

Actuarial Review of the Contributory Pension Fund of Bermuda as of August 1, 2014

FINAL Report

May 10, 2016

Table of Contents

Executive Summary	1
Chapter 1 Introduction	6
Chapter 2 Data & Experience since Previous Review, August 1, 2011	9
Chapter 3 Best-Estimate Assumptions	19
Chapter 4 Best-Estimate Projections	26
Chapter 5 Variant Projections	31
Chapter 6 Conclusions	41
Chapter 7 Statement of Actuarial Opinion	42
Appendix A Main Provisions of Scheme from August 2014	43
Appendix B Benefit and Contribution Rates, 2003 to 2014	45
Appendix C Membership Data	48
Appendix D Financial Data	50
Appendix E Population Projection	52
Appendix F Estimating Methods	57
Appendix G Detailed Results	62
Appendix H Projections of Fund Balance	64
Appendix I Accrued Benefits	71

Executive Summary

This is the actuarial review for the Bermuda Contributory Pension Fund (the “Fund”) as at 1 August 2014 (the “Review Date”). It presents the financial status of the Fund at the Review Date and provides projections of the Fund for the next 50 years to 2064. The last review was done as at 1 August 2011.

During the 3-year review period, 2011 to 2014, although the Bermudian economy experienced negative real GDP growth, the change in real GDP growth over the period was positive, going from -4.4% to -0.4%. Inflation levels also trended downwards going from 2.7% to 2.0% and unemployment was relatively stable averaging 8%, during the review period.

Highlights of the Fund

The financial performance of the Fund over the three years was better than expected due to higher investment returns, lower administrative and investment expenses, lower levels of inflation and lower net benefit / contribution cash outflow. Table 1 shows the comparison of the actual experience with the projected experience from the previous review.

Table 1 Actual vs. Projected Experience

	2012-2014 Projected (millions of \$’s)*	2012-2014 Actual (millions of \$’s)	% Difference
Contribution Income	\$331.3	\$324.6	2% below projected
Investment Income	\$177.4	\$357.8	102% above projected
Benefit Expenditure	\$406.4	\$386.3	4.9% below projected
Admin & Inv. Expenditure	\$32.2	\$25.2	21.7% below projected
July 31 2014 Net Assets	\$1,750.8	\$1,802.3	2.9% above projected
Net Assets-Expenditure Ratio (end of period)	11.7	12.6	7.7% above projected

*Restated in 2014 dollars

- The Fund earned a nominal rate of return of 7.2% per annum and a real rate of 5.0% per annum over the three years since the last review (6.6% and 4.4% if investment and administrative expenses are excluded). This compares with the real rate of return assumption of 3.5% per annum.
- The net assets of the Fund grew 18% over the three years from \$1,532.8 million to \$1,802.3 million. This was 2.9% above the projected value from the previous review.
- Contribution income (\$107.4 million) decreased 8% and benefit expenditure (\$133.7 million) increased 16% over the three years since the last review.

- Total expenses for the three years averaged 0.52% of the average Fund, down from 0.66% over the previous 3 years. Pure administrative expenses averaged 0.24% of the average Fund over the 3 years and were 0.19% of the average Fund at the Review Date. As a percentage of contribution income, total expenses have been relatively stable over the last 10 years at 7.7%.
- The Asset / Expenditure ratio is a static measure of the size of the Fund to annual expenditure or the number of years cover provided by the Fund based on the current annual expenditure. This ratio increased over the three years from 12.3 years to 12.6 years. Compared with 14 other regional social security schemes in a 2013 study, Bermuda's ratio is better than 9 of these countries (average 7.5 years). By comparison, the ratio for the Canada Pension Plan in 2013 was 4.98 years.
- The majority of the Fund's assets were invested at the last review and this continues to be the case at the Review Date. 97.4% of the net assets are invested, with the major investments being equities, hedge funds, bonds and alternative assets.
- Since the last review the Fund's contributor base fell by 3.0%, from 35,913 in the year ending 31 July 2011 to 34,806 in the year ending 31 July 2014.
- Both the benefit and contribution rates remained unchanged during the 3-year review period 2012 to 2014 except contribution rates were increased in August 2012.
- Based on the population projection figures, the old-age support ratio has declined since the last review. The ratio was 4.4 in 2011 and is 3.9 in 2014. The ratio is projected to decline to 1.5 over the next 50 years. The comparative ratio using the actual contributors and beneficiaries of the Fund declined from 3.4 in 2011 to 3.0 in 2014.

A summary of the performance indicators mentioned above is shown in Table 2 below.

Table 2 Fund Performance Indicators

	July 2005	July 2008	July 2011	July 2014
Number of beneficiaries in receipt of monthly benefits	8,733	9,509	10,459	11,568
Average monthly benefit	\$738.74	\$851.37	\$932.56	\$931.56
Number of contributors¹	35,339	37,213	35,913	34,806
Active Insured as a % of Working Age Population	87%	92%	87%	89%
Pensioner Support Ratio: Number of contributors / Number of Beneficiaries	4.0	4.1	3.4	3.0
Old-Age Support Ratio: Population	5.2	4.7	4.4	3.9
Average number of weekly contributions per month	3.86	3.86	3.84	3.55
Weekly Benefit Rate for Contributory Old Age Pension (OAP)¹	\$183.30	\$209.17	\$226.22	\$226.22
Weekly Contribution Rate²	\$25.34	\$28.48	\$30.40	\$32.07
Annual Contribution Income (\$ million)	\$90.60	\$111.90	\$117.30	\$107.4
Annual Benefit Expenditure (\$ million)	\$75.70	\$93.50	\$115.45	\$133.7
Annual Administration & Investment Expenses (\$ million)	\$7.60	\$7.90	\$9.45	\$8.4
Net Assets (Fund) \$ million	\$1,004.4	\$1,297.5	\$1,533.0	\$1802.3
Average Nominal Rate of Return (last 3 yrs)	11.6%	8.0%	6.4%	7.2%
Average Real Rate of Return (last 3 yrs)	8.0%	3.6%	4.2%	5.0%
Annual Expenses as a % of Contributions	8.4%	7.2%	8.5%	7.8%
Annual Expenses as a % of Average Fund	0.81%	0.61%	0.66%	0.49%
Administrative Costs as a % of Average Fund	n/a	n/a	0.3%	0.19%
Net Assets / (Benefits and Expenses)	12.1	12.8	12.3	12.6
Invested Assets / Net Assets	98%	97%	95%	97%

¹The July 2011 figure is the total number of contributors for the 12 month period ending 31 July 2011.

²Rates effective in July of calendar year. The rate increased to \$30.40 in August 2008 and to \$32.07 in August 2012.

Main Findings & Projection Results

- The Fund is projected to increase gradually until 2021 then decline steadily until it is exhausted in 2049 under the best estimate scenario. This is 2 years later when compared to the previous review.

- The total outgo (includes Old Age Pension (OAP) benefits, other benefits, and administration and investment costs) are projected to exceed contribution income throughout the projection period. By the year 2064, contribution income would need to be about 1.25 times the current level in real terms in order to match the increased level of benefit outgo. This would require contributions to be increased by about 2.4% a year more than benefit increases over the next 50 years.
- If contributions were to increase by 3% more than benefits with future real returns of 4% a year and higher, the Fund is projected to be sustainable throughout the projection period. Under scenarios of lower real investment returns and lower contribution rate increases, the Fund is not sustainable in the long term.
- If the contributing population is increased by 10% from 2014 and sustained at these levels thereafter, this is expected to extend the life of the Fund for the entire projection period. For a 10% decrease in the number of contributors, the Fund runs out 6 years earlier.
- An increase in the retirement age to 67 over a 5 year period ending 2023, all else unchanged, could also result in a sustainable Fund over the projection period.
- The total number of beneficiaries over age 65, taking into account the impact of Non-Bermudians, is expected to increase steadily, reaching a peak in about 30 years. Thereafter, a gradual decline in numbers is expected.
- The total number of working age persons (age 20 to 64) is projected to decline gradually resulting in a declining old-age support ratio (3.9 to 1.5 over 50 years).
- Mortality experience shows that Bermudians are living longer than had been previously assumed in the Review. The impact of a change in the mortality assumption to reflect this increase in longevity was a reduction in the life of the Fund by 3 years.

Recommendation

In light of the fact that the current benefit and contribution structure is made up of flat rate amounts and the Government's policy is to increase both rates relative to inflation, with contributions increasing faster than benefits, we recommend that the Government should set a target 'benefit/contribution ratio' as part of the policy. This would ensure that any increases to both amounts would not result in the contribution rate exceeding the benefit rate at any point. The current ratio is 3.5 (226.22/64.14). Under the best estimate assumption of contributions increasing at 2.5% more than benefits, we applied the increase up to the year 2030 at which point the ratio was 2.5 and applied a 1.75% increase thereafter. In 2064 the ratio of benefit to contribution is projected to be 1.42. Had a 2.5% increase applied throughout the 50 years the ratio would be 1.12.

The projected contribution rates should also be compared to projected national average wages to ensure that they are feasible and affordable.

Accrued Benefits

The present value of benefits accrued up to 31 July 2014 is estimated to be \$2.3 billion. This is based on the contributions made to that date and assumes no further increases to the benefit rate. If future

increases to the benefit rate are included and assuming no further contributions, the present value of these benefits increases to \$3.7 billion at the same date. If expected future benefit accruals are included up to the respective retirement dates, assuming benefit increases at the rate of assumed inflation of 3% per annum, the present value of both accrued and future liabilities is estimated to be \$5.8 billion. The present value of future contributions in respect of the future benefit accruals, assuming increases in the contribution rate of 2.5% above inflation up to 2030 and 1.75% above inflation thereafter, is estimated to be \$1.8 billion. These future contributions together with current assets total \$4.0 billion.

These calculations are only in respect of existing beneficiaries and the working population age group as at the Review Date. No new entrants into the Fund are assumed. All dollar amounts are quoted in 2014 Bermudian dollars.

Table 3 Funded ratios

\$'billions	Accrued Benefits (no increases)	Projected Accrued Benefits	Projected Future Benefits
Total Liabilities	2.3	3.7	5.8
Present Value of Future Contributions	-	-	2.2
Current Fund Value	1.8	1.8	1.8
Total Fund Value	1.8	1.8	4.0
Ratio: Fund Value / Liabilities	78.5%	48.4%	68.7%

The Fund is estimated to be 78.5% funded on an accrued basis (no benefit increases) and 48.4% if benefits are assumed to increase at 3% per annum. If benefits continue to accrue and contributions are made assuming increases to both, then the Fund is estimated to be 68.7% funded. Note that the Fund is not designed around a policy of full funding but one of sustainable funding, that is, contribution and investment income is sufficient to meet benefits and administrative expenditure on an ongoing annual basis.

The present value of future pension payments for the next 10 years for existing beneficiaries is estimated to be \$885 million.

The present value of gratuities expected to be paid over the next 10 years, assuming contribution rates increase at 2.5% a year in excess of benefit increases is estimated to be \$28 million.

Chapter 1 Introduction

We have conducted an actuarial review of the Contributory Pension Fund (the “Fund”) as at 1 August 2014 as requested by the Bermuda Department of Social Insurance (the “Department”). An actuarial review is required every third year by Section 35 of the Contributory Pensions Act, 1970 (the “Act”). The last review was performed as of 1 August 2011 by Morneau Shepell Ltd and the results were presented in our report dated September 2013.

The Act came into effect on 24 December 1970 replacing a repealed Act dated 5 August 1968. Since the last review, there were no significant amendments to the Act aside from amendments to change benefit and contribution amounts.

Under the Act, two classes of benefits are payable:

Contributory benefits: old-age pension and gratuity, widow(er)’s allowance and gratuity, and disability pension;

Non-contributory benefits: old-age pension, and disability pension.

Entitlement to contributory benefits depends on the period for which contributions are paid and on the annual average number of contributions (subject to a minimum contributory period and a minimum annual average). Non-contributory pensions are payable to those ineligible for contributory benefits, subject to certain qualifying criteria. The normal pension age for payments is 65 for both men and women.

Flat-rate contributions are payable by employed persons over school-leaving age, which is defined in the Act as age 18 or later. An equal contribution is payable by the employer. Self-employed persons pay flat-rate contributions equal to the joint amount payable by an employee and employer.

Appendix A summarises the main provisions relating to benefits and contributions.

Benefit and contribution rates are reviewed annually, taking into account the annual increase in prices, as measured by the Consumer Price Index (CPI) in the calendar year prior and the inflation outlook for the near term. Increases to benefits and contributions come into effect from August each year. Since August 2006, the Government’s policy intent for the Fund has been to increase benefit rates broadly in line with prices and contribution rates at 1.75% a year more than benefits (prices). However, contribution rates were frozen from 2009 to 2011. Contribution rates were increased by 5.5% in August 2012 with no further increases thereafter. A policy decision was announced in 2010 to increase contributions by 2.5% a year more than benefits. Table B1 of Appendix B summarises price inflation and benefit and contribution increases in the period since August 2001. Table B2 summarises the rates of benefits and contributions payable in the years commencing August 2001 to August 2014. This report takes account of the benefit and contribution rates that were in effect in August 2015 (same rates as in August 2014).

All dollar amounts in this report are quoted in 2014 Bermudian dollars.

1.1 Purpose of the Report

The report is prepared in compliance with Section 35(1) of the Act. The purpose is to examine the financial condition and long-term sustainability of the Fund and to investigate the potential financial implications of future contribution and benefit increases for the Fund.

1.2 Scope of the Report

The main purpose of the review is to assess the implications for future contribution rates of maintaining benefits at their present levels in real terms. We understand that the Government intends to increase benefit rates in the future broadly in line with increases in the Consumer Price Index, with contribution rates increasing at 2.5% a year more than benefits. This therefore constitutes the central long-term policy assumption for this review, with consideration for the impact of this policy on the relationship between the contribution rate and the benefit rate. This is further discussed in Section 3 of the report.

The review includes projections of contribution income and expenditure (on benefits, administration and investment), projections of the Fund balance (allowing for an assumed rate of investment return), and projections of the number of years' outgo secured by the Fund. A projection period of 50 years has been used for the review.

The review is based on a long-term population projection, which includes another important indicator of the likely longer-term development of the Fund, namely the projected ratio of the number of contributors to the number of pensioners. This ratio, known as the "Pensioner support ratio", reflects the maturity of the Fund and the impact of demographic changes.

It is important to recognise that the financial projections for future years are based on reasonable assumptions but they should not be taken as forecasts of the outcome. The projections should be updated at successive actuarial reviews in light of the latest information available. In order to indicate the sensitivity of the results to changes in the main assumptions, the review includes alternative projections. These consider the effects of:

- increasing contribution rates at a lower rate of 1.75% per annum more than benefits and at a higher rate of 3% per annum more than benefits;
- assuming a higher (4%) and lower (2%) real rate of investment return on the Fund's assets;
- increasing the number of contributors by 10% over the projection period;
- decreasing the number of contributors by 10% over the projection period;
- granting gratuities equal to employees' contributions only; and
- increasing the retirement age to 67

Finally, the report includes an assessment of the estimated value of accrued benefits as at the effective date of the review. This is included in Appendix I, together with an estimate of the corresponding funding level at the review date.

The effective date of the review is 1 August 2014. The financial projections are expressed in terms of the benefit and contribution rates applicable from August 2014.

1.3 Result of Previous Review

The previous actuarial review was conducted as at 1 August 2011. The main financial projections were expressed in terms of the benefit and contribution rates in effect at August 2011. Benefits were assumed to increase in line with changes in the assumed Consumer Price Index (CPI) for future years.

The main results of the 2011 review indicated that, if contributions were to increase at a rate 1.75% more than the increase in benefits and the Fund were to earn a real return of 3.5% a year then the Fund would be likely to increase for about 9 years, and thereafter, decline and be exhausted within 36 years in 2047. Under variant scenarios of investment returns and contribution and benefit rates, the Fund is projected to be sustainable in the short to medium term. Longer term Fund sustainability was exhibited under scenarios where contribution rate increases exceeded benefit rate increases by 3% per annum, all other assumptions remaining unchanged.

Although the funding policy for the Fund is one of 'pay-as-you-go', which is typical of most social security schemes, we are also asked to provide an estimated funded position to determine what level of accrued benefits can be provided by the current fund, for the current population and beneficiaries. In the previous review this figure was 42.7%.

Chapter 2 Data & Experience since Previous Review, August 1, 2011

2.1 Data

During the period since the last review, the Department installed a new administration system and for the first time, data was provided in a seriatim (individual) form in EXCEL spreadsheets. For beneficiaries, data covering the period 1 August 2011 to 31 July 2014 was received. For contributors, a record of every contributor who is not yet in receipt of a benefit as of the review date was provided.

We were also provided with an Excel file from the Department of Statistics showing 'Jobs by Age Group and Bermudian Status of Job Holder, 2014'.

We also availed ourselves with Labour Force and Population statistics up to 2014 from the Department of Statistics website.

The data was checked for reasonableness by comparing the expected contributions and benefits from the data provided with the contributions and benefits recorded in the draft accounts.

We were also provided with copies of unaudited accounts for the years ending July 31 2012 (with 2011 comparison), 2013 and 2014. The statements included '*Balance Sheet Previous Year Comparison*' and '*Profit & Loss Previous Year Comparison*'.

2.2 Economic Experience

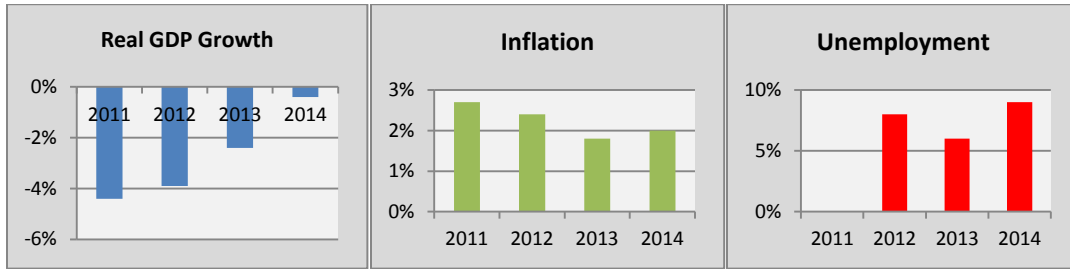
The Fund's two main sources of income, contributions and earnings on investments, are closely linked to economic performance and labour market changes. Benefits are also affected by economic changes as both benefit and contribution rates are adjusted on an ad hoc basis relative to annual inflation.

As shown in the charts in Figure 1.1, the Bermudian economy saw an improvement in economic activity since the last review in 2011 as real GDP performance improved (although still negative) from -4.4% in 2011 to -0.4% in 2014.

Inflation (annual average Consumer Price Index) declined from 2.7% in 2011 to 2% in 2014, reaching its lowest level at 1.8% in 2013.

Unemployment rates have been reasonably steady around 7% to 9% from 2012 to 2014, with no credible data source for 2011.

Figure 2.1 Key Economic Indicators, 2011 to 2014



2.3 Fund Experience

2.3.1 Contributions and Benefits

Table C1 of Appendix C summarises the numbers and total amount of benefits paid for the period 1 August 2011 to 31 July 2014 and, for comparison, for the period 16 August to 15 September 2011. Table C2 of Appendix C summarizes the average amount of benefits paid in 2014 and 2011.

The largest group of beneficiaries was receiving contributory old-age pensions. There were 8,768 such beneficiaries in August 2014, compared to 7,739 in August 2011, an increase of 13.3% over the period. In addition, the average amount of benefits paid remained unchanged, due to no benefit increases being awarded over the 3 year period.

The total number receiving non-contributory old-age pensions increased slightly over the period since the previous review (1.4%). A spouse's allowance was in payment to 1,142 widows and 100 widowers in August 2014, compared to 1,143 and 96 respectively in August 2011 (increases of 0% and 4% respectively). The number receiving contributory disability benefits increased from 161 to 187, and for non-contributory disability benefits, the number also increased, from 257 to 293.

Figure 2.2 Average benefits and number of beneficiaries

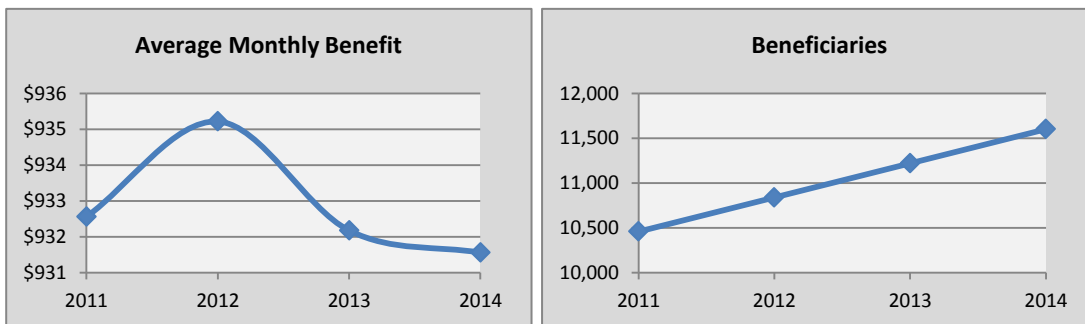


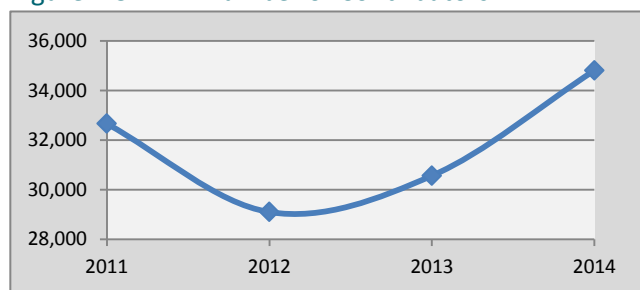
Table C3 of Appendix C summarises the number of persons earning one or more contributions, and the average number of weekly contributions per month earned, for the 12 month periods ending 31 July 2012 to 2014. The actual number of persons earning one or more contributions decreased by 3% over

the 3 years since the previous review, going from 35,913 in the year ending July 2011 to 34,806 in the year ending July 2014. The average number of weekly contributions per month declined from 3.84 to 3.55 over the three years.

We note that the individual data provided indicated a significant decline in the number of contributors in 2012. This is consistent with initial figures provided in 2011 of the order of 25,000 contributors. The revised figure of 35,913 in 2011 may have been reflective of persons who were not yet in receipt of benefits and who would have made contributions at any time during their working life but who would not have necessarily made a contribution in the year ending 31 July 2011. The individual data supports the lower number of actual contributors in 2012.

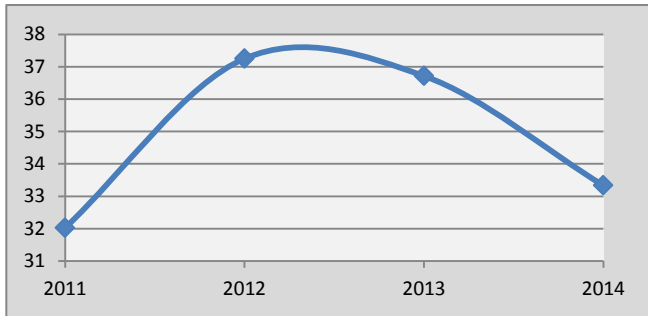
Table C4 presents an age distribution of the number of contributors for July 2012, 2013, 2014. The increasing trend in the number of contributors is consistent with the improvement in real GDP performance shown in Figure 2.1.

Figure 2.3 Number of Contributors



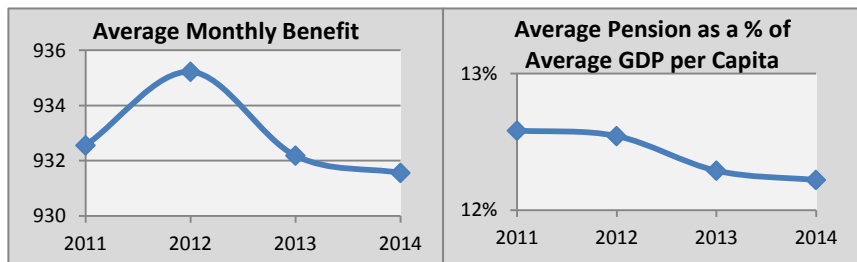
Social Security schemes are designed on the premise that the contributions from the working population together with investment income would be sufficient to pay benefits in any one year. The pensioner support ratio gives an indication of the number of persons in receipt of benefits relative to the number of contributors in the Fund. An increasing trend in this ratio indicates a higher likelihood that contributions would need to be increased above what is currently in place and a declining trend, the opposite. The experience of the Fund shows a declining trend in this ratio. Figure 2.4 shows that the ratio of beneficiaries per 100 contributors has declined from 37 in 2012 to 33 in 2014.

Figure 2.4 Beneficiaries per 100 Contributors



Average pensions divided by average insurable earnings is often referred to as the replacement ratio. As there is no insurable wage defined under the Act, we have used GDP per capita as a comparative reference. This ratio decreased marginally from 13% to 12% between 2011 and 2014 indicating that average pensions are not increasing at the same rate as average GDP per capita. The average GDP per capita increased from \$7,411 to \$7,623 from 2011 to 2014 while the average pension benefit in payment remained relatively unchanged (\$932.56 to \$931.56) over the same period due to no increases to benefit rates.

Figure 2.5 Average GDP per Capita & Pensions in Payment, 20011 to 2014



2.3.3 Fund Income and Expenditure

The following table provides summary income and expenditure amounts for 2011 to 2014. A more detailed version of the Fund's finances for these years may be found in Appendix D.

Table 2.1 Summary of Fund's Income and Expenditure, 2011 – 2014 (millions of \$'s)

	2011	2012	2013	2014
Income				
Contributions	117.3	107.6	109.6	107.4
Investment (net)	103.9	38.9	146.4	220.7
Net Change in FV of Investments	123.0	(21.6)	0.8	(27.6)
Transfers / Other	(0.3)	0.1	(0.7)	0.7
Total	343.9	125.0	256.1	301.2
Expenditure				
Benefits	115.5	123.1	129.4	133.8
Administrative and Investment	9.4	8.4	8.4	8.4
Bad Debt Provision	0.0	0.4	0.4	0.4
Total	124.9	131.9	138.3	142.6
Excess of Income over Expenditure	219.0	(6.9)	117.8	158.6
Net Assets (end of year)	1,532.8	1,525.9	1,643.7	1,802.3
Gross Assets (end of year)	1,580.4	1,565.9	1,679.0	1,831.0

Figures may not sum due to rounding

Key highlights of income and expenditure are:

- (i) Contributions (on an accrual basis) were relatively stable over 2012 to 2014. There was no increase in the contribution rate during that period. The decline from 2011 was due to the decline in the number of employed persons.
- (ii) Total Investment income was volatile.
- (iii) Total administrative costs have been relatively stable during the inter-valuation period. Included in these costs are Investment Managers' fees of \$4.5m, \$4m and \$5m for the three years 2012 to 2014, respectively.
- (iv) Benefit expenditure increased each year due to the increase in the number of beneficiaries.

(v) In 2011, contribution income exceeded benefits. This trend was reversed in 2012 to 2014. Total income exceeded total expenditure in 2011 but was negative in 2012 due to reduced investment income. This trend was reversed and increasing in 2013 and 2014.

(vi) Net Assets increased 18.1% over the three years.

2.4 Investments

As at 31 July 2014, the market value of the net assets was \$1.802 billion, approximately 13.5 times the benefit outgo in the year ending 31 July 2014. As at 31 July 2011, the corresponding figure was 13.3. If total outgo is considered, the coverage ratio in 2014 drops to 12.6. This means that the assets in the Fund at their current value can cover approximately 12 to 13 years of 2014 benefit payments. Table 2.2 shows the coverage ratios using both Total and Net Assets.

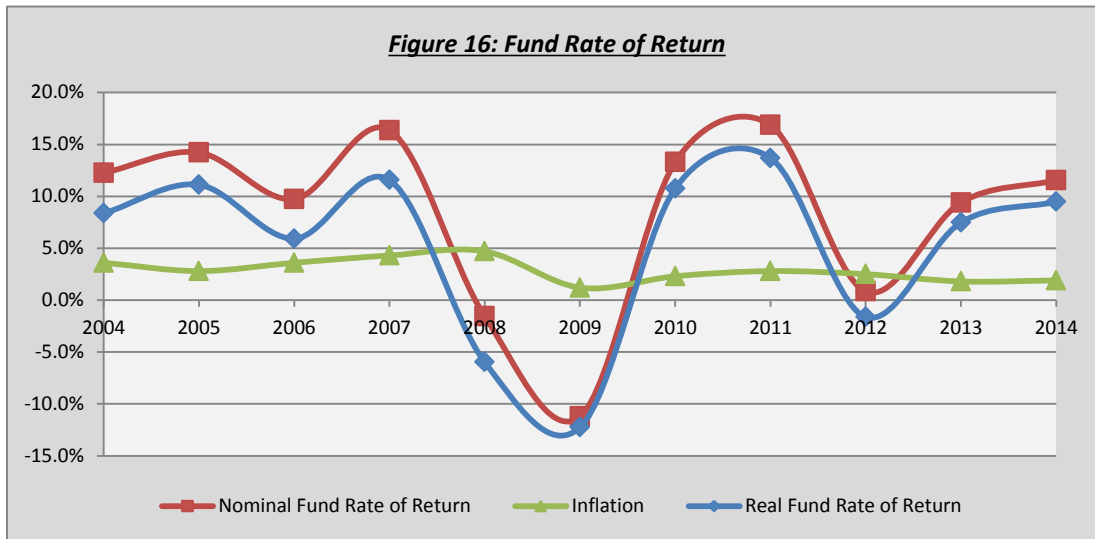
Table 2.2 Years of Benefit Coverage

	2011	2012	2013	2014
Net Assets (end of year)	1,532.8	1,525.9	1,643.7	1,802.3
Benefits	115.5	123.1	129.4	133.8
Total Outgo	124.9	131.9	138.3	142.6
Net Assets / Benefits	13.3	12.4	12.7	13.5
Net Assets / Total Outgo	12.3	11.6	11.9	12.6

Over the three years ended 31 July 2014, the average nominal rate of return earned on the Fund was 7.2% per annum. Allowing for price inflation over the same period, the average real rate of return earned on the Fund over the three years ended 31 July 2014 was 5.0% per annum (see Table D3 of Appendix D). Returns were low in 2012 (real return -1.6%) but high in 2014 (real return 9.5%).

Over the ten years ended 31 July 2014, the average nominal rate of return earned on the Fund was 7.6% per annum. Allowing for price inflation over the same period, the average real rate of return earned on the Fund over the ten years ended 31 July 2014 was 4.7% per annum. This exceeds the long term real rate of return of 3.5% assumed in this review.

Figure 2.6 Fund rate of return, 2004 to 2014



The relationship between investments and net assets, which measures how efficiently available funds are invested, averaged 98% over the 3-year review period. This ratio indicates that there is a very high level of efficiency in the investment of the funds. Table D2 provides a breakdown of the total assets in the Fund.

The Investments of the Fund are guided by a Statement of Investment Policy & Procedures (last updated in 2010) which sets out investment objectives and guidelines for the Fund and defines the management structure and monitoring procedures for both internal and external investment management. It also includes a desired asset allocation policy for the Fund. The following table shows the asset mix at June 2011 and 2014 compared with the target ranges. The invested asset allocation has been relatively stable with shifts among the asset categories still aligned with the target investment asset mix.

Figure 2.7 Invested Asset Allocation June 2011

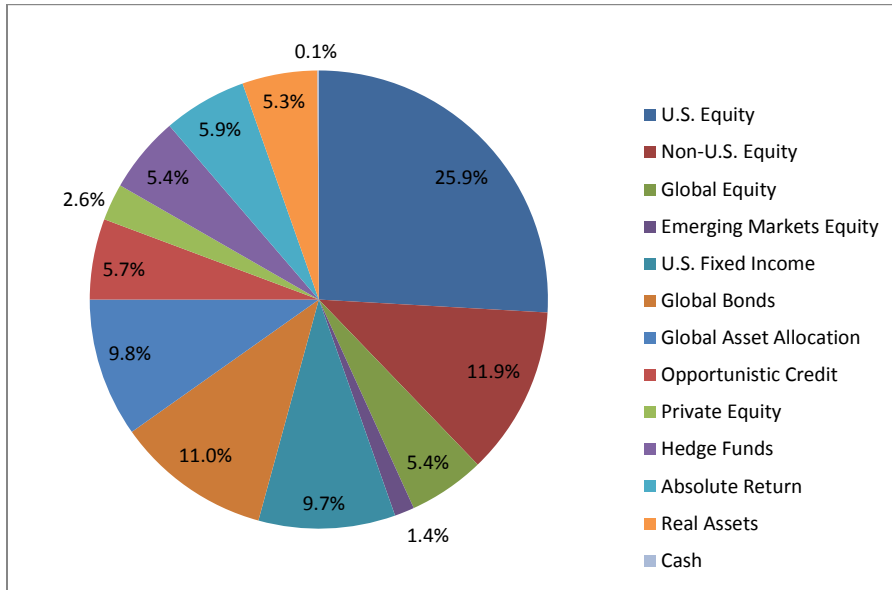


Figure 2.8 Invested Asset Allocation June 2014

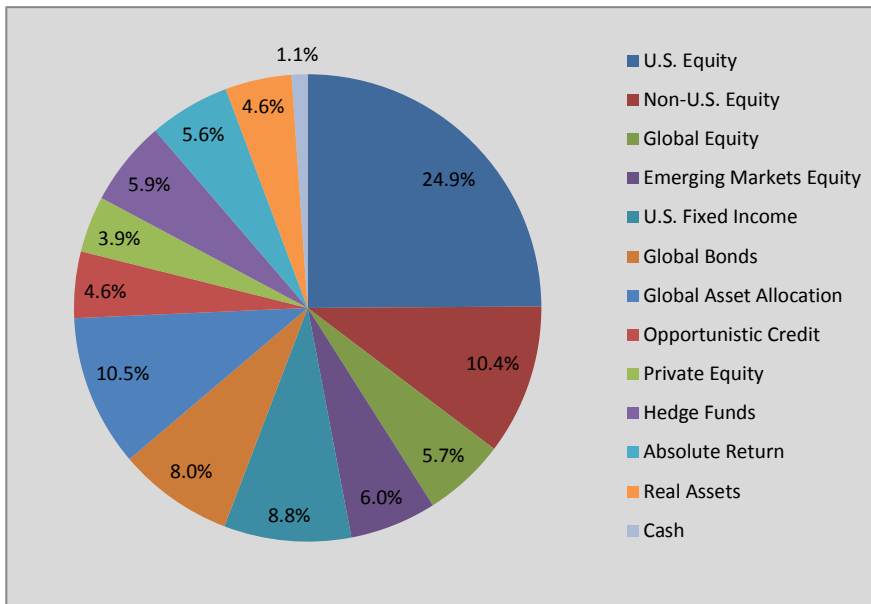


Table 2.3 Actual and Target Asset Allocation June 2011 and 2014

Invested Asset Category	2011	2014	Target
U.S. Equity	25.9%	24.9%	24%
Non-U.S. Equity	11.9%	10.4%	10%
Global Equity	5.4%	5.7%	5%
Emerging Markets Equity	1.4%	6.0%	6%
U.S. Fixed Income	9.7%	8.8%	10%
Global Bonds	11.0%	8.0%	9%
Global Asset Allocation	9.8%	10.5%	10%
Opportunistic Credit	5.7%	4.6%	5%
Private Equity	2.6%	3.9%	5%
Hedge Funds	5.4%	5.9%	6%
Absolute Return	5.9%	5.6%	5%
Real Assets	5.3%	4.6%	5%
Cash	0.1%	1.1%	0%

Source: Investment Performance Reports June 30

2.5 Experience Compared With Projections from Previous Review

Shown below is a comparison of actual cumulative experience over the 3-year period with the projections of the main “best-estimate” scenario of the previous Actuarial Review.

Table 2.4 Projections from Previous Review Compared With Actual Experience

	2012-2014 Projected (millions of \$'s)*	2012-2014 Actual (millions of \$'s)	% Difference
Contribution Income	\$331.3	\$324.6	2% below projected
Investment Income	\$177.4	\$357.8	102% above projected
Benefit Expenditure	\$406.4	\$386.3	4.9% below projected
Admin & Inv. Expenditure	\$32.2	\$25.2	21.7% below projected
2013 Year-end Net Assets	\$1,750.8	\$1,802.3	2.9% above projected
Net Assets-Expenditure Ratio (end of period)	11.7	12.6	7.7% above projected

*Restated in 2014 dollars

The results show that contribution income and benefit expenditure were slightly lower than expected due to no increases during the period. Administrative and Investment expenditure was lower than

expected. Of the \$25.2 million, \$11.5 million is attributable to pure administrative cost over the three years. Investment income was significantly higher than projected by 101%. The assumed real rate of return on the Fund assets was 3.5% for 2012 to 2014. The actual average real rate of return over the three years was 5.0% (5.3% if investment expenses are not deducted from investment income, as in the projections). Inflation was assumed to be 3% while average inflation for the three years was 2.1%. The overall result is a higher than projected Fund value.

2.6 Subsequent Events

This report is being prepared in March 2016. Contribution and benefit rates remain unchanged from 2014 and we have therefore taken this into consideration.

Subsequent to the Review Date, implementation of the new administration system was completed and individual data records were provided for this review compared to grouped data for prior years.

As a result of having individual historical data, a mortality study was performed prior to completing the review which produced results showing that the mortality experience of participants in the Fund was lighter than had been assumed in previous reviews. That is, persons are living longer than had been assumed. We understand that the Government is implementing a number of strategies to reduce the incidence of non-communicable chronic disease ('NCD'), better manage existing NCDs, and restructure the health system financing to promote better continuity of care and more efficient use of resources. The ultimate goal is a healthier population which, if attained, should see the mortality rates continue to improve.

In conducting this review we have taken this increase in longevity into consideration in setting the mortality assumption.

Chapter 3 Best-Estimate Assumptions

Many demographic and economic factors, such as changes in the size and age structure of the population, economic growth, employment and inflation, influence the Fund finances. Therefore, to best assess the Fund's long-term costs and sustainability, projections of Bermuda's total population and the economy are required. For this review 50-year projections have been performed.

In developing the assumptions used for the projections, historical trends and reasonable future expectations, as well as the interrelationships between the various assumptions, have been taken into account. Core projections have been performed using assumptions that reflect best estimates. The demographic and financial projection results based on this assumption set is referred to throughout this report as "*Best Estimate*."

Given the uncertainty inherent in forecasting long periods, projections using additional sets of assumptions that vary contribution income and outgo (benefits and expenses); and the progression of the Fund balance allowing for investment returns, hereinafter referred to as "*Variant*" have also been performed. These alternative projection sets encompass assumptions that are generally more optimistic and more pessimistic than best-estimate assumptions. Results of the Best Estimate, Variant and Alternative scenarios are presented in Chapters 5 and 6 respectively.

3.1 Demographic Assumptions

This section describes the estimating methods and demographic assumptions adopted for the review. We have used the same methodology that was used in the previous review, except where noted.

3.1.1 Population projections

We produced a long-term population projection for the 50-year period covered by the review (2015 to 2064). The baseline population for the long-term projection is taken from the 2010 census, which showed total numbers of males and females split into five-year age groups. Appendix E contains a description of the assumptions adopted for the projection and the results.

Table 3.1 summarizes the results of the projection as well as the projected ratio of the number of working age to the number over pension age, commonly known as the "old-age support ratio".

Table 3.1 Projected Population 2014 - 2064 (Males and Females)

Males and Females						
As at 31 July	Births	Ages 0-19	Ages 20-64	Ages 65+	Total	Old-age support ratio
2014	652	13,239	41,368	10,484	65,091	3.9
2019	608	13,236	39,935	12,739	65,909	3.1
2024	573	12,912	37,696	15,868	66,476	2.4
2029	559	12,333	35,156	18,984	66,473	1.9
2034	556	11,686	33,325	20,902	65,914	1.6
2039	554	11,298	31,481	22,092	64,871	1.4
2044	544	11,092	29,923	22,327	63,341	1.3
2049	522	10,947	28,292	22,117	61,356	1.3
2054	494	10,718	27,521	20,792	59,030	1.3
2059	472	10,365	27,101	19,125	56,591	1.4
2064	460	9,946	26,706	17,665	54,317	1.5

The population over pension age is expected to rise steadily over the next 30 years, at which point it is projected to be more than double the current population over pension age. Thereafter the over pension age population is projected to stabilise, and then gradually decline.

The under age 65 population is expected to decline, gradually at first but more quickly towards the end of the projection period. This decline is due to a combination of the projected continuation of a low birth rate and little or no economic growth. The 2010 census report projected a population of 61,777 as at July 1, 2014 which compares to an estimated figure of 65,091 produced by the Department of Statistics.

The old-age support ratio is a particularly useful indicator of future trends, and Table 3.1 shows a steady fall in the ratio. As at August 2014, there were 3.9 people of working age per pensioner but, over the next fifty years or so, this ratio is projected to fall to 1.5.

3.1.2 Projected Contributors and Beneficiaries

The results of the 50-year population projection are used to project the numbers of contributors (and the number of weekly contributions) and beneficiaries. Appendix F describes the methods and assumptions adopted for this purpose. The assumptions generally reflect the recent experience but with some modifications for the longer-term. The following paragraphs summarise the projected numbers of contributors (and the number of weekly contributions) and beneficiaries. It should be noted that the projections are subject to increasing uncertainty in later years.

3.1.3 Projected Numbers of Contributors and Contributions

The projected numbers of weekly contributions are based on the projected numbers of contributors and the assumed average annual number of weekly contributions per contributor. The projected number of contributors is derived by applying age-specific factors to the projected population in 5-year age groups, with the factors representing the long-term assumed proportions of the population in each age group that will contribute to the Fund. It has been assumed that the proportion of contributors in each 5-year age group will be similar to that obtained from the data provided for the 12 month period ending 31 July 2014. Table 3.2 summarizes the projected number of contributors to the Fund.

Note that the number of contributors considers that persons from all three age groups contribute to the Fund as well as persons who are no longer in the population and have left Bermuda but who are still entitled to a future benefit. Table 3.2 indicates that the projected total number of contributors decreases gradually over the projection period to about 75% of the 2015 figure.

The projected number of weekly contributions paid in a year is based on the projected number of contributors multiplied by the average number of weekly contributions paid by each contributor. Depending on the beneficiary category, each contributor is assumed to contribute, on average, the number of weekly contribution that is consistent with the average benefit for that benefit category.

Table 3.2 Projected numbers of contributors

Year ending 31 July	Males	Females	Total
2015	17,676	17,277	34,953
2019	17,654	17,256	34,910
2024	17,607	17,235	34,842
2029	17,375	17,044	34,419
2034	16,522	16,237	32,759
2039	15,837	15,594	31,431
2044	15,000	14,798	29,798
2049	14,352	14,184	28,536
2054	13,727	13,589	27,316
2059	13,392	13,279	26,671
2064	13,153	13,063	26,216

3.1.4 Average Age of Contributors

Table 3.3 summarises the projected average age of future working age contributors to the Fund at five-year intervals over the projection period. The average age increases initially to year 2024 from 44.3 years to 45.7 years and then declines gradually thereafter to 44.2 years in 2064.

Table 3.3 Projected average age of future contributors

Year ending 31 July	Males	Females	Overall
2015	44.3	44.2	44.3
2019	45.2	45.1	45.1
2024	45.7	45.7	45.7
2029	45.6	45.5	45.6
2034	45.2	45.1	45.2
2039	44.9	44.9	44.9
2044	44.4	44.6	44.5
2049	44.1	44.4	44.2
2054	43.8	44.0	43.9
2059	43.9	43.9	43.9
2064	44.2	44.0	44.1

3.1.5 Benefits and Beneficiaries

The projected amounts of benefits are based on the projected number of beneficiaries (contributory and non-contributory) and the average benefit payable. The distribution of benefits among the population differs from the previous review as the seriatim data was used to inform the revised distribution. Appendix F gives details of the distribution of benefits among the population.

Table 3.4 summarises the projected total numbers of beneficiaries in receipt of contributory and non-contributory old age pension.

Table 3.4 Projected numbers of Beneficiaries (aged 65 or over)

Year ending 31 July	Males	Females	Total
2015	4,867	6,418	11,285
2019	5,817	7,370	13,187
2024	7,242	9,185	16,427
2029	8,784	10,869	19,652
2034	9,789	11,850	21,638
2039	10,464	12,405	22,869
2044	10,633	12,480	23,113
2049	10,508	12,388	22,895
2054	9,784	11,740	21,524
2059	8,937	10,861	19,798
2064	8,226	10,061	18,287

Table 3.4 indicates that the total number of beneficiaries (contributory and non-contributory) over age 65 is expected to increase steadily, reaching a peak in about 30 years. Thereafter, a gradual decline in numbers is expected.

The male to female ratio of over 65 beneficiaries is reflective of the ratio that exists at the Review Date. The impact of higher male mortality has also resulted in a higher number of females than males in this age grouping.

3.2 Financial Assumptions

The results are shown at constant 2014 price levels. The projections allow for the assumed increases in benefits and contributions, and are then deflated by the assumed rate of price increases. The review takes into account the actual benefit and contribution rates in effect from August 2015 (same as August 2014).

The main financial assumptions are the rates at which benefits and contributions will increase (relative to prices) from August 2014, the real rate of investment return (in excess of price increases) and rate of increase of the administrative and investment expenses. It is not necessary to make an explicit assumption in respect of future price increases because the assumed increases to both benefit and contribution rates are expressed relative to price increases.

3.2.1 Increases to Benefit and Contribution Rates

It has been assumed that, over the long-term, benefits will increase in line with prices. Contributions have been projected on three assumed rates of increase, as follows:

- (a) a rate of 1.75% a year more than benefits (i.e. price increases plus 1.75%);
- (b) a rate of 2.5% a year more than benefits (i.e. price increases plus 2.5%); and
- (c) a rate of 3% a year more than benefits (i.e. price increases plus 3%).

For this review, contributions are assumed to increase at the above rates until the year 2030 and thereafter the increase is assumed to be 1.75% more than price increases. This approach is taken so that the projected contribution rate does not surpass the benefit rate and that the ratio of the benefit rate to the contribution rate is approximately 2.5 times under the base scenario (b) above. The current ratio of benefit rate to contribution rate is 3.53. When benchmarked against countries such as Canada and the US, their current ratio of maximum benefit to contribution rate is approximately 2.5. For other Caribbean countries, except Trinidad and Tobago, this ratio is significantly lower than 2.5.

3.2.2 Real Rate of Investment Return

The investment of the assets is overseen by the Bermuda Public Funds Investment Committee ('PFIC'). The assets in the CPF are pooled with Bermuda's largest public sector pension fund for investment purposes. The investment is guided by an investment policy and the investments are undertaken by a number of investment managers. As part of the actuarial review, the PFIC provides the actuaries with a 30 year projection of returns for each asset class which is prepared by the firm NEPC, LLC, an investment consulting firm. Based on the target asset mix of the CPF, an expected long term rate is developed. As the projections are for more than 30 years one would expect that the further into the future the projection, the less certainty is given to the future rate, so we expect the rate to be less than that used for a 30-year projection.

Using the NEPC's '2014 30-year return forecast' of the geometric expected returns and the target investment mix, the projected rate of return on the Fund is 6.674%. The NEPC projects a 5-7 year inflation of 3% and 3.25% for their 30 year projections. We have therefore maintained the best estimate assumption of 3% CPI and 3.5% real rate of return for this review. We note that the real rate of return over the last 10 years was 4.7%. The assumed real rate of return of 3.5% a year is the same as that in the previous review.

Alternative projections of the Fund balance have been carried out using assumed real rates of return of 2% a year and 4% a year. This seems a reasonable range for the real rate of return in view of the returns achieved over the past decade.

3.2.3 Administration and Investment Expenses

For the purposes of the review, we have assumed that administration and investment expenses will increase at a rate of 1.5% a year in excess of price increases. Total expenses for the year ending 31 July 2014 amounted to \$8.4 million. Pure Administrative expenses totalled \$3.3 million as stated in the financial statements. The remaining expenses relate to investment management charges and custodial fees. It is also expected that Administration expenses may decline in the future after the

implementation of a new administration system but no credit has been taken for this in the projections. Appendix F includes a further explanation of the assumed level of administration and investment expenses.

Chapter 4 Best-Estimate Projections

The Fund is projected to increase gradually until 2021, and then decline until it is depleted in 2049 under the best estimate assumptions. That is, contributions increase 2.5% more than benefits until 2030 and by 1.75% more than benefits, thereafter and contributor levels remain at the 2014 levels as a percentage of the working age population. Investment returns of 3.5% per annum in excess of inflation are also assumed. In the previous review the Fund was expected to be exhausted in 2047. There are several contributing factors which, when combined, have produced these results. These factors are as follows:

- The investment performance of the Fund was on average above expectations over the three years 2012 to 2014. The net real return of the Fund over the 3 year period up to the Review Date was 5.0% per annum (5.3% gross of investment charges which are provided for in the Administrative Expense component of the projections).
- These gains were tempered by both contribution and benefit rates remaining unchanged during the 3 year period (contribution rates were last increased August 1, 2012).
- The provision of seriatim data provided the opportunity to analyse the data at a micro level which led to changes in both financial and demographic assumptions as they relate to benefit levels for each benefit category as well as contribution history associated with these benefit levels. This resulted in a lower assumption regarding average future weekly contributions.
- New mortality assumptions reflecting the improvement in mortality of the Fund population means that benefits are assumed to be paid for a longer period, resulting in a reduction in the life of the Fund.

A summary of the impact of the above changes on the life of the Fund is shown below.

Table 4.1 Impact of Changes in Assumptions and Modeling

Changes in Assumptions and Modelling	Year Fund is Expected to be Exhausted	Change in Year Fund is Expected to be Exhausted
Existing model as at the last actuarial review	2047	-
Fund experience and impact of seriatim data on modelling financial assumptions	2045	(2)
Impact of new mortality assumptions	2042	(3)
Impact of seriatim data on modelling demographic assumptions	2045	3
Impact of change in base scenario	2049	4

The results of the financial projections over the 50-year period to the year ended 31 July 2064 are expressed in terms of the benefit and contribution rates effective from August 2014 (same in 2015).

The results show projections of:

- (i) contribution income and outgo (benefits and expenses); and
- (ii) the progression of the Fund balance allowing for investment returns.

4.1 Projected Income and Outgo

Table 4.2 summarises, at five-yearly intervals, the projected contribution income, increasing in line with prices plus 2.5% a year starting effective August 2016 until 2030 and prices plus 1.75% thereafter, and the projected total outgo of the Fund, at 2014 prices. Table G1 of Appendix G shows results for each year of the projection period.

Table 4.2 Projected income and outgo (\$million) at constant 2014 prices

Year ending 31 July	Contribution income	Outgo			
	increasing in line with price increases plus 2.5% to 2030 and 1.75% thereafter	Pension benefits	Other benefits	Expenses	Total outgo ¹
(1)	(2)	(3)	(4)	(5)	(6)
2015	109.6	118.7	18.2	8.5	145.4
2019	117.9	140.4	19.0	9.0	168.4
2024	133.1	177.6	21.0	9.7	208.3
2029	148.8	215.7	22.8	10.5	249.0
2034	155.5	241.2	23.2	11.3	275.6
2039	162.8	258.8	23.6	12.1	294.6
2044	168.3	265.6	23.5	13.1	302.1
2049	175.8	267.1	24.1	14.1	305.3
2054	183.5	255.0	22.7	15.2	292.8
2059	195.4	238.1	22.1	16.4	276.5
2064	209.5	223.3	22.2	17.6	263.1

¹Totals may not sum due to rounding

Total outgo is projected to increase from its current level of \$145.4 million in 2015 to \$305.3 million in 2049, the same year the Fund is projected to be exhausted. Thereafter, total outgo is projected to fall to about \$263.1 million by the end of the projection period (2064). Over the same period, contribution income is projected to increase from \$109.6 million to \$209.5 million.

Figure 4.1 illustrates the projected amounts of contribution income and total outgo, as shown in Table 4.2.

Figure 4.1 Projected Contribution Income and Total Outgo
(\$ million at constant 2014 prices)

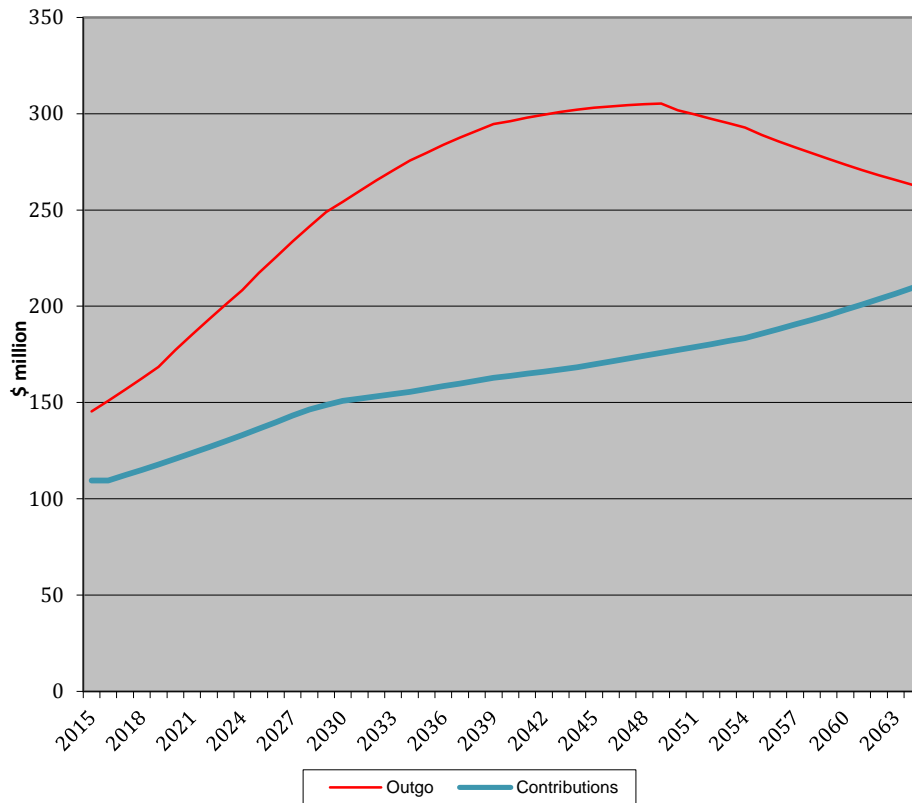


Figure 4.1 indicates that total outgo exceeds contribution income throughout the projection period. By the year 2064, contribution income would need to be 125% of the 2064 level in real terms in order to match the increased level of benefit outgo. This would require contributions to be increased by about 2.5% a year more than benefit increases over the next 50 years.

4.2 Projected Fund Balance

Projections of the Fund balance are subject to further uncertainty since they depend not only on the projections of income and outgo, but also on future investment returns and changes in market values. However, this is an important aspect of the financing of the benefits and it is useful to consider the expected long-term pattern of growth under the assumptions adopted for the purpose of the projections.

Figure 4.2 illustrates the projected balance of the Fund in constant 2014 price terms, assuming a real rate of investment return of 3½% a year.

Figure 4.2 Projected Fund Balance, Real Rate of Return of 3½% a year (\$ million at constant 2014 prices)

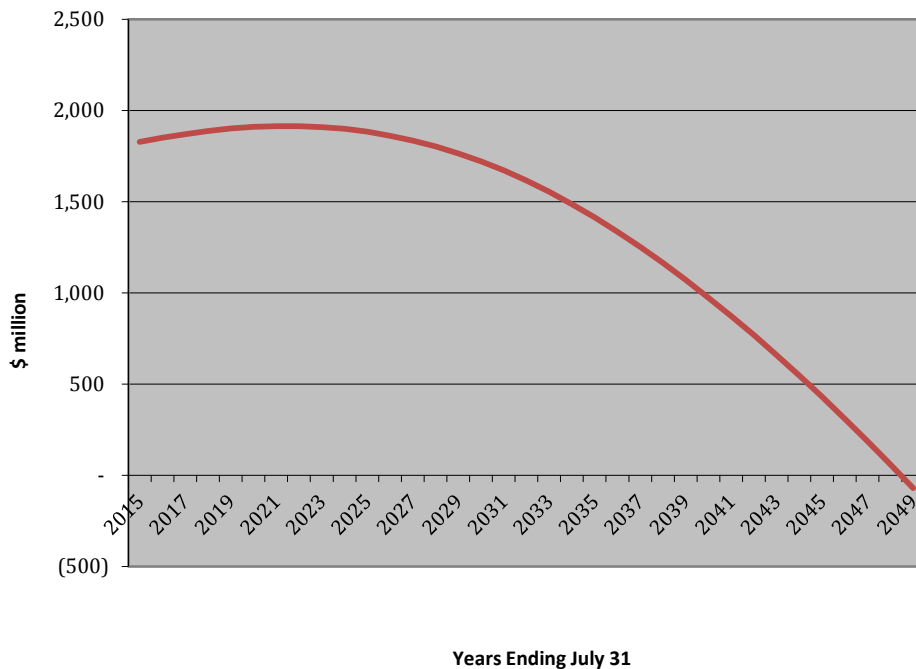


Figure 4.2 indicates that the Fund may be expected to increase in real terms for about 7 years. Thereafter, the Fund is projected to decline steadily until it is completely exhausted in 2049, or after 35 years.

Table H1 of Appendix H shows the Fund projections in detail under the main assumptions, including the multiple by which the projected Fund balance is estimated to cover annual outgo from the Fund (“ratio of Fund to outgo”). At the Review Date the Fund can cover 12.6 years of annual outgo. The ratio initially decreases gradually and then more rapidly over the projection period.

4.3 Comparison with Previous Review

The following considers the results of the current review, which are expressed in 2014-2015 dollars, relative to the results of the previous review (expressed in 2011-2012 dollars).

The methodology and assumptions adopted for the previous review were refined as seriatim data was made available. These refinements are described in more detail in Appendix F. A mortality study was conducted as part of this review and new mortality assumptions reflecting longer life expectancy were used in these projections. We also took into consideration the 2015 contribution and benefit rates.

The following explains the projected outlook for the Fund between the previous and the current reviews:

- The previous Review projected a ratio of 'Fund to Total Outgo' of 11.9 in 2014. This compares to an actual ratio of 12.6. The main contributor to the more favourable ratio is the better than expected return on the Fund.
- Compared to the previous review in which the Fund was projected to be exhausted in 2047, the projection indicates that the Fund may run out 2 years later. Table 4.1 shows the impact on the life of the Fund of the various changes in methods and assumptions.
- Contribution income would have to increase by about 25% in real terms (\$263.1m / 209.5m – see year 2064 in Table 4.2) to keep pace with total outgo from the Fund over the next 50 years. This would require an increase in contributions of about 2.5% per annum more than benefits. This compares with an increase in contribution of 2.9% per annum more than benefits revealed over 40 years in the previous review. (Note that in this review we used 50 years of projections).

Chapter 5 Variant Projections

The projections presented earlier in this report are based on assumptions of contribution increases and investment returns relative to prices. In this section, we look at the results of these projections under variants of these assumptions. The projections are based on the benefits and contributions in effect from August 2015 (same in 2014) and are expressed in constant 2014 price terms.

The variant results show projections of:

- (i) contribution income and outgo (benefits and expenses); and
- (ii) the progression of the Fund balance allowing for investment returns

5.1 Variant Rates of Increases to Contributions

The main projections assume that contributions will increase at 2.5% more than prices up to 2030 and 1.75% thereafter, starting with rates effective August 2015. Table 5.1 summarises (at five yearly intervals) the projected income and outgo of the Fund under the following contribution increase assumptions. The results are in constant 2014 prices.

- (a) prices plus 1.75% throughout the projection period
- (b) prices plus 3% up to 2030 and 1.75% thereafter

Table 5.1 - Projected income and outgo (\$million) at constant 2014 prices

Year ending 31 July	Contribution income			Outgo			
	Increasing in line with price increases plus						
	2.5%	1.75%	3%	Pension benefits	Other benefits	Expenses	Total outgo
(1)	(2a)	(2b)	(2c)	(3)	(4)	(5)	(6)
2015	109.6	109.6	109.6	118.7	18.2	8.5	145.4
2019	117.9	115.3	119.6	140.4	19.0	9.0	168.4
2024	133.1	125.5	138.4	177.6	21.0	9.7	208.3
2029	148.8	135.2	158.5	215.7	22.8	10.5	249.0
2034	155.5	140.3	166.5	241.2	23.2	11.3	275.6
2039	162.8	146.9	174.2	258.8	23.6	12.1	294.6
2044	168.3	151.8	180.2	265.6	23.5	13.1	302.1
2049	175.8	158.6	188.2	267.1	24.1	14.1	305.3
2054	183.5	165.6	196.4	255.0	22.7	15.2	292.8
2059	195.4	176.3	209.2	238.1	22.1	16.4	276.5
2064	209.5	189.0	224.2	223.3	22.2	17.6	263.1

Over the next 50 years, contribution income is projected to increase / decrease from \$209.5 million to:

- (i) \$189 million under the variant assumption that contribution rates increase at 1.75% more than prices, and
- (ii) \$224.2 million under the variant assumption that contribution rates increase at 3% more than prices.

Figure 5 gives a graphical illustration of the variant results shown in Table 5.1, under the two alternative contribution increase assumptions. Contribution income and total outgo are expressed in constant 2014 price terms. Table G1 of Appendix G shows results for each year of the projection period.

Figure 5.1 - Projected contribution income and total outgo, main and variant assumptions for contribution rate increases (\$ million at constant 2014 prices)

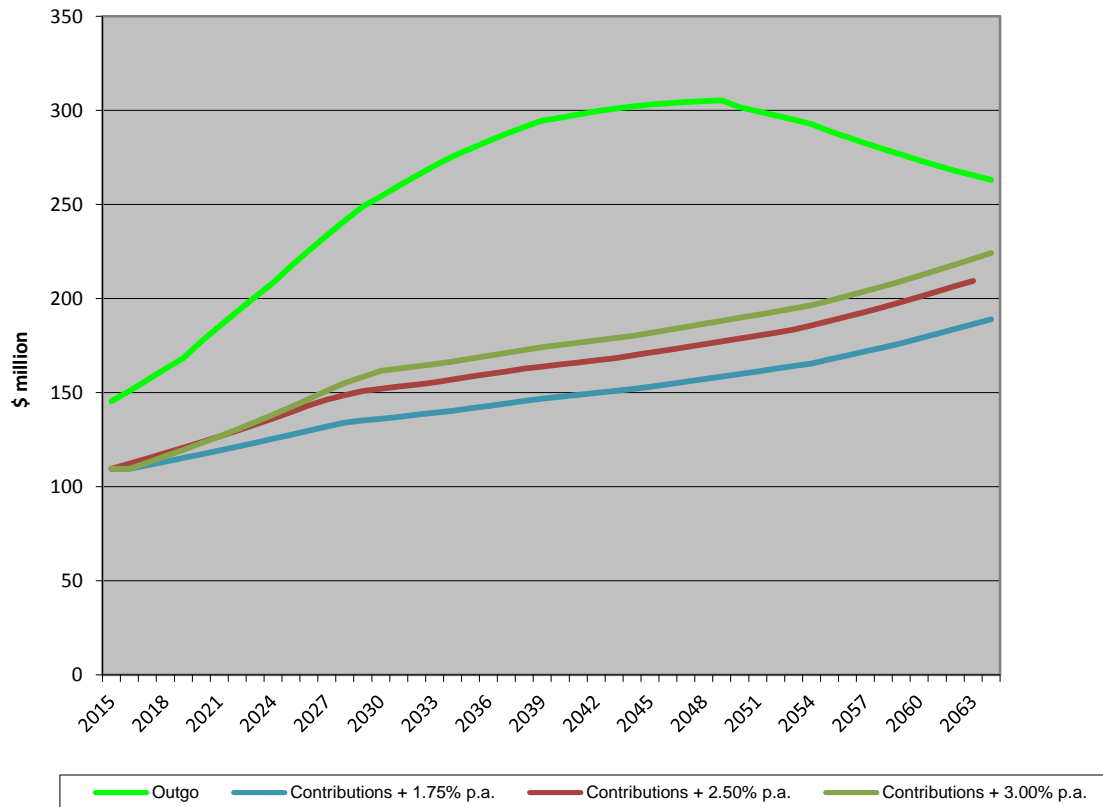


Figure 5.1 indicates that total outgo exceeds contribution income throughout the projection period for all of the scenarios.

5.2 Projected Fund Balance

Projections of the Fund balance are subject to further uncertainty since they depend not only on the projections of income and outgo, but also on future investment returns and changes in market values. However, this is an important aspect of the financing of the benefits and it is useful to consider the long-term pattern of growth under the assumptions adopted for the purposes of the projections.

Negative projected Fund values are shown to indicate the potential shortfall in the projected Fund, although we anticipate that appropriate action would be taken to address this situation.

Figure 5.2 shows the effect of the two alternative contribution increases on the projected Fund.

Figure 5.2 - Projected Fund Balance, main and variant assumptions for contribution rate increases, real rate of return of 3½% a year (\$ million at constant 2014 prices)

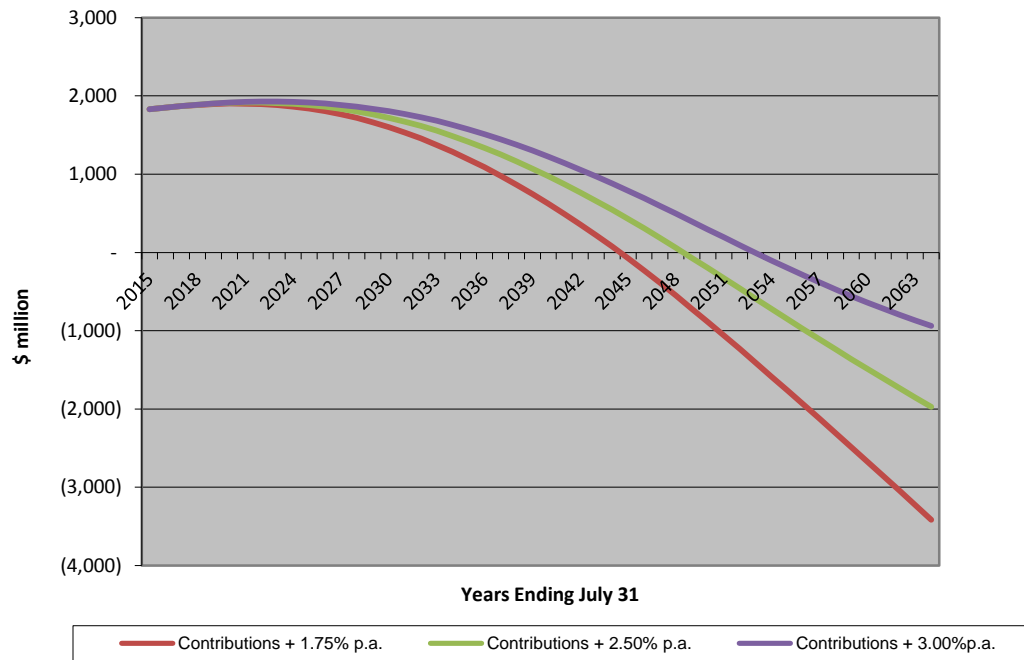


Figure 5.2 shows that the Fund is expected to be exhausted in 2045 (1.75% increase) and 2054 (3% increase).

5.3 Variant Fund Returns

Figure 5.3 illustrates the projected Fund balance in constant 2014 price terms, assuming that contributions increase at 2.5% more than prices until 2030 and 1.75% thereafter and assuming alternative real rates of investment return of 2% and 4% a year.

Figure 5.3 - Projected Fund balance, Real rates of return of 2%, 3.5% and 4% a year. Contributions increase at 2.5% a year more than prices until 2030 and 1.75% thereafter (\$ million at constant 2014 prices)

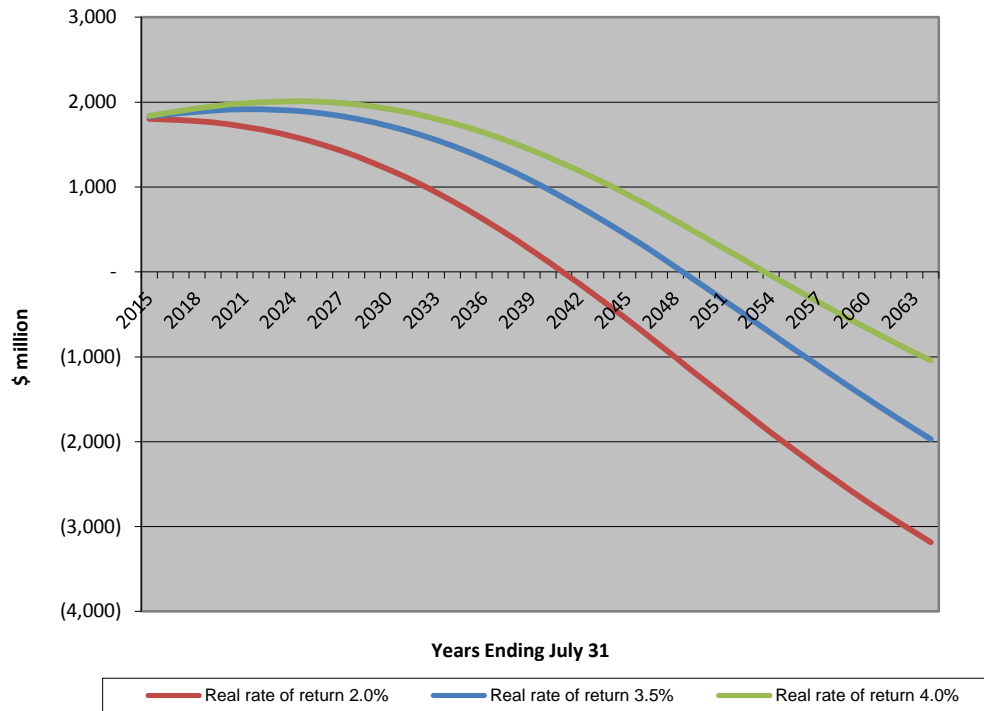


Figure 5.3 shows that if the assumed rate of real investment return decreased to 2% per year, the Fund is projected to decline steadily until it is depleted in 2041. If the assumed real rate of investment return is increased to 4% per year, the Fund increases for the first 7 years then declines steadily until being depleted in 2054, 5 year more than under the best estimate scenario.

Figure 5.4 illustrates the projected Fund balance in constant 2014 price terms, assuming that contributions increase at 1.75% more than prices and assuming alternative real rates of investment return of 2%, 3½% and 4% a year.

Figure 5.4 - Projected Fund balance, Real rates of return of 2%, 3½% and 4% a year
 Contributions increase at 1.75% a year more than prices (\$ million at constant 2014 prices)

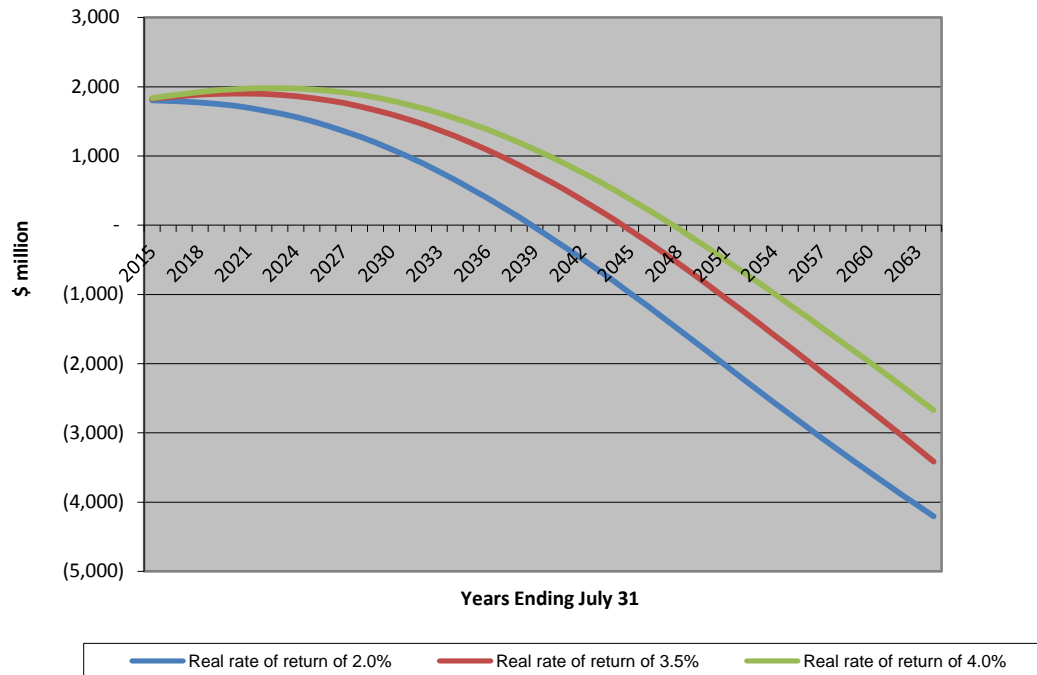


Figure 5.4 shows that if contributions increase at 1.75% a year more than prices, the Fund balance will be exhausted within 25 years and 31 years with a future real rate of return of 2% and 3.5% a year respectively. If the assumed rate of investment return is increased to 4% per year, the Fund increases for the first 10 years then declines steadily until it is depleted by 2048.

Figure 5.6 illustrates the projected Fund balance in constant 2014 price terms, assuming that contributions increase at 3% more than prices and assuming alternative real rates of investment return of 2%, 3½% and 4% a year.

Figure 5.6 - Projected Fund balance, Real rates of return of 2%, 3½% and 4% a year
Contributions increase at 3% a year more than prices (\$ million at constant 2014 prices)

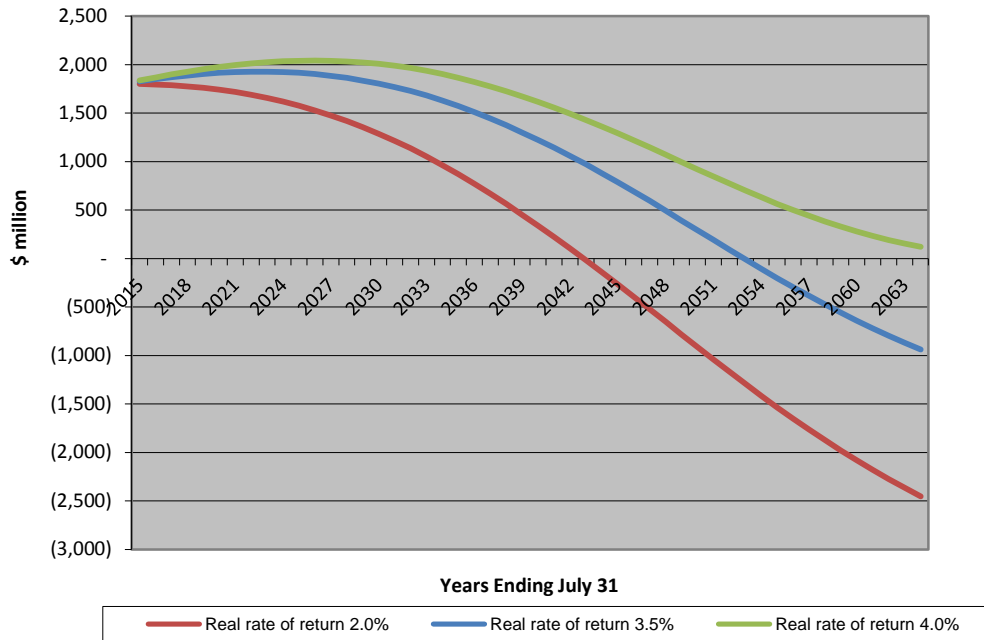


Figure 5.6 shows that if contributions increase at 3% a year more than prices, the Fund balance is projected to remain positive for the entire projection period for assumed real rates of investment return of 4%. With 2% and 3.5% real rates of return the Fund is projected to be exhausted in 2043 and 2053 respectively.

5.4 Variant: 110% and 90% Contributors

Two additional scenarios were investigated where the number of contributors in the population increased and decreased by 10% respectively. This is analogous to there being lower and higher unemployment without any change in the labour force.

Figure 5.7 illustrates the impact on the Fund balance of increasing and decreasing the contributing population by 10% throughout the projection period.

Figure 5.7 - Projected Fund balance, 110% and 90% Contributors (\$ million at constant 2014 prices)

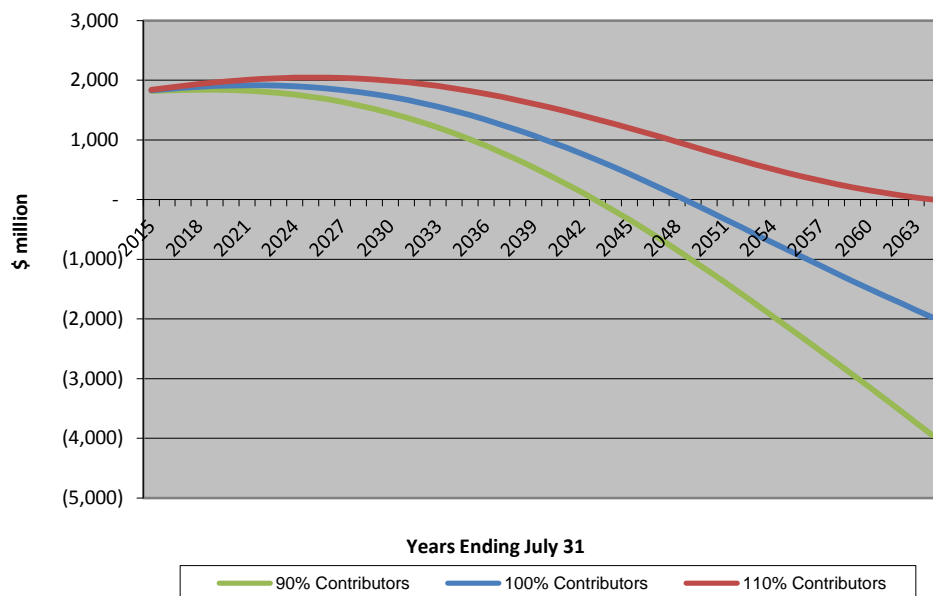


Figure 5.7 shows that a 10% decrease in the number of contributors is projected to reduce the Life of the Fund by 6 years while a 10% increase in the number of contributors is expected to extend, the life of the Fund for the entire projection period, all other assumptions remaining unchanged.

5.5 Additional Scenarios

Some additional design changes were also explored.

In particular, we looked at

- (i) limiting gratuities to just the employee portion of the contributions made; and
- (ii) increasing the retirement age from 65 to 67 over a 5 year period 2017 to 2023.

This change in the gratuity payment is expected to add just 1 year to the life of the Fund whether the change is applicable to all gratuity recipients or to exclude widows(ers) from the change.

When the retirement age is increased, all else remaining unchanged from the best estimate scenario, the Fund is projected to remain positive for the entire 50 years . The Fund appears to be sustainable beyond the 50 years as the net cash flow is decreasingly negative towards the end of the 50 year period. No credit has been taken for any additional contributions as a result of the extension of the retirement age as we have assumed that this will be offset by any increase in benefits for the extra contributions.

5.6 Further Comments

Tables H1 to H14 of Appendix H show the Fund projections in detail, including the multiple by which the projected Fund balance is estimated to cover annual outgo from the Fund (“Ratio of Fund to outgo”).

The results demonstrate that a lower real rate of return would cause the Fund to decline more rapidly, whereas a higher real rate of return either delays or reduces the decline of the Fund.

An increase of 10% of the number of contributors to the Fund would have a moderate positive impact on the Fund but does not result in sustainability of the Fund.

All other things being equal, lower contributions in the short term will give rise to a smaller fund and so, most likely, lead to higher contributions in the longer term.

Sustainability of the Fund is only demonstrated under the scenario where contributions increase by 3% more than benefits (up to 2030) and the real rate of return on the Fund is 4% and higher.

Overall, the results of the Fund projections demonstrate that in the short to medium term the Fund is sufficient to meet its obligations. However, in the longer term there is considerable uncertainty relating to progress of the Fund in respect of the financial assumptions. Given that seriatim data was provided for the Review and a mortality study was conducted, there was more certainty around the demographic assumptions, which will continue to be monitored. Since benefit outgo is projected to increase significantly relative to contribution income, there is an argument for smoothing the impact by raising contributions by more than is necessary in the short term, thus building up a sizeable fund. As a result, however, the future outlook would then be more sensitive to the real rates of return achieved in the Fund. This is evident by the results shown in Table H9 where contributions are increased by 3% a year more than prices (up to 2030) and the Fund earns a real rate of return of 4% per annum.

The scenarios showing increased contributors and increased retirement age both have significant impacts on the life of the Fund, indicating that increased economic growth (increased jobs) and an increase in retirement age, which is in line with global retirement age trends and increased longevity, would have positive impacts on the sustainability of the Fund.

5.7 Accrued Benefits

We were also asked to provide an assessment of the accrued and projected benefit obligation of the Fund for existing contributors and beneficiaries at the Review Date.

It should be noted that social security funds, unlike occupational pension plans, are designed and funded on the premise that contribution income from future generations is expected to fund the benefits of current beneficiaries. The aim of the Fund should be sustainability rather than full funding while ensuring that there are sufficient assets to meet several years of benefit payments and expenses at any point in time. At the Review Date the Fund can meet at least 12.6 years of the current level of benefits and expenses. In a 2014 study done on 14 other Social Security Funds in the Caribbean, Bermuda’s ratio is better than 9 of the countries which average around 7.5 years. By comparison, the ratio for the Canada Pension Plan in 2013 was 4.98 years. The interpretation of this ratio should take into consideration the relationship between the level of contributions and benefits. For countries with

lower ratios, generally their benefit rates are high relative to their contribution rates and vice versa. Maturity of the fund also has an impact on the ratio with younger funds generally having higher ratios.

Based on the valuation assumptions set out in Appendix I, the Fund is estimated to meet 48.4% of projected benefits accrued up to the Review Date in respect of current beneficiaries of the Fund and the current working age population. The Fund is estimated to be 78.5% funded on an accrued basis (no benefit increases). If benefits continue to accrue and contributions are made assuming increases to both, then the Fund is estimated to be 68.7% funded.

Further details of the calculation and the value of accrued and future benefits can be found in Appendix I.

We also calculate the present value of the expected benefit payments and gratuities over the next 10 years which are \$885 million and \$28 million respectively.

Chapter 6 Conclusions

The Fund's performance during the inter-valuation period has had a positive impact on the Fund's financial position. The return on investment has been higher than expected both on a nominal and a real return basis and Plan expenses were lower than expected. The net impact of not increasing benefits or contributions have also had a positive impact on the Fund.

The viability of the Fund in the short to medium term is good with the Fund being able to cover at least 12 years of the current expenditure and being positive for the next 25 years.

The projections indicate that the future sustainability of the Fund is sensitive to the real rate of investment returns, the rate of increase in contributions relative to benefits, the level of economic activity and the demographic profile of the Bermuda population. Possible design changes such as increasing the retirement age may also contribute to the Fund's sustainability.

In considering the rate at which the contribution rate increases relative to benefits, one should be mindful that the contribution rate could exceed the benefit rate in the future, which would not be a desirable situation. Hence the reason the rate of contribution increase relative to benefits (2.5%) was applied up to 2030 and then reduced thereafter to 1.75%. If a rate of 2.5% was used throughout the projection period, the contribution rate would exceed the benefit rate in 2060.

We recommend that the Department of Social Insurance set a target ratio of benefits to contributions which would help guide how much they could increase contributions relative to benefits in the future. One way of determining this is to project the actual contribution rate for say 40 years at various rates of increase and compare it to average wages which one can assume increases at 1% above prices. Then determine which contribution increases (above prices) are feasible and affordable.

Due to the inherent uncertainty in both the future demographic experience and investment returns on the Fund, the progress and funding level of the Contributory Pension Fund should be kept under regular review.

Chapter 7 Statement of Actuarial Opinion

This opinion is given with respect to the Bermuda Contributory Pension Fund (the “Fund”).

We performed a review of the Fund as at 1 August 2014. Our review reflects the provisions of the Fund in effect on 1 August 2014, and in addition, takes into account the contribution and benefit rates effective August 2015.

The financial status of the Fund as at 1 August 2014 was determined based on the Fund information and actuarial assumptions appropriate as at that date.

We hereby certify that, in our opinion, as at 1 August 2014:

- The data on which the actuarial review is based is sufficient and reliable for the purposes of the review.
- The assumptions used are, in aggregate, appropriate for the purposes of the review.
- The methods employed in the review are appropriate for the purposes of the review.

This report has been prepared, and our opinions given, in accordance with *Actuarial Practice Standard 3 (APS3) Social Security Programs of the Caribbean Actuarial Association*. The assumptions that form each actuarial basis used in the report were reasonable at the time this actuarial review report was prepared.

The opinions are given exclusively from a financial viewpoint. This report does not constitute a legal opinion on the rights or duties of the Government of Bermuda, or the members over the Fund. Actuarial reviews are performed based on assumptions and methods that are in accordance with accepted actuarial practice. Emerging experience differing from these assumptions may result in gains or losses, which may affect future results. These will be revealed in future actuarial reviews. The next actuarial review should be performed not later than as at 1 August 2017.

Morneau Shepell Ltd.



Marcia Tam-Marks, F.S.A
Fellow of the Society of Actuaries

May 10th, 2016

Appendix A Main Provisions of Scheme from August 2014

Benefits

A **contributory old-age pension** is payable to any person over age 65, provided that:

- (i) at least 484 contributions have been paid or credited in respect of the person (the minimum was previously 250 contributions and was changed with effect from 4 August 1986 under the Contributory Pensions (Amendment of Contributions and Benefits) Order 1986); and
- (ii) an average of not less than 25 paid or credited contributions a year has been achieved between attaining age 21 (or 5 August 1968 if later or age 18 if contributions started after the date on which the Age of Majority Act 2001 came into effect) and commencement of pension.

The full rate of pension, payable if the yearly average contributions paid or credited is 50 or more, is \$226.22 a week plus increments of \$1.33 for every 26 contributions paid or credited in excess of 484. The increments are at half this rate for contributions after age 65. If the contribution average is between 25 and 50, lower rates of pension are payable. Although the lower limit for increments was raised from 250 to 484 in 1986, it has remained the same since then. Since 1986, the increment rate has been increased only in line with prices. No increases have been given since August 2011.

A **non-contributory old-age pension** is payable to any person aged over 65, who possesses Bermudian status and has been ordinarily resident in Bermuda for a period of not less than 10 years during the 20 years immediately preceding the application for non-contributory pension. These pensions are payable only to persons who are not entitled to a contributory old-age pension. The rate of pension is \$103.81 a week, increased to \$106.83 a week for persons whose income from all sources does not exceed \$4,000 a year excluding any pension granted under the scheme. During 1988 to 1990, the higher rate of non-contributory old age pension was increased by less than the lower rate, with the result that the difference between the two rates of benefit was reduced. It is now \$3.02 a week.

A **contributory old-age gratuity** is payable to any person reaching age 65 whose contribution record is insufficient to entitle them to an old-age pension. The gratuity is equal to the total of all contributions paid by the person and their employer.

A **contributory widow's allowance** is payable to any widow whose husband has satisfied the contribution requirements for a contributory old age pension at the date of death. If a person becomes a widow under 50 years of age the benefit is for 26 weeks or continues if she has children under school leaving age (the benefit continues until the last child is over school leaving age) or is incapable of self-support, in which case the benefit could continue to age 65. If a person becomes a widow after age 50, the benefit continues to age 65 at which time the person can choose between the widow's allowance and their own pension and will normally choose whichever is higher. In each case, a choice is made at age 65.

The rate of allowance is \$226.22 a week (subject to reduction if the husband's contribution average was less than 50) with an additional \$22.57 a week for each child under school-leaving age.

Where a widow is eligible for a contributory old-age pension, she may elect to receive it in lieu of the widow's allowance. In satisfying the contribution conditions and in arriving at the amount of the contributory pension, her husband's record of contributions may be substituted for her own in respect of any completed contribution year during the period while they were married.

A **contributory widow's gratuity** is payable to a widow whose husband's contribution record is insufficient to entitle her to a widow's allowance, so long as no claim had been made by her husband for an old-age gratuity. The gratuity is equal to the total of all contributions paid by or in respect of her husband.

A contributory widower's allowance or contributory widower's gratuity has been payable to widowers whose wives died on or after 16 April 1985, under the same terms and conditions as the corresponding widows' benefits.

A **contributory disability pension** of \$150.79 a week is payable to persons who are incapacitated for a continuous period of 52 weeks or more, subject to certain contribution conditions. In 1988 and 1989, contributory disability pensions were increased only in line with prices. In 1990, however, contributory disability pensions were increased substantially, so as to equal two-thirds of the full rate of contributory old-age pension, excluding increments. This relationship has been maintained.

A **non-contributory disability pension** of \$103.81 a week is payable if a person does not qualify for a contributory disability pension, is over age 18 and under pension age, has lived in Bermuda for 10 years immediately preceding application for the benefit, and is permanently incapacitated. Since 1985, non-contributory disability pension has been at the same rate as the lower rate of non-contributory old-age pension.

Contributions

Contributions are payable in respect of employed and self-employed persons. The employer pays \$32.07 per week (\$30.40 before August 2012) for each employee, and the employee pays an equal amount if he is under the age of 65. Self-employed persons pay a contribution equal to the joint contribution of employee and employer. Contributions are credited in the case of an unemployed widow(er) under pension age entitled to widow(er)'s allowance. They may also be credited in respect of a person incapacitated from work, if he has paid not less than 150 contributions and was employed immediately prior to his incapacity.

Increases to Benefits and Contributions

Benefit and contribution rates are reviewed annually by reference to the increase in the CPI over the previous calendar year. Contributions increased by 5.5% in August 2012. There was no increase in the contribution rate after August 2012 to 31 July 2014. Benefits were last increased in August 2011.

Appendix B Benefit and Contribution Rates, 2003 to 2014

Increases to Benefits and Contributions

Table B1 summarises the annual increases to benefit and contribution rates since August 2003, together with the increase in the CPI over the previous calendar year.

Table B1 - Annual increases in CPI, benefits and contributions

Year	Increase in CPI *	Increase in Benefits †	Increase in Contributions †
2003	2.3%	3.0%	0.0%
2004	3.2%	9.0%	4.25%
2005	3.6%	3.5%	4.75%
2006	3.1%	4.0%	5.75%
2007	3.1%	4.5%	6.25%
2008	3.8%	5.0%	6.75%
2009	4.8%	5.0%	0.0%
2010	1.8%	0.0%	0.0%
2011	2.4%	3.0%	0.0%
2012	2.7%	0.0%	5.5%
2013	2.4%	0.0%	0.0%
2014	1.8%	0.0%	0.0%
Average (3 years to 2014)	2.3%	0.0%	1.8%
Average (10 years to 2014)	2.95%	2.5%	2.9%

* CPI in previous calendar year.

† Increase in August of calendar year.

Source: http://subportal.gov.bm/images/Cabinet_Office/Dept_of_Statistics/Docs/ConsumerPriceIndex/Consumer%20Price%20Index%20-%20Jul%2015.pdf

Benefit and contribution rates, 2001 to 2014

Table B2 summarises the main rates of benefits and contributions in force for the years commencing August 2001 to August 2014.

Table B2 - Benefit and contribution rates, 2001-2007

Benefits	From 16/8/08	16/08/09	16/08/10 (unchanged)	16/08/11	16/08/12	16/08/13 (unchanged)	16/08/14 (unchanged)
Contributory Old-Age Pension							
Full pension p.w.	\$209.17	\$219.63	\$219.63	226.22	226.22	226.22	226.22
Limit for increments	484	484	484	484	484	484	484
Increment p.w.	\$1.23	\$1.29	\$1.29	\$1.33	\$1.33	\$1.33	\$1.33
Non-Contributory Old-Age Pension							
Income limit p.a.	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000
Pension, for those below limit, p.w.	\$98.78	\$103.72	\$103.72	\$106.83	\$106.83	\$106.83	\$106.83
Pension, for those above limit, p.w.	\$95.99	\$100.79	\$100.79	\$103.81	\$103.81	\$103.81	\$103.81
Contributory Widow's or Widower's Allowance							
Personal rate p.w.	\$209.17	\$219.63	\$219.63	\$226.22	\$226.22	\$226.22	\$226.22
Addition per child p.w.	\$20.87	\$21.91	\$21.91	\$22.57	\$22.57	\$22.57	\$22.57
Contributory Disability pension p.w.	\$139.43	\$146.40	\$146.40	\$150.79	\$150.79	\$150.79	\$150.79
Non-Contributory Disability Pension p.w.	\$95.99	\$100.79	\$100.79	\$103.81	\$103.81	\$103.81	\$103.81
Rate of increase in benefits	5.0%	5.0%	0.0%	3.0%	0.0%	0.0%	0.0%
Contributions	From 4/8/08	4/8/09	4/8/10	4/8/11	4/8/12	4/8/13	4/8/14
Contributions p.w.	\$30.40	\$30.40	\$30.40	\$30.40	\$32.07	\$32.07	\$32.07
Total Contributions p.w.	\$60.80	\$60.80	\$60.80	\$60.80	\$64.14	\$64.14	\$64.14
Rate of increase in contributions	6.75%	0.0%	0.0%	0.0%	5.50%	0.0%	0.0%

Table B2 (continued) - Benefit and contribution rates, 2001-2007

Benefits	From 16/8/01 (unchanged)	16/8/02	16/8/03	16/8/04	16/8/05	16/8/06	16/8/07
Contributory Old-Age Pension							
Full pension p.w.	\$153.16	\$157.75	\$162.48	\$177.10	\$183.30	\$190.63	\$199.21
Limit for increments	484	484	484	484	484	484	484
Increment p.w.	89 cents	92 cents	95 cents	104 cents	\$1.08	\$1.12	\$1.17
Non-Contributory Old-Age Pension							
Income limit p.a.	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000
Pension, for those below limit, p.w.	\$72.32	\$74.49	\$76.73	\$83.64	\$86.57	\$90.03	\$94.08
Pension, for those above limit, p.w.	\$70.29	\$72.40	\$74.57	\$81.28	\$84.12	\$87.48	\$91.42
Contributory Widow's or Widower's Allowance							
Personal rate p.w.	\$153.16	\$157.75	\$162.48	\$177.10	\$183.30	\$190.63	\$199.21
Addition per child p.w.	\$15.28	\$15.74	\$16.21	\$17.67	\$18.29	\$19.02	\$19.88
Contributory Disability pension p.w.	\$102.08	\$105.14	\$108.30	\$118.05	\$122.18	\$127.07	\$132.79
Non-Contributory Disability Pension p.w.	\$70.29	\$72.40	\$74.57	\$81.28	\$84.12	\$87.48	\$91.42
Rate of increase in benefits	0.0%	3.0%	3.0%	9.0%	3.5%	4.0%	4.5%
Contributions	From 6/8/01	5/8/02	16/8/03	1/8/04	16/8/05	1/8/06	6/8/07
Contributions p.w.	\$22.25	\$23.20	\$23.20	\$24.19	\$25.34	\$26.80	\$28.48
Total Contributions p.w.	\$44.50	\$46.40	\$46.40	\$48.38	\$50.68	\$53.60	\$56.96
Rate of increase in contributions	0.0%	4.25%	0.0%	4.25%	4.75%	5.75%	6.25%

Appendix C Membership Data

Table C1 - Numbers and amounts of monthly benefits in payment

Benefit	16/8/11 – 15/9/11		As at 1/8/14	
	Number in payment	Amount (\$000 pm)	Number in payment	Amount (\$000 pm)
Contributory old-age pension	7,739	7,978	8,600	8,912
Contributory old-age pension - UK	-	-	168	80
Non-contributory old-age pension:				
higher rate	685	318	696	323
lower rate	378	170	382	172
Contributory widow's allowance	1,143 ^[1]	999	1,142 ^[2]	986
Contributory widower's allowance	96	78	100	80
Contributory disability pension	161	93	187	92
Non-contributory disability pension	257	117	293	132
Total	10,459	9,753	11,568	10,776 ^[3]

[1]: of whom 216 were under age 65; [2]: of whom 205 were under age 65; [3]: Totals may not sum due to rounding.

Table C2 - Average amounts of monthly benefits in payment

Benefit	Average benefit (\$ pm)	
	2011	2014
Contributory old-age pension	1,030.92	1,036.28
Contributory old-age pension – UK	-	473.73
Non-contributory old-age pension:		
higher rate	464.20	464.20
lower rate	451.08	451.08
Contributory widow's allowance	874.06	863.06
Contributory widower's allowance	815.63	796.18
Contributory disability pension	578.77	491.24
Non-contributory disability pension	451.08	451.08
Gratuity	10,717.30	- ^[1]
Total	932.56	932.56

[1]: Not sufficient credible data to determine an average. Draft financials as at July 31, 2014 indicate \$5,131,144.81 over the last 12 months.

Table C3 - Contributions data

	2011	2012	2013	2014
Number of contributors¹	35,913	29,100	30,563	34,806
Av. no. of weekly cont. per month	3.84	3.46	3.40	3.55

[1]: Figures for the 12 month period ending July 31

Table C4 - Age Distribution of Contributors

	0-19	20-64	>65	Total
2012¹	11	25,756	3,333	29,100
2013²	15	27,172	3,376	30,563
2014²	22	31,178	3,806	34,806

[1]: Figures extrapolated from July 2012 for the 12 month period ending July 31

[2]: Figures for the 12 month period ending July 31

Appendix D Financial Data

Table D1 - Income and Expenditure - 2012 to 2014 (\$ million)¹

	Year ending 31 July			1 August 2012 to 31 July 2014
	2012	2013	2014	
Fund at start of year	1,532.8	1,525.9	1,643.6	1,532.8
<u>Income</u>				
Contributions	107.6	109.6	107.4	324.6
Interest and dividends	30.6	25.3	16.9	72.8
Realised gains (losses)	8.3	121.1	203.8	333.3
Unrealised gains (losses)	(21.6)	0.8	(27.6)	(48.4)
F/X gains/(losses)	0.1	(1.0)	0.0	(0.9)
Other	0.0	0.3	0.7	1.0
Total income	125.0	256.1	301.2	682.3
<u>Expenditure</u>				
Pensions	123.1	129.4	133.7	386.3
Investment Management Fees	4.6	4.0	5.0	13.6
Administrative Costs	3.8	4.4	3.3	11.5
Increase in Bad Debt Provision		0.5	0.4	1.3
Total expenditure	131.9	138.3	142.6	412.7
Excess of income over expenditure	(6.9)	117.8	158.7	269.5
Fund at end of year	1,525.9	1,643.6	1,802.3	1,802.3

Figures may not sum to totals due to rounding

¹Draft Financials for 2012, 2013, 2014

Table D2 - Fund assets at market value, 31 July 2014

Asset	\$ million ¹	% ¹
Equities	706.0	38.6
Bonds	224.1	12.2
Private Equities	62.6	3.4
Other Alternative Investments	201.5	11.0
Hedge Funds	507.3	27.7
Securities Lending	54.2	3.0
Cash	6.2	0.9
Receivables	59.2	3.2
Total Assets	1,831.0	100.0
Current Liabilities	(28.7)	
Net Assets Available for Benefits	1,802.3	

¹Numbers may not sum to totals due to rounding

Table D3 - Annual investment returns of Fund

Year ending 31 July	Nominal % p.a.	Inflation % p.a.	Real % p.a.
	(1)	(2)	(3)
2005	14.2	2.8	11.1
2006	9.7	3.6	5.9
2007	16.4	4.3	11.6
2008	(1.6)	4.7	(6.0)
2009	(11.2)	1.2	(12.3)
2010	13.3	2.3	10.8
2011	16.8	2.8	13.6
2012	0.8	2.5	(1.6)
2013	9.4	1.8	7.5
2014	11.6	1.9	9.5
Average (3 years)	7.2	2.1	5.0
Average (10 years)	7.6	2.8	4.7

The inflation rates have been restated to reflect the increases from July of year y to year y+1.

Appendix E Population Projection

Introduction

This Appendix describes the assumptions used to prepare the 50-year population projection for Bermuda required for actuarial review of the CPF as at 1 August 2014.

The population projection was based on the latest total population count as at December 31, 2013 as set out in the 2014 Bermuda Digest of Statistics, and using a distribution by age group as set out in Bermuda's Population Projections 2010-2020 (July 1, 2014 numbers). Both of these publications are published by the Bermuda Department of Statistics. The fertility and migration assumptions utilized are mostly consistent with those used in the last actuarial review. The mortality assumption, however, was changed based on a recent experience study.

Base year

The base year for the projections starts at January 31, 2014 (middle of the fiscal year). The population distribution as at January 31, 2014 was assumed to be the same as the December 31, 2013 population as derived from both the 2014 Bermuda Digest of Statistics and Bermuda's Population Projections 2010-2020. This population was used to determine the cash flows for the period August 1, 2013 to July 31, 2014. Projections in future years incorporate a similar methodology. Table E1 summarizes the estimated population in 2014.

Table E1 - Estimated population as at January 31, 2014

Age last birthday	2014 ¹		
	Males	Females	Total
0-19	6,671	6,568	13,239
20-64	20,052	21,316	41,368
>65	4,480	6,004	10,484
All ages	31,203	33,888	65,091

¹ December 31, 2013 population as derived from both the 2014 Bermuda Digest of Statistics and Bermuda's population projections 2010-2020

Mortality

A mortality study was conducted as part of this valuation and the results indicate that actual mortality was lighter than assumed mortality for past actuarial reviews. The results of the study are contained in a separate report. A draft of that report was provided to the Bermuda Department of Social Insurance on September 8, 2015. For this review, we have used the 2014 Canadian Private Mortality Table (Sex Distinct) with generational mortality improvement for ages 18 and above, while keeping the mortality assumption for all ages below 18 consistent with what was used in the last actuarial review.

Table E2 summarises the projected life expectancy for males and females under the mortality assumptions adopted for the projection.

Table E2 - Expectation of Life

Year to 31 July	Expectation of life at birth		Expectation of life at age 65	
	Males	Females	Males	Females
2014	85.1	88.8	20.5	22.9
2024	85.8	89.3	21.2	23.3
2034	86.4	89.8	21.6	23.8
2044	86.9	90.2	22.1	24.2
2054	87.5	90.6	22.5	24.6
2064	88.0	91.0	23.0	25.0

Fertility

We have assumed a long-term total period fertility rate (TPFR) of 1.7. This is based on the fertility rates assumed in the Statistics Department’s 2000 to 2030 projections. Fertility rates apply to females ages 15 to 49 in each year of the projection. In the Bermuda Population Projections 2010-2020, a total fertility rate was estimated based on a three-year average of births from 2011 to 2013. This rate, however, was not utilized because of the long term nature of the projections used in the actuarial review. The impact of an increase in fertility rate to 2.0 and 2.5 was investigated under the variant scenarios in the last actuarial review and projected an extension of the life of the Fund by zero and three years respectively.

In light of recent data from the 2014 Bermuda Digest of Statistics, we have assumed a minor change of male/female sex ratio from 1.05:1 for future births in the last actuarial review to 0.95:1 for the first five years and graded back to 1.05:1 over the next ten years and remaining so thereafter for future births in this actuarial review.

Migration

The projection does not include any allowance for future migration, either inward or outward. The migration assumptions used by the Department of Statistics in Bermuda suggest a net overall outward migration of 196 persons a year in 2014 to 96 persons by 2020, which represents an insignificant proportion of the total population. The same allowance was made for the previous projection.

Results

Tables E3, E4 and E5 summarise, at five-yearly intervals, the projected numbers below age 20, between ages 20 and 64, and over age 65, for males, females, and both sexes combined, respectively. Table E5 also shows the projected numbers of births and the ratio of the number of people between ages 20 and 64 to the number over age 65, commonly known as the “old-age support ratio”. Figure E1 illustrates the results with population split into the three main age groups (below age 20, between ages 20 and 64, and above age 65).

Table E3 - Projected population 2014 - 2064 (Males)

Males				
Year to 31 July	Ages 0-19	Ages 20-64	Ages 65+	Total
2014	6,671	20,052	4,480	31,203
2019	6,657	19,332	5,619	31,608
2024	6,442	18,434	6,995	31,871
2029	6,119	17,287	8,485	31,891
2034	5,837	16,368	9,456	31,662
2039	5,717	15,365	10,109	31,191
2044	5,662	14,557	10,272	30,491
2049	5,602	13,836	10,150	29,588
2054	5,484	13,602	9,451	28,537
2059	5,303	13,500	8,633	27,437
2064	5,089	13,367	7,947	26,402

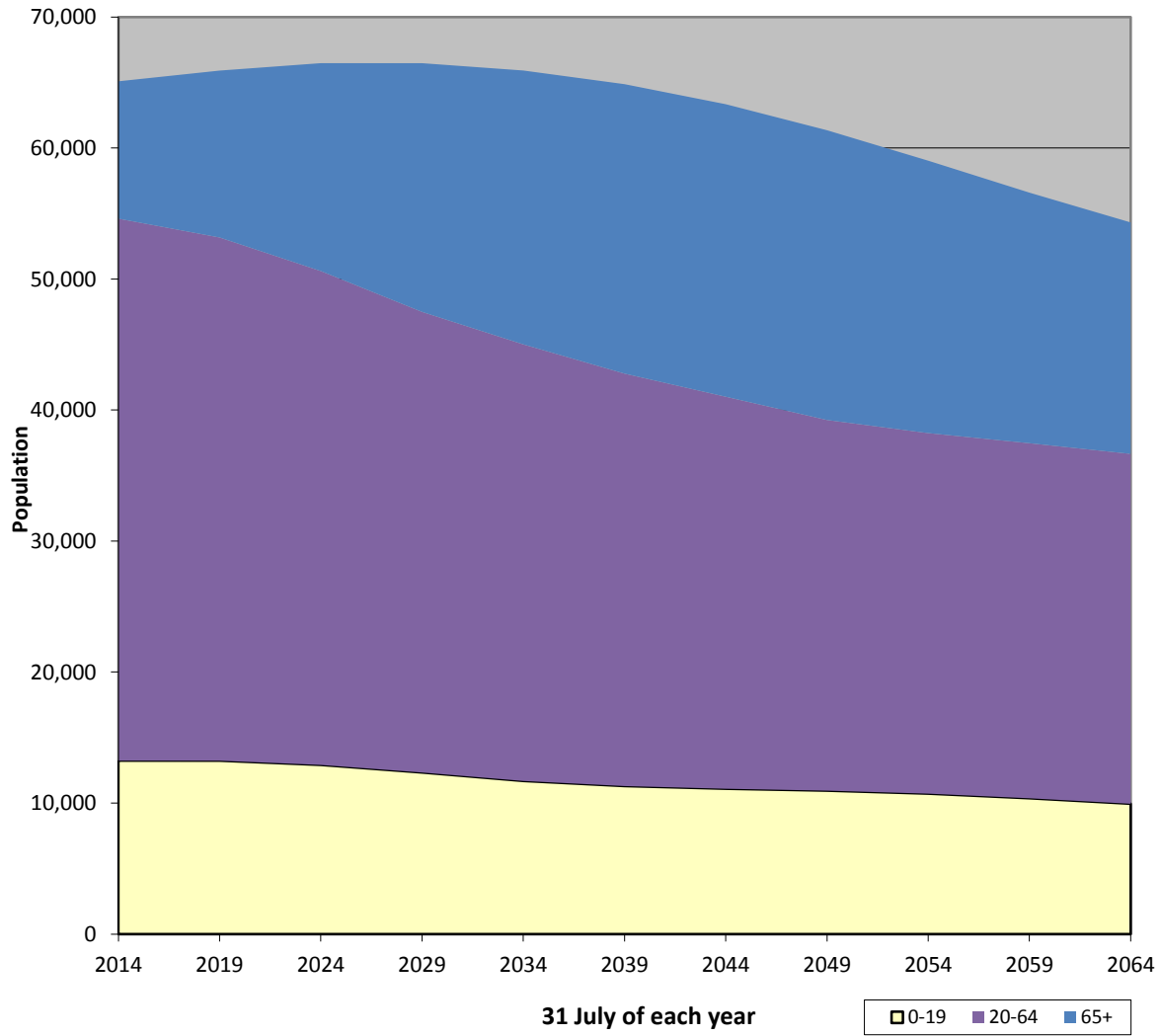
Table E4 - Projected population 2014 - 2064 (Females)

Females				
Year to 31 July	Ages 0-19	Ages 20-64	Ages 65+	Total
2014	6,568	21,316	6,004	33,888
2019	6,579	20,603	7,119	34,301
2024	6,469	19,262	8,873	34,605
2029	6,214	17,869	10,499	34,581
2034	5,849	16,956	11,447	34,252
2039	5,581	16,116	11,983	33,680
2044	5,429	15,366	12,055	32,850
2049	5,345	14,456	11,966	31,768
2054	5,233	13,919	11,341	30,493
2059	5,061	13,601	10,492	29,154
2064	4,857	13,339	9,719	27,915

Table E5 - Projected population 2014 - 2064 (Males and Females)

Males and Females						
Year to 31 July	Births	Ages 0-19	Ages 20-64	Ages 65+	Ages 0-19	Old-age support ratio
2014	652	13,239	41,368	10,484	65,091	3.9
2019	608	13,236	39,935	12,739	65,909	3.1
2024	573	12,912	37,696	15,868	66,476	2.4
2029	559	12,333	35,156	18,984	66,473	1.9
2034	556	11,686	33,325	20,902	65,914	1.6
2039	554	11,298	31,481	22,092	64,871	1.4
2044	544	11,092	29,923	22,327	63,341	1.3
2049	522	10,947	28,292	22,117	61,356	1.3
2054	494	10,718	27,521	20,792	59,030	1.3
2059	472	10,365	27,101	19,125	56,591	1.4
2064	460	9,946	26,706	17,665	54,317	1.5

Figure E1 - Projected population 2014 -2064 (Males and Females)



Appendix F Estimating Methods

Introduction

This Appendix describes the methods and assumptions used to project future amounts of benefits and contributions. The assumptions generally reflect the recent experience but with some modifications for the longer-term. It should be noted that the projections are subject to increasing uncertainty in later years.

Benefits in respect of current beneficiaries

The projected amount of future benefits payable to current beneficiaries is based on seriatim data of persons receiving benefits as at 31 July 2014. This included the person's benefit amount, benefit type, date of birth, sex and contribution history, among other things. In projecting future amounts of benefits payable to current beneficiaries, allowance was made for future mortality and future increases to benefits.

Benefits in respect of future beneficiaries

Future benefit awards are derived from the projected difference between the Bermuda population and the remaining beneficiaries, and the average benefit rates at the time of the award, trended for future variation (for contributory benefits only). Thereafter new awards are projected allowing for future mortality and future increases to benefits.

In each year of the projection period, the projected population as described in Appendix E is grouped into five categories which are used to determine the number of persons entitled to specific benefits:

- Projected population greater than or equal to age 65 adjusted for migrant beneficiaries no longer resident in Bermuda: This consists of all people greater than or equal to age 65 adjusted by a factor of 104% to account for other people that have satisfied the requirements to receive pension but are no longer resident in the country. This factor was derived as the difference between the actual number of beneficiaries greater than or equal to age 65 in the beneficiary data received, and the number greater than or equal to age 65 as inferred from the population projections as at 31 July 2014.
- Projected age 65 population adjusted for migrant beneficiaries no longer resident in Bermuda: This consists of all people age 65 adjusted by a similar factor of 104% to account for other people that have satisfied the requirements to receive gratuities but are no longer resident in the country.
- Projected males greater than or equal to age 18: This is inferred from the population projections without adjustment.
- Projected females greater than or equal to age 18: This is inferred from the population projections without adjustment.

- Projected males and females greater than or equal to age 18: This is inferred from the population projections without adjustment.

Corresponding beneficiary Information from actual data was then used to assign various proportions of the projected population categories, as drivers for the number of beneficiaries for a particular type of benefit, in each projection year. This is detailed in the table below.

This approach takes into consideration all non-Bermudians and over age 65 contributors, hence no separate assumptions have been made in respect of these persons.

Table F1 - Summary of benefit distribution assumptions

Benefit	Population Category Driver	Proportion
Contributory old-age pension	Projected greater than or equal to age 65 population adjusted for migrant beneficiaries no longer resident in Bermuda	79.2%
Contributory old-age pension - UK	Projected greater than or equal to age 65 population adjusted for migrant beneficiaries no longer resident in Bermuda	1.5%
Non-contributory old-age pension: higher rate	Projected greater than or equal to age 65 population adjusted for migrant beneficiaries no longer resident in Bermuda	6.4%
lower rate	Projected greater than or equal to age 65 population adjusted for migrant beneficiaries no longer resident in Bermuda	3.5%
Contributory widow's allowance	Projected females greater than or equal to age 18	4.1%
Contributory widower's allowance	Projected males greater than or equal to age 18	0.4%
Contributory disability pension	Projected males and females greater than or equal to age 18	0.4%
Non-contributory disability pension	Projected males and females greater than or equal to age 18	0.6%
Gratuity	Projected age 65 population adjusted for migrant beneficiaries no longer resident in Bermuda	Varies by type ¹

¹ See below for details

For all benefits except gratuities, the above numbers are multiplied by the respective average benefit amounts, as detailed in Table C2 of this report, and trended for future variation (for contributory benefits only) to determine projected cash flows for each benefit type in each of the projected years.

For non-contributory gratuities, these were assumed to be received by all non-contributory pension recipients at age 65. For widows and widowers gratuities, these were assumed to be 5.5% and 0.5% respectively, of the projected age 65 population adjusted for migrant beneficiaries no longer resident in Bermuda and estate gratuities were also implicitly accounted for in these numbers. Estimated gratuity amounts varying by type and the projected year were then calculated using contribution history from the actual beneficiary data together with historical (and future indexations) of contribution rates.

Overall, about 96% of the expenditure on benefits is in respect of persons aged over 65. Also about 94% of expenditure is in respect of contributory benefits.

Contributions

The projected amount of contributions is derived from the projected number of future contributors and the proportion of a full 50 weekly contribution premium assumed for each contributor.

The data provided for this review included seriatim data consisting of people contributing for the period 1 August 2011 to 31 July 2014. This included the person's date of birth, sex and the amount of contributions in each of the last three years, among other things.

Labour force participation along with employment and unemployment rates are first determined from the 2014 Labour Force Survey Executive Report published by the Bermuda Department of Statistics. These rates are extrapolated for the various age groups, trended for future years and combined with the population projection to determine an employed population for each of the projected years. The contributor population is then taken as 98.1% of the employed population as this is the adjustment required to equate to the number of contributors who made at least one contribution in the 12 month period ending 31 July 2014 according to the actual contributor data. The number of contributors in the period ending 31 July 2014 was 34,806, 3.1% less than the total number of contributors in the period ending 31 July 2011.

Using the average of the premiums in the financials divided by the implied premiums for the years ending July 31, 2004 to July 31, 2014, the proportion of a full 50 weekly contribution premium was then assumed to be 97.76% for each contributor.

Note that any indexation of premiums was only assumed to be effective after the year ending July 31, 2016.

Administration and Investment expenses

Administration and investment expenses charged to the Fund for the year ending 31 July 2014 totalled \$8.4 million. Similar amounts of \$8.4 million were recorded for both of the years ending 31 July 2013 and 2012. Of the \$8.4 million in each of the three years, actual administrative costs were \$3.8 million, \$4.4 million and \$3.3 million, respectively. Administration expenses would be expected to be broadly related to both the number of beneficiaries and the level of earnings. Over the long term it would be reasonable to assume some reduction relative to current expense levels, due to efficiency savings. Investment expenses would be expected to be related to asset size and mix.

For the purposes of the review, we have assumed that total expenses will increase at a real rate of 1.5% a year (i.e. in excess of price increases).

Table F3 - Summary of baseline projection assumptions

Contribution annual increase over CPI	2.50% (1.75% after the year ending July 31, 2030)
Administration expense increase (real)	1.50%
Fund rate of return (real)	3.50%
Joint Contribution rate in 2014	\$ 64.14
Years of contribution freeze	2
- Projection Basis	Bermuda's Population Projections 2010-2020 and the 2000-2030 projection report
- Mortality Assumption	2014 CPM Private table (sex distinct) for ages greater than or equal to age 18 and UK GAD interim life table 2005-2007 (sex distinct) for ages less than 18
- Mortality Improvement	2014 CPM Improvement Scale B for ages greater than or equal to 18 and UK GAD 2006 population projection, 50% the applicable improvement for males, 100% for females for ages less than 18
- Fertility Rate	1.7% (unchanged from last review)
- Newborn sex ratio	0.95:1 male to female ratio for the first five years graded to 1.05:1 over the next ten years and remaining so thereafter
- Benefit rates	Updated to in force July 31, 2015
- Rate of benefit increase	To match inflation (CPI)
- Gratuity amounts	Based on contribution assumptions
- Pension amounts	In accordance with Table C2
- Rate of contribution increase	CPI plus 2.50% (CPI plus 1.75% after the year ending July 31, 2030)
- Employed population	Based on extrapolations from the 2014 Labour Force Survey Executive Report
- Contributing proportion	Static percentage of employed population based on contribution data for the month ending 31 July 2014

Appendix G Detailed Results

Table G1 - Projected income and outgo \$ million at constant 2014 prices

Year ending 31 July	Contribution income, increasing in line with prices plus			Outgo ³			
	2½% ¹	1¾%	3% ¹	Pension benefits	Other benefits	Expenses	Total outgo ¹
(1)	(2a)	(2b)	(2c)	(3)	(4)	(5)	(6)
2015	109.6	109.6	109.6	118.7	18.2	8.5	145.4
2016	109.6	109.6	109.6	124.0	18.3	8.6	151.0
2017	112.3	111.4	112.8	129.4	18.5	8.8	156.7
2018	115.0	113.3	116.1	134.9	18.8	8.9	162.6
2019	117.9	115.3	119.6	140.4	19.0	9.0	168.4
2020	120.8	117.3	123.1	148.2	20.0	9.2	177.3
2021	123.7	119.3	126.8	155.8	20.2	9.3	185.3
2022	126.8	121.3	130.5	163.2	20.5	9.4	193.2
2023	129.9	123.4	134.4	170.5	20.7	9.6	200.8
2024	133.1	125.5	138.4	177.6	21.0	9.7	208.3
2025	136.4	127.6	142.5	185.7	21.7	9.9	217.3
2026	139.7	129.8	146.7	193.5	22.0	10.0	225.5
2027	143.2	132.1	151.1	201.2	22.2	10.2	233.6
2028	146.4	134.0	155.2	208.6	22.5	10.3	241.4
2029	148.8	135.2	158.5	215.7	22.8	10.5	249.0
2030	150.9	136.2	161.6	221.3	22.3	10.6	254.3
2031	152.1	137.2	162.8	226.6	22.6	10.8	259.9
2032	153.2	138.2	164.0	231.6	22.8	10.9	265.4
2033	154.4	139.3	165.3	236.5	23.0	11.1	270.6
2034	155.5	140.3	166.5	241.2	23.2	11.3	275.6
2035	157.0	141.7	168.1	245.2	23.1	11.4	279.7
2036	158.5	143.0	169.7	248.9	23.3	11.6	283.8
2037	159.9	144.3	171.2	252.4	23.4	11.8	287.6

Year ending 31 July	Contribution income, increasing in line with prices plus			Outgo ³			
	2½% ¹	1¼%	3% ¹	Pension benefits	Other benefits	Expenses	Total outgo ¹
2038	161.4	145.6	172.7	255.7	23.5	12.0	291.2
2039	162.8	146.9	174.2	258.8	23.6	12.1	294.6
2040	163.9	147.9	175.5	260.6	23.1	12.3	296.1
2041	165.0	148.9	176.6	262.1	23.2	12.5	297.9
2042	166.1	149.8	177.8	263.5	23.3	12.7	299.5
2043	167.2	150.8	178.9	264.6	23.4	12.9	300.9
2044	168.3	151.8	180.2	265.6	23.5	13.1	302.1
2045	169.8	153.2	181.7	266.3	23.5	13.3	303.1
2046	171.2	154.5	183.3	266.7	23.7	13.5	303.9
2047	172.8	155.9	184.9	267.0	23.8	13.7	304.5
2048	174.3	157.2	186.6	267.1	24.0	13.9	305.0
2049	175.8	158.6	188.2	267.1	24.1	14.1	305.3
2050	177.3	160.0	189.8	264.9	22.5	14.3	301.7
2051	178.8	161.4	191.4	262.5	22.6	14.5	299.6
2052	180.4	162.7	193.1	260.0	22.6	14.7	297.4
2053	181.9	164.1	194.7	257.5	22.6	15.0	295.1
2054	183.5	165.6	196.4	255.0	22.7	15.2	292.8
2055	185.8	167.7	198.9	251.5	22.0	15.4	289.0
2056	188.2	169.8	201.4	248.1	22.0	15.6	285.7
2057	190.6	171.9	204.0	244.6	22.0	15.9	282.5
2058	193.0	174.1	206.6	241.3	22.0	16.1	279.5
2059	195.4	176.3	209.2	238.1	22.1	16.4	276.5
2060	198.2	178.8	212.1	234.9	22.0	16.6	273.5
2061	201.0	181.3	215.1	231.8	22.0	16.9	270.7
2062	203.8	183.9	218.1	228.8	22.1	17.1	268.0
2063	206.6	186.4	221.2	226.0	22.1	17.4	265.5
2064	209.5	189.0	224.2	223.3	22.2	17.6	263.1

¹Totals may not sum due to rounding.

²Increases up to 2030 and 1.75% thereafter

³Outgo columns are only representative of contribution income increasing 2½% in line with prices up to 2030 and 1.75% thereafter. Other margins of increase would change gratuity amounts and thus vary total outgo marginally.

Appendix H Projections of Fund Balance

Table H1 - Contributions increase at prices plus 2½%, Real rate of return of 3½% pa, constant 2014 prices

Year ending 31 July	Contribution income \$ million	Total Outgo \$ million	Estimated Fund \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	145.4	1,828.9	12.6
2019	117.9	168.4	1,902.0	11.3
2024	133.1	208.3	1,899.9	9.1
2029	148.8	249.0	1,764.7	7.1
2034	155.5	275.6	1,486.7	5.4
2039	162.8	294.6	1,071.1	3.6
2044	168.3	302.1	545.4	1.8
2049	175.8	305.3	(70.5)	(0.2)
2054	183.5	292.8	(723.1)	(2.5)
2059	195.4	276.5	(1,363.2)	(4.9)
2064	209.5	263.1	(1,972.2)	(7.5)

Table H2 - Contributions increase at prices plus 1¾%, Real rate of return of 3½% pa, constant 2014 prices

Year ending 31 July	Contribution income \$ million	Total Outgo \$ million	Estimated Fund \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	145.4	1,828.9	12.6
2019	115.3	168.4	1,896.7	11.3
2024	125.5	208.3	1,864.1	9.0
2029	135.2	248.8	1,662.4	6.7
2034	140.3	275.4	1,284.6	4.7
2039	146.9	294.3	747.4	2.5
2044	151.8	301.7	74.3	0.3
2049	158.6	304.8	(719.6)	(2.4)
2054	165.6	292.3	(1,587.7)	(5.4)
2059	176.3	276.0	(2,488.8)	(9.0)
2064	189.0	262.5	(3,414.4)	(13.0)

Table H3 - Contributions increase at prices plus 3%, Real rate of return of 3½% pa, constant 2014 prices

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	145.4	1,828.9	12.6
2019	119.6	168.4	1,905.6	11.3
2024	138.4	208.4	1,924.4	9.2
2029	158.5	249.1	1,836.2	7.4
2034	166.5	275.8	1,629.9	5.9
2039	174.2	294.8	1,301.6	4.4
2044	180.2	302.4	881.6	2.9
2049	188.2	305.6	393.5	1.3
2054	196.4	293.2	(104.5)	(0.4)
2059	209.2	276.9	(557.1)	(2.0)
2064	224.2	263.6	(938.9)	(3.6)

Table H4 - Contributions increase at prices plus 2½%, Real rate of return of 2% pa, constant 2014 prices

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	145.4	1,802.2	12.4
2019	117.9	168.4	1,759.5	10.5
2024	133.1	208.3	1,596.0	7.7
2029	148.8	249.0	1,287.6	5.2
2034	155.5	275.6	834.2	3.0
2039	162.8	294.6	251.6	0.9
2044	168.3	302.1	(422.4)	(1.4)
2049	175.8	305.3	(1,158.1)	(3.8)
2054	183.5	292.8	(1,894.0)	(6.5)
2059	195.4	276.5	(2,576.1)	(9.3)
2064	209.5	263.1	(3,183.6)	(12.1)

Table H5 - Contributions increase at prices plus 2½%, Real rate of return of 4% pa, constant 2014 prices

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	145.4	1,837.9	12.6
2019	117.9	168.4	1,951.4	11.6
2024	133.1	208.3	2,010.8	9.7
2029	148.8	249.0	1,948.8	7.8
2034	155.5	275.6	1,754.4	6.4
2039	162.8	294.6	1,431.3	4.9
2044	168.3	302.1	1,005.6	3.3
2049	175.8	305.3	496.2	1.6
2054	183.5	292.8	(43.9)	(0.2)
2059	195.4	276.5	(564.4)	(2.0)
2064	209.5	263.1	(1,044.6)	(4.0)

Table H6- Contributions increase at prices plus 1¾%, Real rate of return of 2% pa, constant 2014 prices

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	145.4	1,802.2	12.4
2019	115.3	168.4	1,754.4	10.4
2024	125.5	208.3	1,561.7	7.5
2029	135.2	248.8	1,192.1	4.8
2034	140.3	275.4	650.9	2.4
2039	146.9	294.3	(31.5)	(0.1)
2044	151.8	301.7	(818.3)	(2.7)
2049	158.6	304.8	(1,681.6)	(5.5)
2054	165.6	292.3	(2,562.2)	(8.8)
2059	176.3	276.0	(3,409.0)	(12.4)
2064	189.0	262.5	(4,204.7)	(16.0)

Table H7- Contributions increase at prices plus 1%, Real rate of return of 4% pa, constant 2014 prices

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	145.4	1,837.9	12.6
2019	115.3	168.4	1,946.1	11.6
2024	125.5	208.3	1,974.6	9.5
2029	135.2	248.8	1,844.2	7.4
2034	140.3	275.4	1,545.5	5.6
2039	146.9	294.3	1,092.4	3.7
2044	151.8	301.7	505.6	1.7
2049	158.6	304.8	(202.9)	(0.7)
2054	165.6	292.3	(989.3)	(3.4)
2059	176.3	276.0	(1,814.6)	(6.6)
2064	189.0	262.5	(2,672.2)	(10.2)

Table H8- Contributions increase at prices plus 3%, Real rate of return of 2% pa, constant 2014 prices

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	145.4	1,802.2	12.4
2019	119.6	168.4	1,763.0	10.5
2024	138.4	208.4	1,619.5	7.8
2029	158.5	249.1	1,354.6	5.4
2034	166.5	275.8	964.2	3.5
2039	174.2	294.8	453.3	1.5
2044	180.2	302.4	(139.4)	(0.5)
2049	188.2	305.6	(783.4)	(2.6)
2054	196.4	293.2	(1,415.2)	(4.8)
2059	209.2	276.9	(1,978.7)	(7.2)
2064	224.2	263.6	(2,450.8)	(9.3)

Table H9 - Contributions increase at prices plus 3%, Real rate of return of 4% pa, constant 2014 prices

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	145.4	1,837.9	12.6
2019	119.6	168.4	1,955.0	11.6
2024	138.4	208.4	2,035.7	9.8
2029	158.5	249.1	2,021.9	8.1
2034	166.5	275.8	1,902.3	6.9
2039	174.2	294.8	1,672.5	5.7
2044	180.2	302.4	1,362.3	4.5
2049	188.2	305.6	995.6	3.3
2054	196.4	293.2	632.1	2.2
2059	209.2	276.9	330.3	1.2
2064	224.2	263.6	120.9	0.5

Table H10 - Same as H1 except 110% of contributor population

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	120.5	145.4	1,840.1	12.7
2019	129.7	168.4	1,963.5	11.7
2024	146.4	208.3	2,042.0	9.8
2029	163.6	249.0	2,011.3	8.1
2034	171.1	275.6	1,863.2	6.8
2039	179.0	294.6	1,605.5	5.5
2044	185.1	302.1	1,270.7	4.2
2049	193.3	305.3	885.1	2.9
2054	201.9	292.8	510.2	1.7
2059	215.0	276.5	205.5	0.7
2064	230.4	263.1	2.0	0.0

Table H11 - Same as H1 except 90% of contributor population

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	98.6	145.4	1,817.8	12.5
2019	106.1	168.4	1,840.5	10.9
2024	119.8	208.3	1,757.7	8.4
2029	133.9	249.0	1,518.0	6.1
2034	140.0	275.6	1,110.2	4.0
2039	146.5	294.6	536.7	1.8
2044	151.5	302.1	(179.9)	(0.6)
2049	158.2	305.3	(1,026.1)	(3.4)
2054	165.2	292.8	(1,956.4)	(6.7)
2059	175.9	276.5	(2,931.9)	(10.6)
2064	188.5	263.1	(3,946.4)	(15.0)

Table H12 – Same as H1 except return of only employee's contributions for all gratuities

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	144.1	1,830.3	12.7
2019	117.9	166.9	1,909.7	11.4
2024	133.1	206.0	1,920.6	9.3
2029	148.8	246.0	1,804.5	7.3
2034	155.5	272.6	1,549.8	5.7
2039	162.8	291.3	1,163.2	4.0
2044	168.3	298.8	672.0	2.3
2049	175.8	301.5	99.3	0.3
2054	183.5	289.5	(504.2)	(1.7)
2059	195.4	273.3	(1,086.1)	(4.0)
2064	209.5	259.6	(1,624.6)	(6.3)

Table H13 – Same as H1 except return of only employee’s contributions for all gratuities except widow(er)s

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	144.6	1,829.8	12.7
2019	117.9	167.5	1,906.9	11.4
2024	133.1	206.9	1,913.0	9.3
2029	148.8	247.1	1,789.9	7.2
2034	155.5	273.7	1,526.6	5.6
2039	162.8	292.5	1,129.4	3.9
2044	168.3	300.1	625.5	2.1
2049	175.8	302.9	36.9	0.1
2054	183.5	290.7	(584.6)	(2.0)
2059	195.4	274.5	(1,187.9)	(4.3)
2064	209.5	260.9	(1,752.3)	(6.7)

Table H14 - Same as H1 except Normal Retirement Age of 67

Year ending 31 July	Contribution income \$ million	Total outgo \$ million	Estimated Fund balance \$ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2015	109.6	145.4	1,828.9	12.6
2019	117.9	163.6	1,906.9	11.7
2024	133.1	185.7	2,005.7	10.8
2029	148.8	223.9	2,026.7	9.1
2034	155.5	253.0	1,920.6	7.6
2039	162.8	272.6	1,705.5	6.3
2044	168.3	282.0	1,407.9	5.0
2049	175.8	284.9	1,064.0	3.7
2054	183.5	276.4	711.8	2.6
2059	195.4	261.7	421.0	1.6
2064	209.5	248.2	227.6	0.9

Appendix I Accrued Benefits

The Department has asked us to provide an assessment of accrued benefits as was done in the previous review. The assessment is in respect of existing and future beneficiaries from the existing population as of 31 July 2014. In particular, an assessment of the following is provided:

- The Accrued Benefit Obligation (the ABO). This is the value of the pension and other benefits accrued in respect of contributions paid to date into the Fund excluding allowance for future increases to benefits.
- The Projected Benefit Obligation (the PBO). This is the same as the ABO except that allowance is made for future increases to benefits.
- The Present Value of Future Benefits (the PVFB). This is the value of the total benefits payable to existing members and beneficiaries in the future in respect of past and future expected contributions. Allowance is made for future benefit increases.
- The present value of retired liabilities over the next 10 years for existing beneficiaries.
- The present value of expected gratuity payments over the next 10 years.

It should be noted that the assessments mentioned above in this appendix do not include any provision for future administrative expenses.

It should also be noted that the funding policy for the Fund is not based on full actuarial funding but based on sustainable funding. That is, contributions plus investment income should cover benefits and administration expenses on an annual basis while the fund builds up sufficient reserves to cover several years of benefits and expenses to withstand future adverse circumstances.

Assumptions

The ABO has been estimated by discounting expected future payments, excluding administration expenses, at 6% a year nominal, which is broadly equivalent to assuming future price increases of about 3% a year and a real rate of return (in excess of prices) of 3% a year. The PBO and PVFB have been estimated by assuming that benefits increase in line with future prices discounting future benefit payments in respect of both past and future service at a real rate of return of 3% a year.

All other applicable demographic and financial assumptions mentioned in appendix Table F1 were used in estimating these amounts. The assessment is based on the actual demographic and benefit data provided for the review and no new entrants are assumed.

Table I1 - The ABO, PBO and PVFB as at 31 July 2014

(\$million at constant 2014 prices)

Yr. Ending 31 July	2014 ²		
	ABO	PBO	PVFB
Accrued Rights			
Current Beneficiaries	1,170	1,400	1,400
Future Beneficiaries ¹	1,126	2,322	2,322
Total accrued rights	2,296	3,722	3,722
Future Service Rights			
Future Beneficiaries¹	-	-	2,081
Total service rights	2,296	3,722	5,804
Present Value of Future Contributions	-	-	2,183
Assets per accounts	1,802	1,802	1,802
Total Assets	1,802	1,802	3,986
Ratio	78.5%	48.4%	68.7%

¹In the last actuarial review, only the contributors were valued as future beneficiaries; the 2014 value includes non-contributors who are entitled to future benefits

²Totals may not sum due to rounding

The ABO, which assumes no further increases to benefits, is estimated to be \$2,296 million as at 31 July 2014. The Fund at \$1,802 million covers approximately 78.5% of the accrued benefits (excluding future administration expenses).

As at 31 July 2014, the estimated accrued liability assuming future increases to benefits and valued at a real return of 3% per annum, is \$3,722 million. The Fund at \$1,802 million covers approximately 48.4% of the accrued benefits (excluding future administration expenses). This level of coverage is higher than that indicated in the previous review (42.7%).

The PVFB for the total expected period of participation in the Fund is estimated to be \$5,804 million as at 31 July 2014. The present value of expected future contributions is estimated to be \$2,183 million as at 31 July, 2014. The Fund along with future contributions covers approximately 68.7% of both current and future benefits (excluding future administration expenses).

Present value of retired liabilities and gratuities

As at 31 July 2014, the present value of retired liabilities for existing beneficiaries over the next 10 years is estimated to be \$885 million.

The present value of gratuities expected to be paid over the next 10 years, assuming that contribution rates increase at 2.5% a year in excess of benefit increases is estimated to be \$28 million.

List of Tables and Figures

Table of Contents	i
Executive Summary	1
Table 1 Actual vs. Projected Experience	1
Table 2 Fund Performance Indicators	3
Table 3 Funded ratios	5
Chapter 1 Introduction	6
Chapter 2 Data & Experience since Previous Review, August 1, 2011	9
Figure 2.1 Key Economic Indicators, 2011 to 2014	10
Figure 2.2 Average benefits and number of beneficiaries	10
Figure 2.3 Number of Contributors	11
Figure 2.4 Beneficiaries per 100 Contributors.....	12
Figure 2.5 Average GDP per Capita & Pensions in Payment, 20011 to 2014	12
.....	12
Table 2.1 Summary of Fund’s Income and Expenditure, 2011 – 2014 (millions of \$’s)	13
Table 2.2 Years of Benefit Coverage.....	14
Figure 2.6 Fund rate of return, 2004 to 2014	15
Figure 2.7 Invested Asset Allocation June 2011	16
Figure 2.8 Invested Asset Allocation June 2014	16
Table 2.3 Actual and Target Asset Allocation June 2011 and 2014.....	17
Table 2.4 Projections from Previous Review Compared With Actual Experience	17
Chapter 3 Best-Estimate Assumptions	19
3.1.1 Population projections.....	19
Table 3.1 Projected Population 2014 - 2064 (Males and Females).....	20
3.1.2 Projected Contributors and Beneficiaries.....	20
3.1.3 Projected Numbers of Contributors and Contributions	21
Table 3.2 Projected numbers of contributors	21
3.1.4 Average Age of Contributors	22
Table 3.3 Projected average age of future contributors.....	22
3.1.5 Benefits and Beneficiaries	22
Table 3.4 Projected numbers of Beneficiaries (aged 65 or over).....	23
3.2.1 Increases to Benefit and Contribution Rates	24
3.2.2 Real Rate of Investment Return.....	24
3.2.3 Administration and Investment Expenses	24
Chapter 4 Best-Estimate Projections	26
Table 4.1 Impact of Changes in Assumptions and Modeling	26
Table 4.2 Projected income and outgo (\$million) at constant 2014 prices	27

Figure 4.1	Projected Contribution Income and Total Outgo (\$ million at constant 2014 prices)	28
Figure 4.2	Projected Fund Balance, Real Rate of Return of 3½% a year (\$ million at constant 2014 prices)	29
Chapter 5	Variant Projections	31
Table 5.1	Projected income and outgo (\$million) at constant 2014 prices	32
Figure 5.1	Projected contribution income and total outgo, main and variant assumptions for contribution rate increases (\$ million at constant 2014 prices)	33
Figure 5.2	Projected Fund Balance, main and variant assumptions for contribution rate increases, real rate of return of 3½% a year (\$ million at constant 2014 prices)	34
Figure 5.3	Projected Fund balance, Real rates of return of 2%, 3.5% and 4% a year. Contributions increase at 2.5% a year more than prices until 2030 and 1.75% thereafter (\$ million at constant 2014 prices)	35
Figure 5.4	Projected Fund balance, Real rates of return of 2%, 3½% and 4% a year Contributions increase at 1.75% a year more than prices (\$ million at constant 2014 prices)	36
Figure 5.6	Projected Fund balance, Real rates of return of 2%, 3½% and 4% a year Contributions increase at 3% a year more than prices (\$ million at constant 2014 prices)	37
Figure 5.7	Projected Fund balance, 110% and 90% Contributors (\$ million at constant 2014 prices)	38
Chapter 6	Conclusions	41
Chapter 7	Statement of Actuarial Opinion	42
Appendix A	Main Provisions of Scheme from August 2014	43
Appendix B	Benefit and Contribution Rates, 2003 to 2014	45
Table B1	Annual increases in CPI, benefits and contributions	45
Table B2	Benefit and contribution rates, 2001-2007	46
Table B2 (continued)	Benefit and contribution rates, 2001-2007	47
Appendix C	Membership Data	48
Table C1	Numbers and amounts of monthly benefits in payment	48
Table C2	Average amounts of monthly benefits in payment	48
Table C3	Contributions data	49
Table C4	Age Distribution of Contributors	49
Appendix D	Financial Data	50
Table D1	Income and Expenditure - 2012 to 2014 (\$ million) ¹	50
Table D2	Fund assets at market value, 31 July 2014	51
Table D3	Annual investment returns of Fund	51
Appendix E	Population Projection	52
Table E1	Estimated population as at January 31, 2014	52
Table E2	Expectation of Life	53
Table E3	Projected population 2014 - 2064 (Males)	54
Table E4	Projected population 2014 - 2064 (Females)	54
Table E5	Projected population 2014 - 2064 (Males and Females)	55
Figure E1	Projected population 2014 -2064 (Males and Females)	56

Appendix F	Estimating Methods.....	57
	Table F1 - Summary of benefit distribution assumptions.....	58
	Table F3 - Summary of baseline projection assumptions.....	61
Appendix G	Detailed Results.....	62
	Table G1 - Projected income and outgo \$ million at constant 2014 prices.....	62
Appendix H	Projections of Fund Balance	64
	Table H1 - Contributions increase at prices plus 2½%, Real rate of return of 3½% pa, constant 2014 prices...	64
	Table H2 - Contributions increase at prices plus 1¾%, Real rate of return of 3½% pa, constant 2014 prices...	64
	Table H3 - Contributions increase at prices plus 3%, Real rate of return of 3½% pa, constant 2014 prices.....	65
	Table H4 - Contributions increase at prices plus 2½%, Real rate of return of 2% pa, constant 2014 prices.....	65
	Table H5 - Contributions increase at prices plus 2½%, Real rate of return of 4% pa, constant 2014 prices.....	66
	Table H6- Contributions increase at prices plus 1¾%, Real rate of return of 2% pa, constant 2014 prices	66
	Table H7- Contributions increase at prices plus 1¾%, Real rate of return of 4% pa, constant 2014 prices	67
	Table H8- Contributions increase at prices plus 3%, Real rate of return of 2% pa, constant 2014 prices	67
	Table H9 - Contributions increase at prices plus 3%, Real rate of return of 4% pa, constant 2014 prices	68
	Table H10 - Same as H1 except 110% of contributor population.....	68
	Table H11 - Same as H1 except 90% of contributor population.....	69
	Table H12 – Same as H1 except return of only employee’s contributions for all gratuities	69
	Table H13 – Same as H1 except return of only employee’s contributions for all gratuities except widow(er)s	70
	Table H14 - Same as H1 except Normal Retirement Age of 67	70
Appendix I	Accrued Benefits.....	71
	Table I1 - The ABO, PBO and PVFB as at 31 July 2014	72



Morneau Shepell is the largest company in Canada offering human resources consulting and outsourcing services. The Company is the leading provider of Employee and Family Assistance Programs, as well as the largest administrator of pension and benefits plans. Through health and productivity, administrative, and retirement solutions, Morneau Shepell helps clients reduce costs, increase employee productivity, and improve their competitive position. Established in 1966, Morneau Shepell serves more than 20,000 clients, ranging from small businesses to some of the largest corporations and associations in North America. With approximately 3,600 employees in offices across North America, Morneau Shepell provides services to organizations across Canada, in the United States, and around the globe. Morneau Shepell is a publicly traded company on the Toronto Stock Exchange (TSX: MSI).