999</u> |
| Total Assets (a) | 691 | 1,138 |
| Actuarial Liability ⁽¹⁾ (b) | 649 | 1,082 |
| Asset Excess (Shortfall) (a) – (b) | 42 | 56 |
| Assets as percentage of Liability (a)/(b) | 106.4% | 105.2% |

(1) Liability includes operating expenses.

The financial projections presented in Table 21 are based on the FAMCR of 1.98% for the year 2023 and thereafter and the SAMCR of 7.92% for the year 2024 and thereafter. As shown in the table, the assets to expenditures ratio is very high in the early years due to low expenditures. Eventually, the ratio stabilizes at a level close to 26. This indicates that the FAMCR and SAMCR of 1.98% and 7.92%, respectively, satisfy condition (b) formulated in section III.E of the report.

**Table 21 Financial Projections Additional CPP after Amendments
 using AMCRs 1.98%/7.92%**

| Year | First Additional Minimum Contribution Rate (%) | Second Additional Minimum Contribution Rate (%) | Contributory Earnings (\$ million) | Contributions (\$ million) | Expenditures (\$ million) | Net Cash Flow (\$ million) | Investment Income (\$ million) | Assets at 31 Dec. (\$ million) | Return ⁽¹⁾ (%) | Asset/ Expenditure Ratio |
|------|---|--|--|-------------------------------|------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|------------------------------|--------------------------------|
| 2016 | - | - | - | - | - | - | - | - | - | - |
| 2017 | - | - | - | - | - | - | - | - | - | - |
| 2018 | - | - | - | - | - | - | - | - | - | - |
| 2019 | 0.30 | 0.00 | 524,960 | 1,575 | 106 ⁽²⁾ | 1,469 | 34 | 1,503 | 4.12 | 25.3 |
| 2020 | 0.60 | 0.00 | 545,491 | 3,273 | 60 | 3,213 | 146 | 4,863 | 4.45 | 59.2 |
| 2021 | 1.00 | 0.00 | 567,494 | 5,675 | 82 | 5,593 | 361 | 10,817 | 4.53 | 88.3 |
| 2022 | 1.49 | 0.00 | 590,033 | 8,791 | 122 | 8,669 | 737 | 20,222 | 4.71 | 98.7 |
| 2023 | 1.98 | 0.00 | 614,202 | 12,161 | 205 | 11,956 | 1,276 | 33,455 | 4.75 | 104.8 |
| 2024 | 1.98 | 7.92 | 662,713 | 14,535 | 319 | 14,216 | 2,162 | 49,833 | 5.23 | 111.1 |
| 2025 | 1.98 | 7.92 | 712,036 | 16,951 | 449 | 16,502 | 3,323 | 69,659 | 5.63 | 114.4 |
| 2026 | 1.98 | 7.92 | 739,246 | 17,591 | 609 | 16,982 | 4,455 | 91,096 | 5.63 | 112.1 |
| 2027 | 1.98 | 7.92 | 767,516 | 18,259 | 813 | 17,446 | 5,678 | 114,219 | 5.63 | 107.3 |
| 2028 | 1.98 | 7.92 | 797,132 | 18,953 | 1,064 | 17,889 | 6,996 | 139,104 | 5.63 | 101.9 |
| 2029 | 1.98 | 7.92 | 828,479 | 19,709 | 1,366 | 18,344 | 8,413 | 165,861 | 5.63 | 96.9 |
| 2030 | 1.98 | 7.92 | 860,727 | 20,456 | 1,712 | 18,744 | 9,934 | 194,539 | 5.63 | 92.2 |
| 2031 | 1.98 | 7.92 | 894,744 | 21,273 | 2,111 | 19,162 | 11,564 | 225,265 | 5.63 | 87.6 |
| 2032 | 1.98 | 7.92 | 930,439 | 22,099 | 2,572 | 19,527 | 13,309 | 258,100 | 5.63 | 83.1 |
| 2033 | 1.98 | 7.92 | 968,383 | 22,999 | 3,105 | 19,894 | 15,172 | 293,167 | 5.63 | 78.8 |
| 2034 | 1.98 | 7.92 | 1,007,408 | 23,930 | 3,718 | 20,211 | 17,160 | 330,538 | 5.63 | 74.9 |
| 2035 | 1.98 | 7.92 | 1,048,562 | 24,899 | 4,411 | 20,487 | 19,277 | 370,303 | 5.63 | 71.4 |
| 2036 | 1.98 | 7.92 | 1,088,928 | 25,852 | 5,185 | 20,667 | 21,527 | 412,497 | 5.63 | 68.3 |
| 2037 | 1.98 | 7.92 | 1,131,625 | 26,857 | 6,042 | 20,814 | 23,912 | 457,224 | 5.63 | 65.4 |
| 2038 | 1.98 | 7.92 | 1,176,748 | 27,941 | 6,988 | 20,953 | 26,441 | 504,618 | 5.63 | 62.8 |
| 2039 | 1.98 | 7.92 | 1,223,531 | 29,025 | 8,032 | 20,993 | 29,117 | 554,728 | 5.63 | 60.4 |
| 2040 | 1.98 | 7.92 | 1,271,683 | 30,173 | 9,185 | 20,988 | 31,945 | 607,661 | 5.63 | 58.1 |
| 2041 | 1.98 | 7.92 | 1,321,352 | 31,352 | 10,456 | 20,896 | 34,930 | 663,488 | 5.63 | 56.0 |
| 2042 | 1.98 | 7.92 | 1,372,835 | 32,570 | 11,852 | 20,718 | 38,077 | 722,283 | 5.63 | 54.0 |
| 2043 | 1.98 | 7.92 | 1,426,514 | 33,829 | 13,383 | 20,445 | 41,388 | 784,116 | 5.63 | 52.1 |
| 2044 | 1.98 | 7.92 | 1,480,985 | 35,110 | 15,062 | 20,048 | 44,867 | 849,031 | 5.63 | 50.2 |
| 2045 | 1.98 | 7.92 | 1,537,177 | 36,421 | 16,903 | 19,517 | 48,516 | 917,064 | 5.63 | 48.5 |
| 2050 | 1.98 | 7.92 | 1,842,976 | 43,641 | 28,857 | 14,784 | 69,404 | 1,305,548 | 5.63 | 41.0 |
| 2055 | 1.98 | 7.92 | 2,195,459 | 51,966 | 46,277 | 5,689 | 94,758 | 1,775,319 | 5.63 | 35.2 |
| 2060 | 1.98 | 7.92 | 2,612,088 | 61,796 | 69,461 | -7,665 | 124,577 | 2,326,342 | 5.63 | 31.2 |
| 2065 | 1.98 | 7.92 | 3,129,007 | 73,989 | 96,696 | -22,707 | 159,284 | 2,967,906 | 5.63 | 28.9 |
| 2070 | 1.98 | 7.92 | 3,767,678 | 89,018 | 127,899 | -38,881 | 200,081 | 3,722,809 | 5.63 | 27.6 |
| 2075 | 1.98 | 7.92 | 4,533,702 | 107,097 | 164,537 | -57,439 | 248,325 | 4,615,779 | 5.63 | 26.8 |
| 2080 | 1.98 | 7.92 | 5,441,299 | 128,478 | 207,505 | -79,027 | 305,515 | 5,674,565 | 5.63 | 26.2 |
| 2085 | 1.98 | 7.92 | 6,508,854 | 153,662 | 258,009 | -104,347 | 373,398 | 6,931,485 | 5.63 | 25.8 |
| 2090 | 1.98 | 7.92 | 7,773,709 | 183,450 | 316,749 | -133,299 | 454,177 | 8,427,878 | 5.63 | 25.6 |

(1) Returns are net of all investment expenses.

(2) It is assumed that operating expenses incurred in calendar years preceding 2019 will be charged to the additional CPP Account in the calendar year 2019, along with the expenses incurred in that year.

VI. Uncertainty of Results

This actuarial report is based on the projection of the base and additional CPP revenues and expenditures over a long period of time. The information required by statute, which is presented in sections IV and V of this report, has been derived using best-estimate assumptions regarding future demographic and economic trends. Both the length of the projection period and the number of assumptions required ensure that actual future experience will not develop precisely in accordance with the best-estimate assumptions.

To address this uncertainty in the results, sensitivity tests have been performed relating to the new assumptions on the effects of the child-rearing and disability drop-ins for the additional CPP as described below. All assumptions will be re-examined in the next triennial actuarial valuation of the CPP, taking into consideration both experience as it develops and a reassessment of the long-term view of the Plan.

Due to the uncertainty of the impacts of introducing child-rearing and disability drop-ins for the additional CPP, two sensitivity tests have been prepared assuming impacts on the best average forty years of earnings other than the best-estimate assumptions. Under the lower-cost alternative, the combined impact of the two types of drop-ins on the best average forty years of earnings is assumed to be 50% lower than under the best-estimate assumptions. Under the higher-cost alternative, the combined impact is assumed to be 50% higher than under the best-estimate assumption. Table 22 presents the resulting AMCRs under each of the scenarios.

**Table 22 Sensitivity Tests – Impacts of Child-Rearing and Disability Drop-ins
(Additional CPP)**

| Assumption | Scenario | Additional CPP | | | |
|--|---------------|---|---|--|---|
| | | First Additional Minimum Contribution Rate ⁽¹⁾ | Difference from Best Estimate (basis points) | Second Additional Minimum Contribution Rate ⁽²⁾ | Difference from Best Estimate (basis points) |
| | Best Estimate | 1.98% | | 7.92% | |
| Combined impact of child-rearing and disability drop-ins on best average forty years of earnings | Lower Cost | 1.96% | - 2 bps | 7.84% | - 8 bps |
| | Higher Cost | 2.01% | + 3 bps | 8.04% | +12 bps |

(1) The first additional minimum contribution rate in this table refers to the rate applicable for 2023 and thereafter.

(2) The second additional minimum contribution rate in this table refers to the rate applicable for 2024 and thereafter.

VII. Conclusion

The actuarial projections of the financial state of the Canada Pension Plan presented in this report reveal the following if the CPP is amended as per Division 19 of Part 6 of Bill C-74:

Base CPP

The minimum contribution rate of the base CPP is 9.82% for years 2019 to 2033 and 9.80% for the year 2034 and thereafter. This report confirms that the legislated contribution rate of 9.9% is sufficient to finance the base CPP over the long term. The results show that, under the legislated contribution rate of 9.9%, assets are projected to accumulate to \$598 billion by 2030 and to \$1,442 billion (or 7.2 times annual expenditures) by 2050.

Additional CPP

The first and second additional minimum contribution rates that result in projected contributions and investment income that are sufficient to fully pay the projected expenditures of the additional Canada Pension Plan are, respectively, 1.98% for the year 2023 and thereafter and 7.92% for the year 2024 and thereafter.

This report confirms that the legislated first additional contribution rate of 2.0% for the year 2023 and thereafter and the legislated second additional contribution rate of 8.0% for the year 2024 and thereafter result in projected contributions and investment income that are sufficient to fully pay the projected expenditures of the additional Plan over the long term. Under these rates, assets of the additional Plan are projected to accumulate to \$196 billion by 2030 and to \$1,322 billion by 2050.

VIII. Actuarial Opinion

In our opinion, considering that this 29th CPP Actuarial Report was prepared pursuant to the *Canada Pension Plan*:

- the data on which this report is based are sufficient and reliable;
- the assumptions used are, individually and in aggregate, reasonable and appropriate; and
- the methods employed are appropriate for the purposes of this report.

Based on the results of this valuation, we hereby certify that if the base and additional CPP are amended as per Division 19 of Part 6 of Bill C-74:

- the minimum contribution rate required to finance the base CPP is 9.82% for years 2019 to 2033 and 9.80% for the year 2034 and thereafter.
- the first and second additional minimum contribution rates that result in projected contributions and investment income being sufficient to fully pay projected expenditures of the additional CPP are respectively 1.98% for the year 2023 and thereafter, and 7.92% for the year 2024 and thereafter.

This report has been prepared, and our opinions given, in accordance with accepted actuarial practice in Canada.



Jean-Claude Ménard, F.S.A., F.C.I.A.
Chief Actuary



Michel Montambeault, F.S.A., F.C.I.A.
Senior Actuary



Assia Billig, Ph.D., F.S.A., F.C.I.A.
Senior Actuary

Ottawa, Canada
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IX. Acknowledgements

The following people assisted in the preparation of this report:

Shayne Barrow

Yu Cheng, A.S.A.

Patrick Dontigny, A.S.A.

Sari Harrel, F.S.A., F.C.I.A.

Kelly Moore