TELUS Health

Actuarial Review of the Contributory Pension Fund of Bermuda as of August 1, 2023

Final Report

June 2024

Table of contents

Executive Summary

This is the actuarial review for the Bermuda Contributory Pension Fund (the "Fund") as at August 1, 2023 (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 2073. The last review was done as at August 1, 2020.

During the 3-year review period, 2020 to 2023, the Bermudian economy experienced higher growth than previously as the economy rebounded from the impact of COVID-19 measures. Real GDP performance averaged 5.9% over 2021-2022. Inflation (per the annual average Consumer Price Index) increased from an average of 0.6% over 2018-2020 to 3.1% over 2021-2023.

In response to the economic challenges brought about by the COVID-19 pandemic, a temporary amendment was made to the Contributory Pensions Act allowing employees, employers (with employee consent) and self-employed persons to opt to suspend contributions for the period July 1, 2020 to June 30, 2021.

Highlights of the Fund

The financial performance of the Fund over the three years was above expectations mainly due to higher-than-expected investment and contribution income.

- The Fund earned a nominal rate of return net of investment expenses of 7.0% per annum over the three years since the last review (8.0% gross of investment expenses). This compares with the nominal rate of return assumed at the previous valuation of 6.5% per annum.
- The net assets of the Fund grew 8.7% over the three years from $1.97 billion to $2.14 billion. This is 7.1% above the projected value from the previous review.
- Contribution income in 2022/2023 ($135.8 million) was 21% higher than in 2019/2020 and benefit expenditure ($203.5 million) increased 14% over the three years since the last review.
- Total expenses for the three years averaged 0.95% of the average Fund, up from 0.46% over the previous 3 years. Pure administrative expenses averaged 0.16% of the average Fund over the 3 years. Total expenses were 11.3% of contribution income at the Review Date.
- The Asset / Expenditure ratio is a static measure of the size of the Fund relative to annual expenditure or the number of years cover provided by the Fund based on the current annual expenditure. This ratio decreased over the three years from 10.4 years to 9.7 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, 93.5% of the net assets are invested, with the major investments being equities, bonds, private equities and real assets to a lesser extent.

- Since the last review, the number of contributors has declined, from 34,629 in the year ending July 31, 2020 to 33,770 in the year ending July 31, 2023.
- Benefit rates increased during the inter-review period. Benefit rates increased by 2.75% and 4.1% effective August 2021 and August 2023 respectively. No increases were made to contribution rates during the inter-review period.
- Based on the population projection figures, the old-age support ratio has declined since the last review. The ratio was 3.1 in 2020 and is 2.8 in 2023. The comparative ratio using the actual contributors and beneficiaries of the Fund declined from 2.6 in 2020 to 2.4 in 2023.

A summary of the performance indicators mentioned above is shown in Table 1 below.

Table 1 Fund Performance Indicators

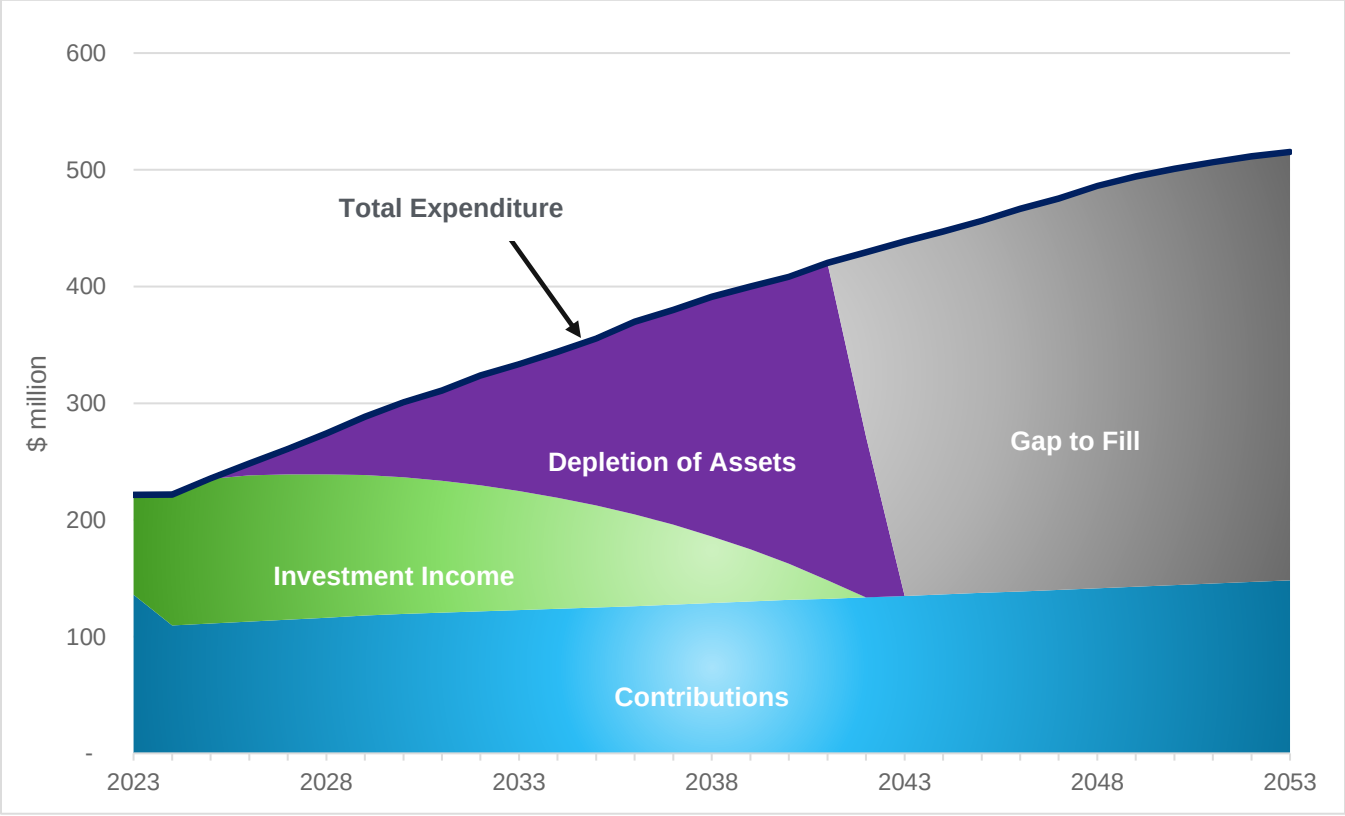
	July 2011	July 2014	July 2017	July 2020	July 2023
Number of beneficiaries in receipt of monthly benefits	10,459	11,568	12,842	13,926	14,538
Average monthly benefit	$933	$932	$991	$1,043	$1,098
Number of contributors[1]	35,913	34,806	35,889	34,629	33,770
Active Insured as a % of Working Age Population	87%	89%	89%	88%	89%
Pensioner Support Ratio: Number of contributors / Number of Beneficiaries aged 65+	3.4	3.0	3.1	2.6	2.4
Old-Age Support Ratio: Working-Age Population / Age 65+ Population	4.4	3.9	3.6	3.1	2.8
Average number of weekly contributions per month	3.84	3.55	3.90	3.68	3.78
Weekly Benefit Rate for Contributory Old Age Pension (OAP)	$226	$226	$238	$248	$265
Weekly Contribution Rate	$30.40	$32.07	$34.47	$35.92	$35.92
Annual Contribution Income ($ million)	$117.30	$107.4	$121.7	$112.3	$135.8
Annual Benefit Expenditure ($ million)	$115.45	$133.7	$155.8	$178.6	$203.5
Annual Administration & Investment Expenses ($ million)	$9.45	$8.4	$6.2	$10.6	$15.3
Net Assets (Fund) $ million	$1,533.0	$1,802.3	$1,927.7	$1,970.4	$2,141.4
Average Nominal Rate of Return (last 3 yrs)	6.4%	7.2%	4.3%	4.0%	7.0%
Average Real Rate of Return (last 3 yrs)	4.2%	5.0%	2.5%	3.6%	3.7%
Annual Expenses as a % of Contributions	8.5%	7.8%	5.1%	9.5%	11.3%
Annual Expenses as a % of Average Fund	0.66%	0.49%	0.34%	0.54%	0.72%
Net Assets / (Benefits and Expenses)	12.3	12.6	11.8	10.4	9.7
Invested Assets / Net Assets	95%	97%	93%	95%	94%

[1] *Figures from 2017 and onwards include Government workers.*

Main Findings & Projection Results

- The Fund is projected to decline steadily until it is exhausted in 2042 under the best estimate scenario. This is 2 years earlier when compared to the previous review.
- Expenditure is projected to exceed contributions plus investment income from 2026 meaning that assets will have to be liquidated to help meet expenditure.
- As more and more assets are sold to meet benefits and expenses, they are projected to be depleted by 2042. The average annual income shortfall (grey section in Figure 1 below) from 2043 until the end of the projection period, is approximately 238% of contribution income. That is, the contribution rate would have to more than triple to meet benefits and expenses, thereby reducing the ratio of the benefit rate to the contribution rate from 369% to 109%.

Figure 1 Sources of Financing Expenditure, 2023 to 2053



- Projections were also made under two different sets of distinct population and economic assumptions. These are referred to as Optimistic and Pessimistic Scenarios in this report. The Fund is depleted between 2040 and 2045 under these alternative scenarios.
- If contributions were to increase by 2.5% p.a. more than benefits, this is estimated to extend the life of the fund by 3 years until 2045. Increasing future contributions by 3% p.a. produces an equivalent result to hiking contributions by 10% next year thereafter reverting to annual increases of 2%. Both add 1 year to the life of the Fund (fund expected to be depleted in 2043).
- If there is an increase in the retirement age to 70 years over an 8-year period ending 2035, all else unchanged, the life of the Fund would be extended to 2051. Extending the retirement age to 68 extends the life of the Fund to 2047.
- If investment returns are 1% higher than expected, the life of the Fund is estimated to be extended by 2 years to 2044. A 1% lower investment return results in fund depletion 2 years prior in 2040.
- 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 25 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 (2.8 to 1.5 over 50 years).

Accrued Benefits

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. This is consistent with the partial funding method where future generations are expected to meet part of the cost of previous generations.

The concept of comparing accrued benefits with existing assets is more consistent with a policy of full funding and therefore the following results are presented for illustrative purposes only. The present value of benefits accrued up to July 31, 2023 is estimated to be $2.9 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 $3.9 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 2% per annum, the present value of both accrued and future liabilities is estimated to be $5.5 billion. The present value of future contributions in respect of the future benefit accruals, assuming increases in the contribution rate in line with inflation, is estimated to be $1.5 billion. These future contributions together with current assets total $3.6 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.

Table 2 Funded ratios ($'s in billions)

$'billions	Accrued Benefits (no increases)	Projected Accrued Benefits	Projected Future Benefits
Total Liabilities	$2.9	$3.9	$5.5
Present Value of Future Contributions	-	-	$1.5
Current Fund Value	$2.1	$2.1	$2.1
Total Fund + Future Contributions	$2.1	$2.1	$3.6
Ratio: (Fund+ Future Contributions Value) / Liabilities	73%	55%	66%

The Fund is estimated to be 73% funded on an accrued basis (no benefit increases) and 55% if benefits are assumed to increase at 2% per annum. If benefits continue to accrue and contributions are made assuming increases to both, then the Fund is estimated to be 66% funded.

Recommendations

The CPF is not financially sustainable for the long-term: assets are 55.2% of projected accrued liabilities and the fund is projected to be exhausted around 2042. While full funding is not required for national pension systems, there should be a viable financing strategy that ensures that future generations will not be overly burdened or forced to receive significantly reduced benefits. We recommend that the following policies are established to set out the objectives of the CPF, to improve its governance and to guide future decision making:

1. Benefits Policy – the goals and priorities of the system
2. Funding Policy – financing strategy with explicit medium- and long-term targets that trigger when benefits and/or contributions are adjusted
3. Risk Policy – the plan for managing the risks of the system

We note that the Government announced a policy decision in 2010 to increase contributions by 2.5% a year more than benefits. We observe that both benefits and contributions have increased broadly in line with inflation over the period 2006 to current date. We recommend that the Government reviews its policy and approach to future contribution increases.

Consideration should also be given to benefit changes that would positively impact the Fund's sustainability without compromising its ultimate objectives. One such change is an increased retirement age as this materially enhances the Fund's lifespan without increasing the cost burden on contributors.

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 1 Introduction

We have conducted an actuarial review of the Contributory Pension Fund (the "Fund") as at August 1, 2023 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 August 1, 2020 by TELUS Health (formerly LifeWorks) and the results were presented in our report dated July 2021.

The Act came into effect on December 24, 1970 replacing a repealed Act dated August 5, 1968. Since the last review, there were no significant amendments to the Act aside from changes to benefit and contribution amounts. In response to the economic challenges brought about by the COVID-19 pandemic, a temporary amendment was made to the Contributory Pensions Act allowing employees, employers (with employee consent) and self-employed persons to opt to suspend contributions for the period July 1, 2020 to June 30, 2021.

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

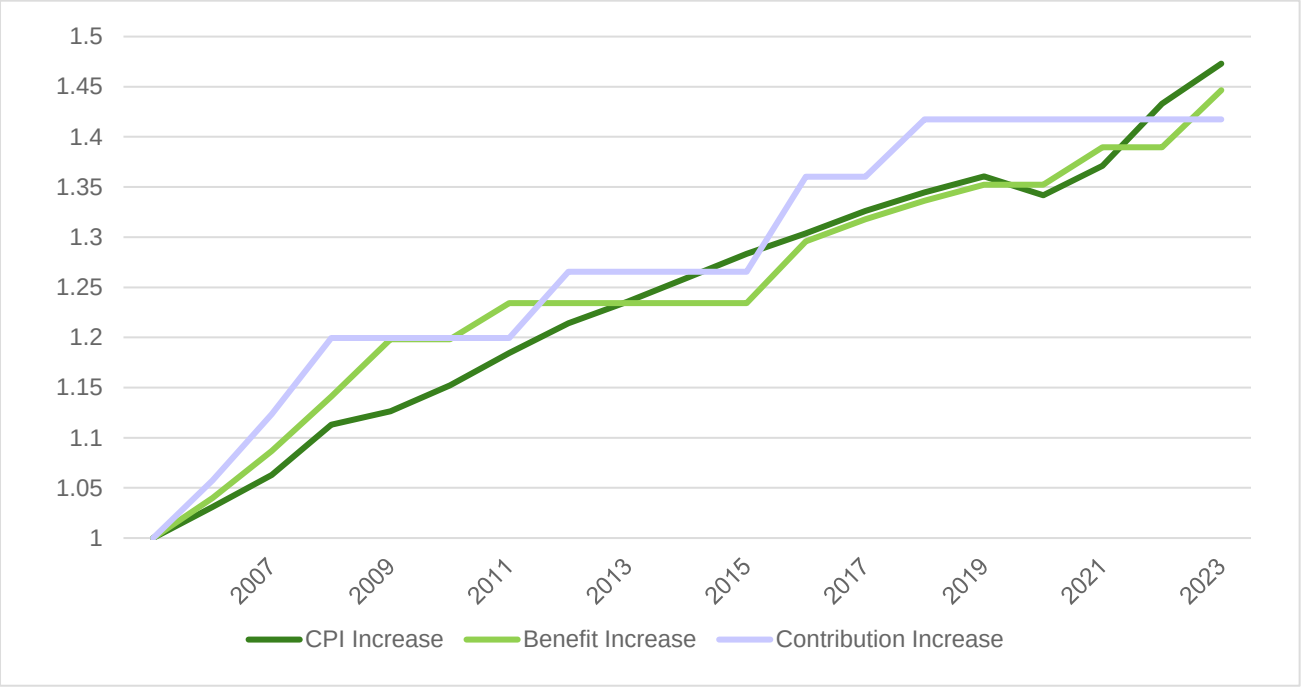
Entitlement to contributory benefits depends on the period for which contributions are paid and on the annual average number of contributions (subject to a minimum contributory period and a minimum annual average). Non-contributory pensions are payable to those ineligible for contributory benefits, subject to certain qualifying criteria. The pension commencement is age 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. Figure 1.1 shows historic cumulative increases to benefit and contribution rates over the period 2006 to 2023.

Figure 1.1 Cumulative Benefit and Contribution Rate Increases, 2006 to 2023



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. However, contribution rates were frozen from 2009 to 2011. A policy decision was announced in 2010 to increase contributions by 2.5% a year more than benefits. Contribution rates were increased by 5.5% in August 2012 with no further increases until 2016 with a 7.5% increase and 2018 with a 4.2% increase. There have been no contribution increases since 2018. In June 2020, a temporary amendment was made to the Contributory Pensions Act allowing employees, employers (with employee consent) and self-employed persons to opt to suspend contributions for the period July 1, 2020 to June 30, 2021.

Benefits were increased by 5% in August 2016 and since then increases have largely followed the growth in the CPI over the previous 12 month period. Table B1 of Appendix B summarises price inflation and benefit and contribution increases in the period since August 2006. Table B2 summarises the rates of benefits and contributions payable at each triennial review date commencing August 2008. This report takes account of the benefit and contribution rates that were in effect in August 2023.

Notwithstanding the 2010 policy announcement, we note that both benefits and contributions have increased in line with inflation over the period 2006 to current date as illustrated in Figure 1.1 above.

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

1.1 Purpose of the Report

This 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. We understand that the Government intends to continue to increase benefit rates in the future broadly in line with increases in the Consumer Price Index.

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 ("best estimate") but they should not be taken as predictions of the outcome. Given the uncertainty in forecasting such a long period, two alternative scenarios that highlight the sensitivity of the results to differences in assumptions regarding future outlook have been performed. These alternative projection sets encompass assumptions that are generally more optimistic and more pessimistic than those of the Best Estimate projections. In addition, the review examines the impact on the Fund of various contribution policies and increased retirement ages.

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 August 1, 2023.

1.3 Results of Previous Review

The previous actuarial review was conducted as of August 1, 2020. The main financial projections were expressed in terms of the benefit and contribution rates in effect in August 2020. Benefits were assumed to increase in line with changes in the assumed Consumer Price Index (CPI) for future years.

The main results of the 2020 review indicated that if contributions were to increase by 2.5% more than benefits with future real returns of 4.5% a year, then the Fund was projected to decline steadily until it becomes exhausted in 2044. Under variant scenarios of investment returns and contribution and benefit rates, a few additional years could be expected to be added to the Fund's lifetime. Longer-term Fund sustainability was exhibited under scenarios where the retirement age increased to 70 especially when coupled with contribution rate increases exceeding benefit rate increases by 4% 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 53% assuming benefits continue to increase in the future with CPI. If benefits were frozen at 2020 levels the Fund was estimated to cover 71% of the accrued benefits.

Chapter 2 Data & Experience since Previous Review

2.1 Data

Data was provided in a seriatim (individual) form in Excel spreadsheets extracted from the Department's administration system. For beneficiaries, data covering the period August 1, 2020 to July 31, 2023 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 also availed ourselves with the '*2016 Population and Housing Census Report'* and '*Labour Force and Population'* statistics up to 2022 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 unaudited accounts.

We were also provided with copies of unaudited Statements of Financial Position and Statements of Changes in Net Assets for the years ending July 31, 2021, 2022 and 2023.

A copy of the NEPC's report on the invested assets as of June 30, 2023, titled *'Contributory Pension Fund Quarterly Performance, June 30, 2023'* was also received.

2.2 Economic Experience

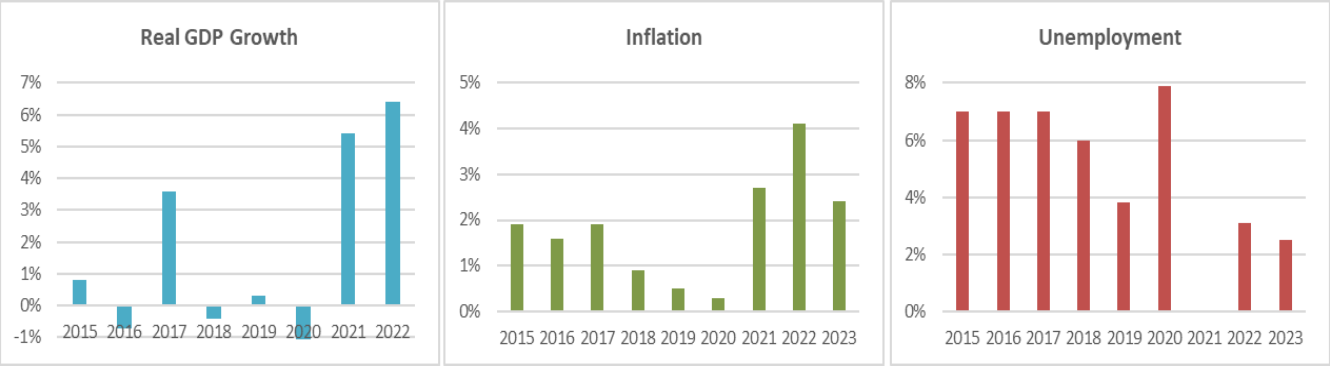
One of the main sources of income for the Fund, contributions, is closely linked to economic performance and labour market changes. Whereas earnings on investments are only slightly linked to the Bermuda economy. Benefits are also affected by economic changes as both benefit and contribution rates are adjusted on an ad hoc basis relative to annual inflation.

As shown in the charts in Figure 2.1, the Bermudian economy experienced positive growth since the last review in 2020 with real GDP performance averaging 5.9% over 2021-2022 as the economy rebounded from the impact of the COVID-19 measures.

Inflation (annual average Consumer Price Index) increased from an average of 0.6% over 2018-2020 to 3.1% over 2021-2023.

Unemployment rates have continued the downward pre-COVID trend from 3.8% in 2019 down to 2.5% in 2023.

Figure 2.1 Key Economic Indicators, 2015 to 2023



** No unemployment statistics published for 2021*

2.3 Fund Experience

2.3.1 Contributions and Benefits

Table C1 of Appendix C summarises the numbers and amount of monthly benefits in payment as at August 1, 2023 and August 1, 2020 for comparison. Table C2 of Appendix C summarizes the average amount of benefits paid in 2023 and 2020.

The number of beneficiaries has steadily increased over the period since the previous review as shown in Figure 2.2 below. The actual number of persons making one or more contributions decreased over the 3 years since the previous review, going from 34,629 in 2020 to 33,770 in July 2023. This has resulted in the ratio of beneficiaries per 100 contributors increasing from 40 in 2020 to 43 in 2023.

Figure 2.2 Beneficiaries and Contributors, 2020 to 2023

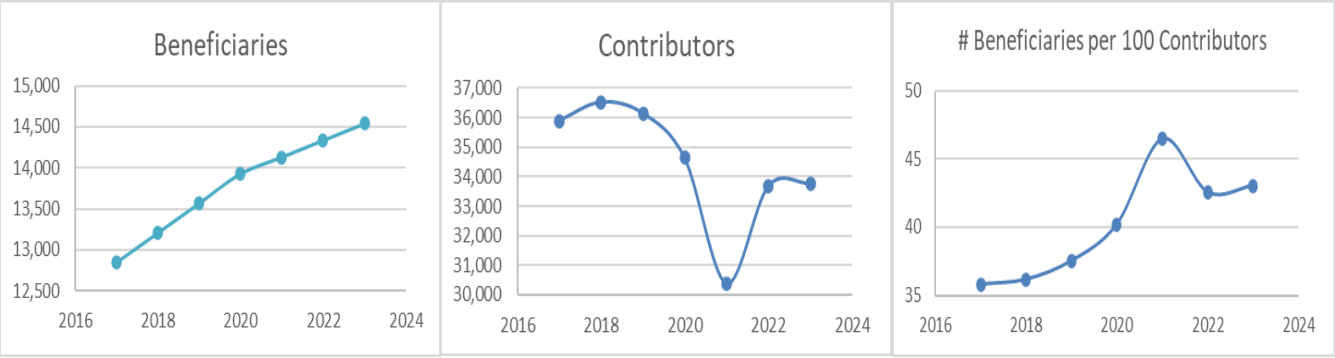


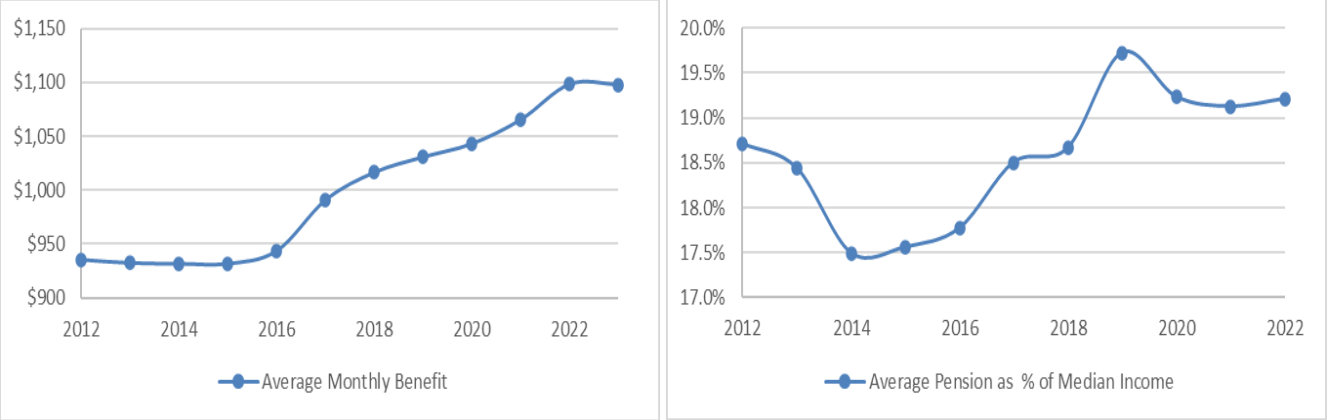
Table C3 of Appendix C summarises the number of persons making one or more contributions, and the average number of weekly contributions per month earned, for the 12-month periods ending July 31, 2021 to 2023. The average number of weekly contributions per month increased from 3.68 in 2020 to 3.78 in 2023.

Partially funded social security schemes are designed on the premise that the contributions from the working population together with investment income would cover all or most of the expenditure payable 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 an increasing trend in this ratio.

2.3.2 Replacement Ratio

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 the Median Gross Annual Income as per the annual *Employment Survey Tabulation Set* prepared by the Department of Statistics, as a comparator. In 2012, the ratio was 18.7%. Thereafter the ratio declined until 2015 mainly due to level benefit amounts. In 2016 and subsequent years, the ratio has increased steadily in line with benefit increases. In 2022, the ratio stands at 19.2%.

Figure 2.3 Average Pensions in Payment & Median Income, 2012 to 2023



2.3.3 Fund Income and Expenditure

The following table provides summary income and expenditure amounts for 2020 to 2023. 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, 2020 – 2023 (millions of $'s)

	2020	2021	2022	2023
Income				
Contributions	112.3	85.9	101.4	135.8
Investment (net)	42.9	108.8	144.9	67.3
Net Change in Fair Value of Investments	47.6	288.7	(214.5)	43.5
Transfers / Other	3.3	22.6	12.6	13.6
Total	206.0	506.0	44.4	260.3
Expenditure				
Benefits	178.6	183.5	189.1	203.5
Administrative and Investment	10.6	22.7	23.0	15.3
Bad Debt Provision	0.2	0.7	(0.4)	2.2
Total	189.4	206.9	211.7	221.0
Excess of Income over Expenditure	**16.6**	**299.1**	**(167.2)**	**39.2**
Net Assets (end of year)	**1,970.4**	**2,269.4**	**2,102.2**	**2,141.4**

Figures may not sum due to rounding

Key highlights of income and expenditure are:

(i) Contributions (on an accrual basis) decreased significantly in 2021 before rising again in 2023. The decline observed in 2021 is as a result of the take-up of the option to suspend contributions during the period July 1, 2020 to June 30, 2021. Contribution rates were last increased effective August 2018 by 4.2%.

(ii) Total investment income was highly volatile over the period increasing significantly in 2022 before falling again in 2023.

(iii) Total administrative costs increased during the inter-valuation period. Included in these costs are Investment Management expenses of $18.6m, $20.5m and $11.9m for the three years 2021 to 2023, respectively.

(iv) Benefit expenditure increased each year due to the increase in the number of beneficiaries and the increase in benefit rates.

(v) In all three years, benefit expenditure exceeded contribution income. Total Expenditure exceeded income in 2022 by $167m resulting from fair value losses on investments. Net income was positive in all other years.

(vi) Net Assets increased 8.7% over the three years.

2.4 Investments

As at July 31, 2023, the market value of the net assets was $2.141 billion, approximately 9.7 times total expenditure in the year ending July 31, 2023. This means that the assets in the Fund at their current value can cover approximately 9 to 10 years of 2023 benefit payments and expenses. Table 2.2 shows the coverage ratios.

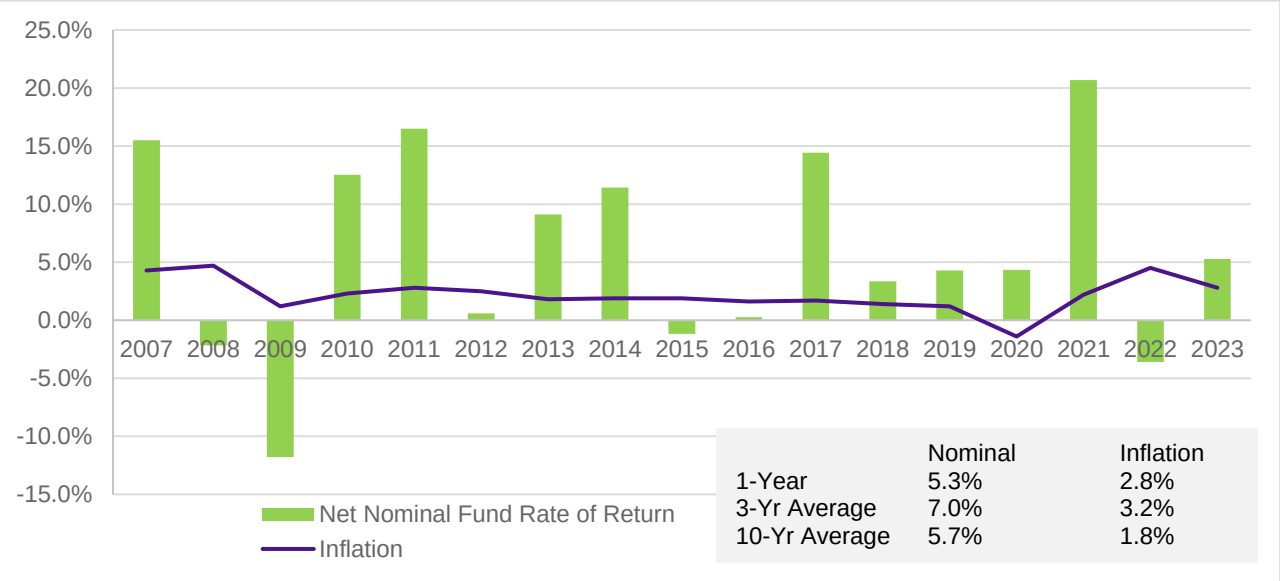
Table 2.2 Years of Benefit Coverage

	2020	2021	2022	2023
Net Assets (end of year)	1,970.4	2,269.4	2,102.2	2,141.4
Benefits	178.6	183.5	189.1	203.5
Total Outgo	189.4	206.9	211.7	221.0
Net Assets / Total Outgo	**10.4**	**11.0**	**9.9**	**9.7**

Over the three years ended July 31, 2023, the average nominal rate of return earned on the Fund was 7.0% 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 July 31, 2023 was 3.7% per annum (see Table D3 of Appendix D). The nominal return was extremely high in 2021 (20.7%) which drove the overall average return upwards. This was followed by a negative nominal return and real return in 2022 of -3.6% and -7.7% respectively.

Over the ten years ended July 31, 2023, the average nominal rate of return earned on the Fund (net of investment expenses) was 5.7% 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 July 31, 2023 was 3.9% per annum. The long-term nominal rate of return assumed for the projections presented in this review is 6.5% gross of investment expenses (6.0% net).

Figure 2.4 Fund rate of return, 2007 to 2023



The relationship between investments and net assets, which measures how efficiently available funds are invested, averaged 94% over the 3-year review period. This ratio indicates that there is a 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 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. Figures 2.5 and 2.6 show the asset mix at June 2020 and June 2023 respectively. Table 2.3 shows the asset mix at June 2020 and 2023 compared with the target ranges. There have been some shifts in the allocations since the previous valuation with the larger ones being an increase in Private Markets (+12.3%), a decrease in Core Bonds (-5.6%) and in Risk Parity (-3.7%).

***Figure* 2.5 Invested Asset Allocation June 2020**

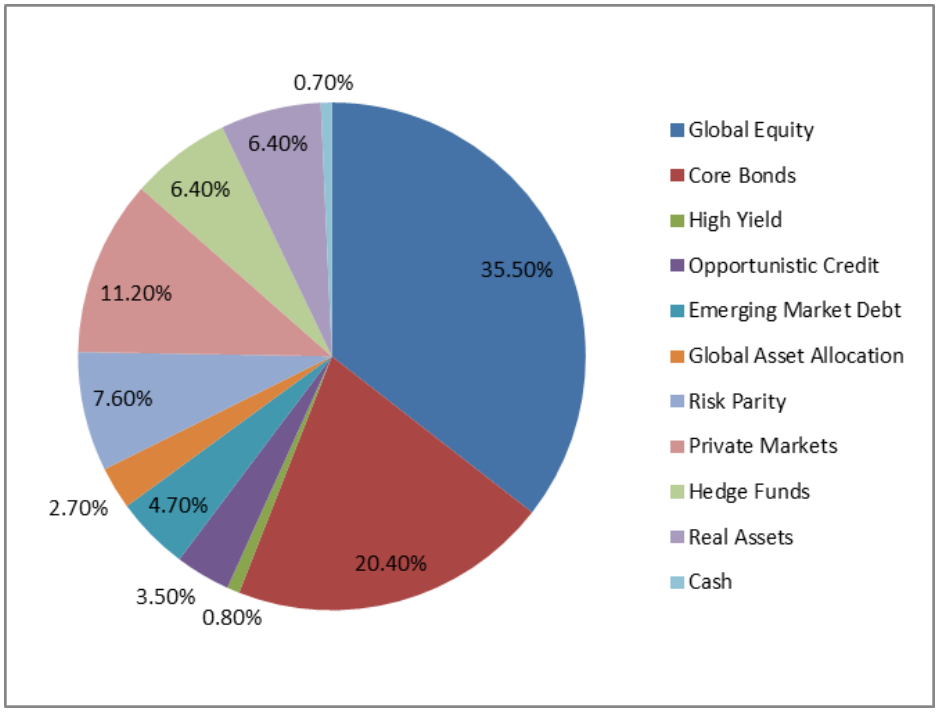


Figure 2.6 Invested Asset Allocation June 2023

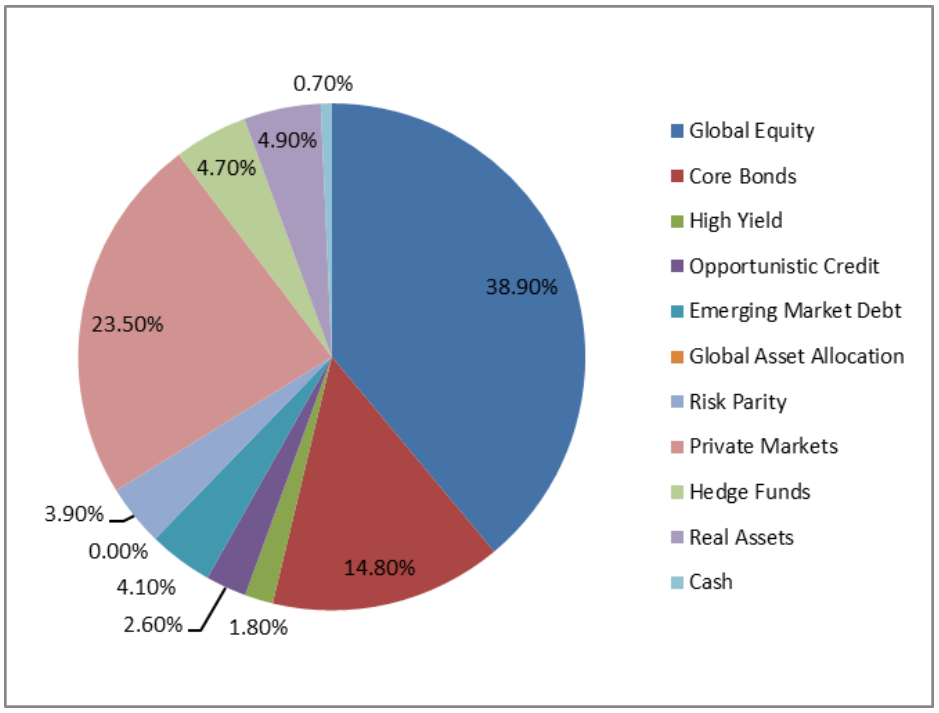


Table 2.3 Actual and Target Asset Allocation June 2020 and 2023

Invested Asset Category	2020 Actual	2020 Target	2023 Actual	2023 Target
Global Equity	35.5%	35.0%	38.9%	38.0%
Core Bonds	20.4%	19.5%	14.8%	19.5%
High Yield	0.8%	1.0%	1.8%	1.0%
Opportunistic Credit	3.5%	3.0%	2.6%	3.0%
Emerging Market Debt	4.7%	5.0%	4.1%	5.0%
Global Asset Allocation	2.7%	3.0%	0.0%	0.0%
Risk Parity	7.6%	5.0%	3.9%	5.0%
Private Markets	11.2%	15.0%	23.5%	17.0%
Hedge Funds	6.4%	6.0%	4.7%	6.0%
Real Assets	6.4%	7.5%	4.9%	5.5%
Cash	0.7%	0.0%	0.7%	0.0%

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

	2021-2023 Projected (millions of $'s)	2021-2023 Actual (millions of $'s)	% Difference
Contribution Income	$284.9	$323.1	13.4% above projected
Investment Income	$372.5	$487.6	30.9% above projected
Benefit Expenditure	$601.0	$576.1	4.2% below projected
Admin & Inv. Expenditure	$26.4	$63.6	141.1% above projected
2023 Year-end Net Assets	$2,000	$2,141	7.1% above projected
Net Assets/Expenditure Ratio (end of period)	9.0	9.7	7.2% above projected

The results show that contribution income was higher than expected due to fewer contributors taking up the option to suspend contributions than was assumed in the 2020 best estimate scenario. Benefit expenditure was lower than expected as deaths were higher than expected, particularly during 2021. Administrative and Investment expenditure was significantly higher than expected. Of the $63.6 million, $10.1 million is attributable to pure administrative cost over the three years. Investment income was significantly higher than expected. The assumed nominal rate of return on the Fund assets (gross of investment expenses) was 6.5% for 2021 to 2023. The actual average nominal rate of return over the three years was 7.0% (net of investment expenses and 8.0% gross). Inflation was assumed to be 2%, while average inflation for the three years was 3.2%. The overall result is a higher than projected Fund value.

2.6 Subsequent Events

This report is being prepared in June 2024. Benefit rates have changed subsequent to the valuation date (effective August 16, 2023) and we have taken this into consideration when preparing the projections.

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's 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, two alternative scenarios that highlight the sensitivity of the results to differences in assumptions regarding future outlook have been performed. These alternative projection sets encompass assumptions that are generally more optimistic and more pessimistic than those of the Best Estimate projections. In addition, the review examines the impact on the Fund of various contribution policies and increased retirement ages. Results of the Best Estimate, and Alternative scenarios are presented in Chapters 5 and 6 respectively.

3.1 Demographic Projections

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 (2023 to 2073). The baseline population for the long-term projection is taken from the 2016 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.

Figure 3.1 Projected Total Population 2023 - 2073

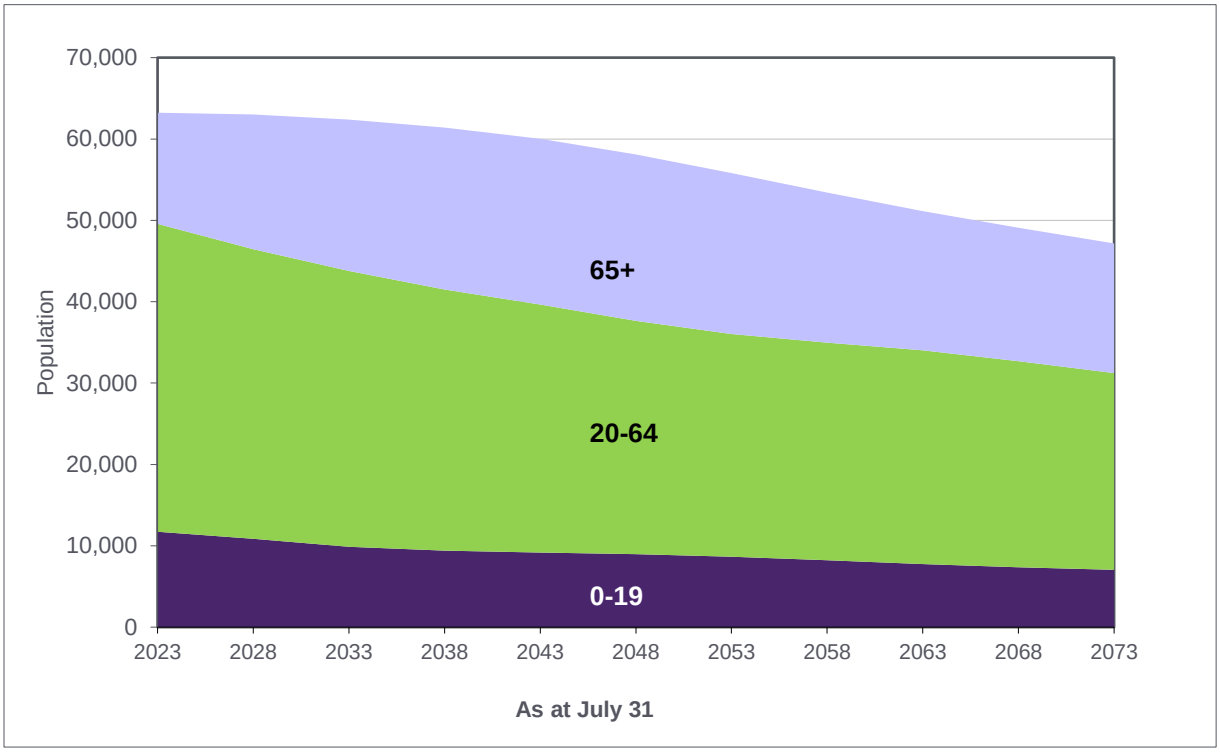
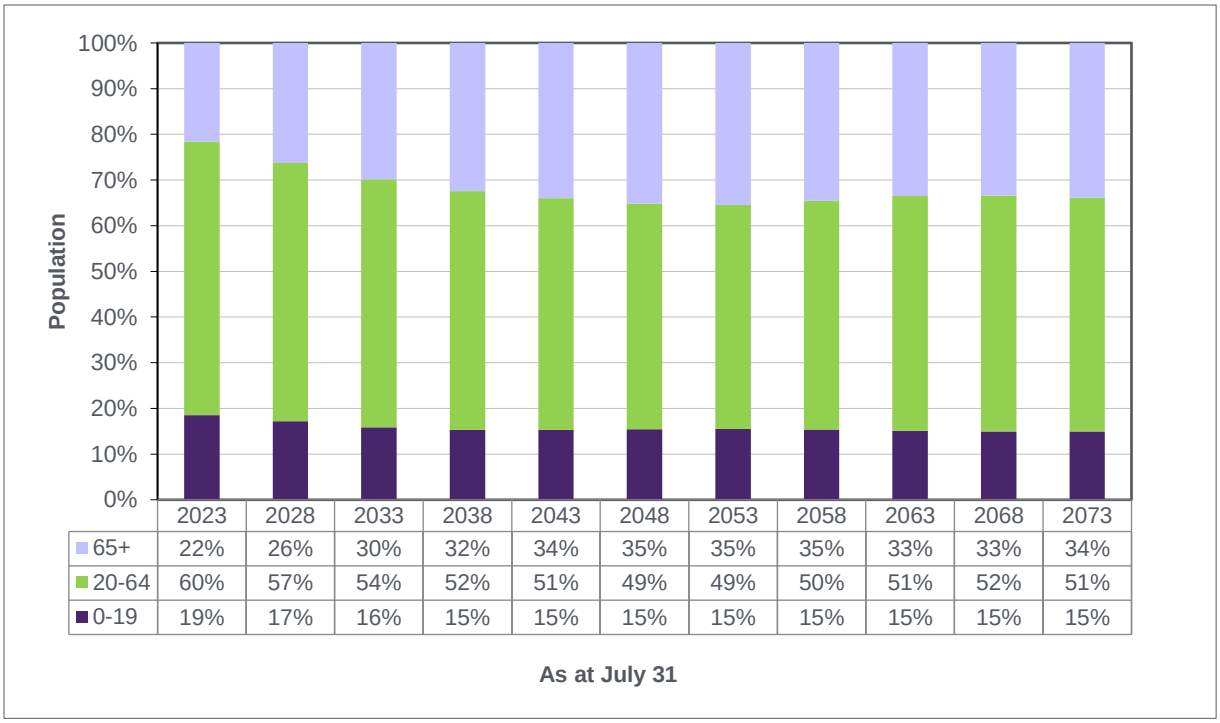


Figure 3.2 Projected Population Age Mix 2023 – 2073



	2023	2028	2033	2038	2043	2048	2053	2058	2063	2068	2073
65+	22%	26%	30%	32%	34%	35%	35%	35%	33%	33%	34%
20-64	60%	57%	54%	52%	51%	49%	49%	50%	51%	52%	51%
0-19	19%	17%	16%	15%	15%	15%	15%	15%	15%	15%	15%

The population over pension age is expected to rise steadily over the next 20 to 25 years, at which point it is projected to be approximately 1.5 times the current population over pension age. Thereafter the over pension age population is projected to stabilise, and then gradually decline.

The working age population is expected to decline throughout the projection period. This decline is due to a combination of the projected continuation of a low birth rate and low (or no) assumed economic growth.

The old-age support ratio (ratio of the number of working age to the number over pension age) is a particularly useful indicator of future trends. As at August 2023, there were 2.8 people of working age per pensioner but over the next fifty years or so, this ratio is projected to fall to 1.5.

The above projections assume annual net inward immigration of 50 persons in 2024, increasing to 125 persons by 2040 before reducing to 100 persons by the end of the projection period.

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 number of weekly contributions is based on the projected number 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 July 31, 2023. Table 3.1 summarizes the projected number of contributors to the Fund.

Note that the number of contributors considers that persons from all three age groups (0 to 19, 20 to 64 and 65 and over) contribute to the Fund. Future beneficiaries include persons who are no longer in the population and have left Bermuda but who are still entitled to a future benefit. Table 3.1 indicates that the projected total number of contributors decreases gradually over the projection period to about two-thirds of the 2023 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.

Table 3.1 Projected numbers of contributors

Year ending July 31	Males	Females	Total
2023	17,047	16,723	33,770
2028	16,623	16,307	32,930
2033	15,899	15,596	31,496
2038	15,100	14,812	29,912
2043	14,323	14,050	28,374
2048	13,608	13,349	26,957
2053	12,918	12,671	25,589
2058	12,426	12,190	24,616
2063	12,108	11,877	23,986
2068	11,807	11,582	23,389
2073	11,354	11,137	22,491

3.1.4 Benefits and Beneficiaries

Projected benefit amounts are based on the projected number of beneficiaries (contributory and non-contributory) and the average benefit payable. The distribution of benefits among the population is based on the seriatim data provided for the valuation. Appendix F gives details of this distribution.

Table 3.2 summarises the projected total numbers of beneficiaries in receipt of contributory and non-contributory old age pension.

Table 3.2 Projected numbers of Beneficiaries (aged 65 or over)

Year ending July 31	Males	Females	Total
2023	6,058	7,795	13,853
2028	7,426	9,373	16,799
2033	8,505	10,371	18,877
2038	9,230	10,965	20,196
2043	9,531	11,128	20,660
2048	9,529	11,209	20,739
2053	9,184	10,893	20,077
2058	8,510	10,201	18,711
2063	7,879	9,497	17,376
2068	7,500	9,126	16,626
2073	7,369	8,813	16,182

Figure 3.3 Projected Contributors versus Beneficiaries

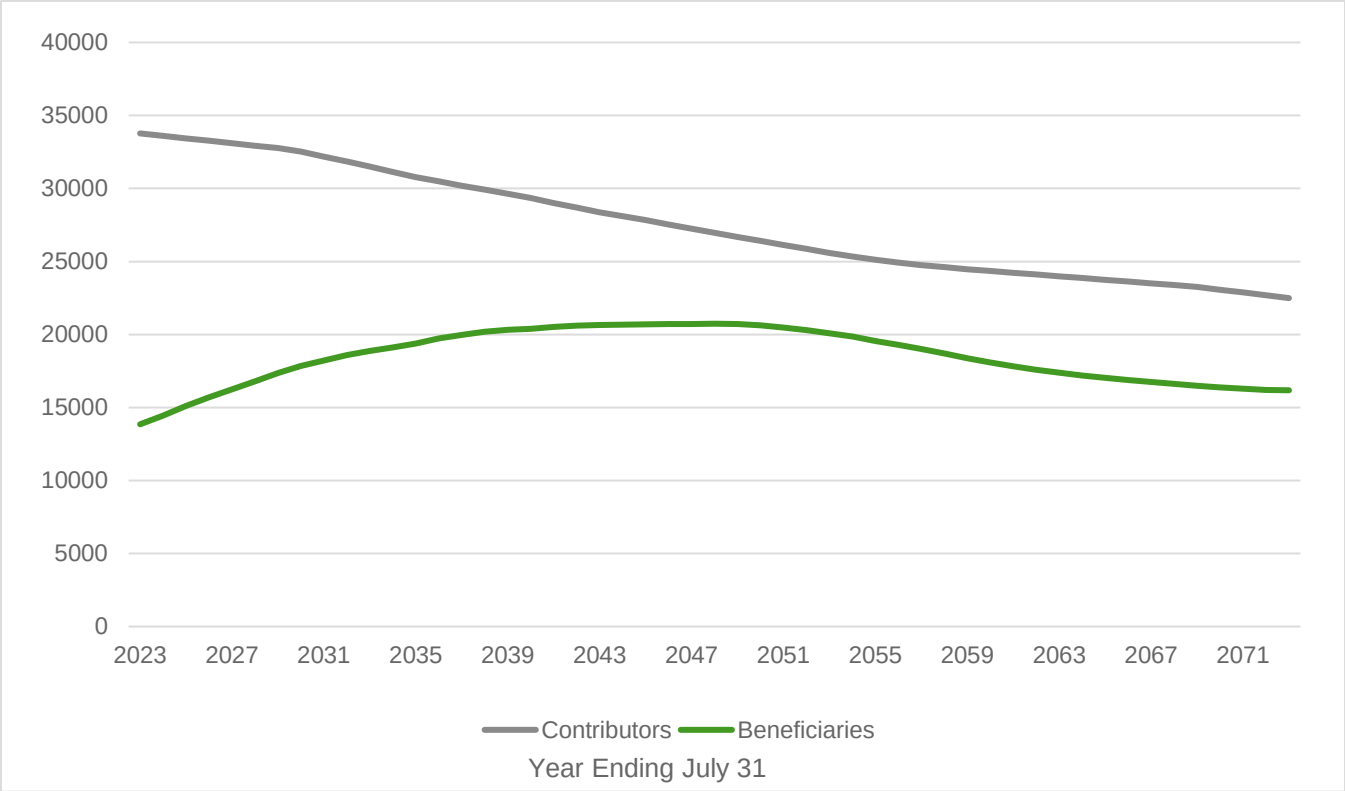


Figure 3.3 indicates that the total number of beneficiaries (contributory and non-contributory) over age 65 is expected to increase steadily, reaching a peak in about 25 years. Thereafter, a gradual decline in numbers is expected.

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 review takes into account the actual benefit and contribution rates in effect from August 2023.

The main financial assumptions are the rates at which benefits and contributions will increase from August 2024, the rate of investment return and rate of increase of the administrative and investment expenses.

3.2.1 Increases to Benefit and Contribution Rates

For this review, it has been assumed that, over the long-term, contributions and benefits will increase in line with prices. Figure 1.1 showed that cumulative benefit and contribution increases over the period 2006 to 2023 were broadly in line with inflation. At the previous valuation, contributions were projected to increase at a rate of 2.5% a year more than benefits (i.e. price increases plus 2.5%).

3.2.2 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.

The elements considered in the development of the gross investment return assumption are summarized in the table below:

Table 3.3 Investment Return Assumption (gross of expenses)

	%
Expected Real Return	4.51
Inflation Assumption*	2.00
Nominal Investment Return	6.51
Nominal Investment Return (rounded)	6.50

**2% is the Bermuda Ministry of Finance current assumption used in economic forecasting*

The Optimistic and Pessimistic projections of the Fund balance have been carried out using assumed rates of return of 7.5% and 5.5% respectively. This seems a reasonable range for the 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 modelled investment expenses as 0.5% of assets and have assumed that administration expenses will increase at a rate of 0.5% a year. Total expenses for the year ending July 31, 2023 amounted to $15.3 million. Pure Administrative expenses totalled $3.4 million as stated in the financial statements. The remaining expenses relate to investment management charges and investment monitoring costs.

Chapter 4 Best-Estimate Projections

The Fund is projected to steadily decline until it is depleted in 2042 under the best estimate assumptions:

- contributions and benefits both increase in line with inflation at 2% per annum
- contributor levels remain at the 2023 levels as a percentage of the working age population
- Investment returns of 6.5% per annum

In the previous review, the Fund was expected to be exhausted in 2044. There are several contributing factors which, when combined, have produced these results. These main factors are as follows:

- Future contributions are assumed to increase in line with inflation at 2% p.a. At the previous valuation, contributions were assumed to increase at a rate of 4.5% until 2034 and at 3.75% thereafter. This assumption change reduced the expected life of the Fund by 4 years.
- Favourable investment performance has offset the impact of not increasing contributions during the inter-valuation period.
- The number of contributors at 2023 is 2.5% higher than what was projected in the 2020 valuation. Conversely, the number of pensioners is 7.3% lower than that projected in the 2020 valuation.

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 Modelling

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	2044	-
Update projection to nominal (rather than real) terms	2044	0
Update future contribution increases to 2% p.a.	2040	(4)
Update for actual contribution and benefit increases	2039	(1)
Using actual 2023 Assets	2040	1
Update with new demographic projections and benefit rates	2042	2
Update expense modelling	2042	0

4.1 Projected Income and Outgo

Table 4.2 summarises, at five-yearly intervals, the projected contribution income, increasing in line with inflation starting effective August 2024, and the projected total outgo of the Fund. Table G1 of Appendix G shows results for each of the first 10 years of the projection period.

Table 4.2 Projected income and outgo ($million)

Year ending July 31	Contribution income	Outgo		
	increasing in line with inflation	Pension & Other benefits	Expenses	Total outgo[1]
(1)	(2)	(3)	(4)	(5)
2024	109.6	217.9	3.4	221.3
2029	118.0	284.4	3.5	287.8
2034	123.7	339.9	3.5	343.5
2039	130.1	395.8	3.6	399.4
2044	136.1	442.9	3.7	446.6
2049	142.8	489.9	3.8	493.7
2054	149.7	515.6	3.9	519.5
2059	159.6	525.6	4.0	529.6
2064	171.9	547.3	4.1	551.4
2069	184.9	580.6	4.2	584.8
2073	193.6	618.2	4.3	622.5

[1]*Totals may not sum due to rounding*

Total outgo is projected to increase at higher rates initially compared to the later part of the projection period. Contribution income is projected to increase consistently throughout the projection period.

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)

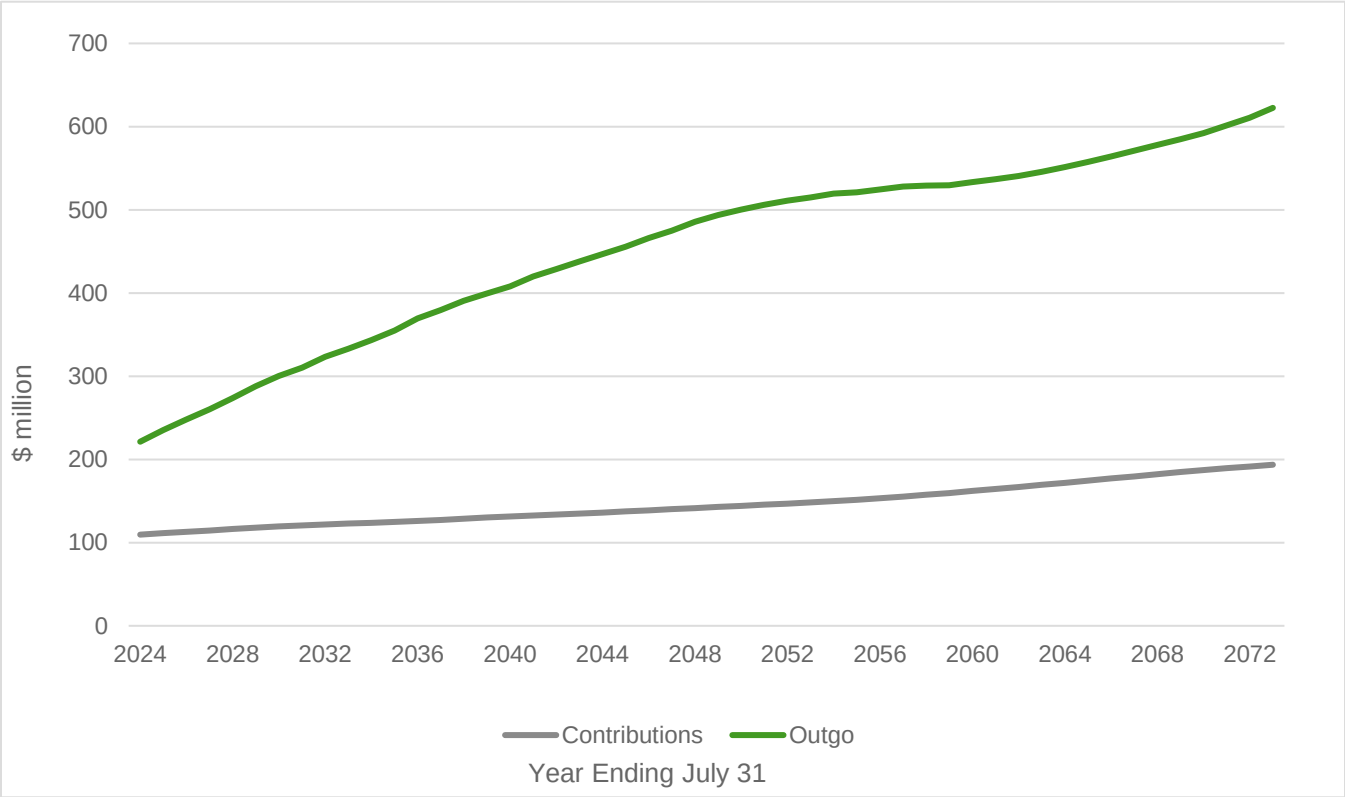
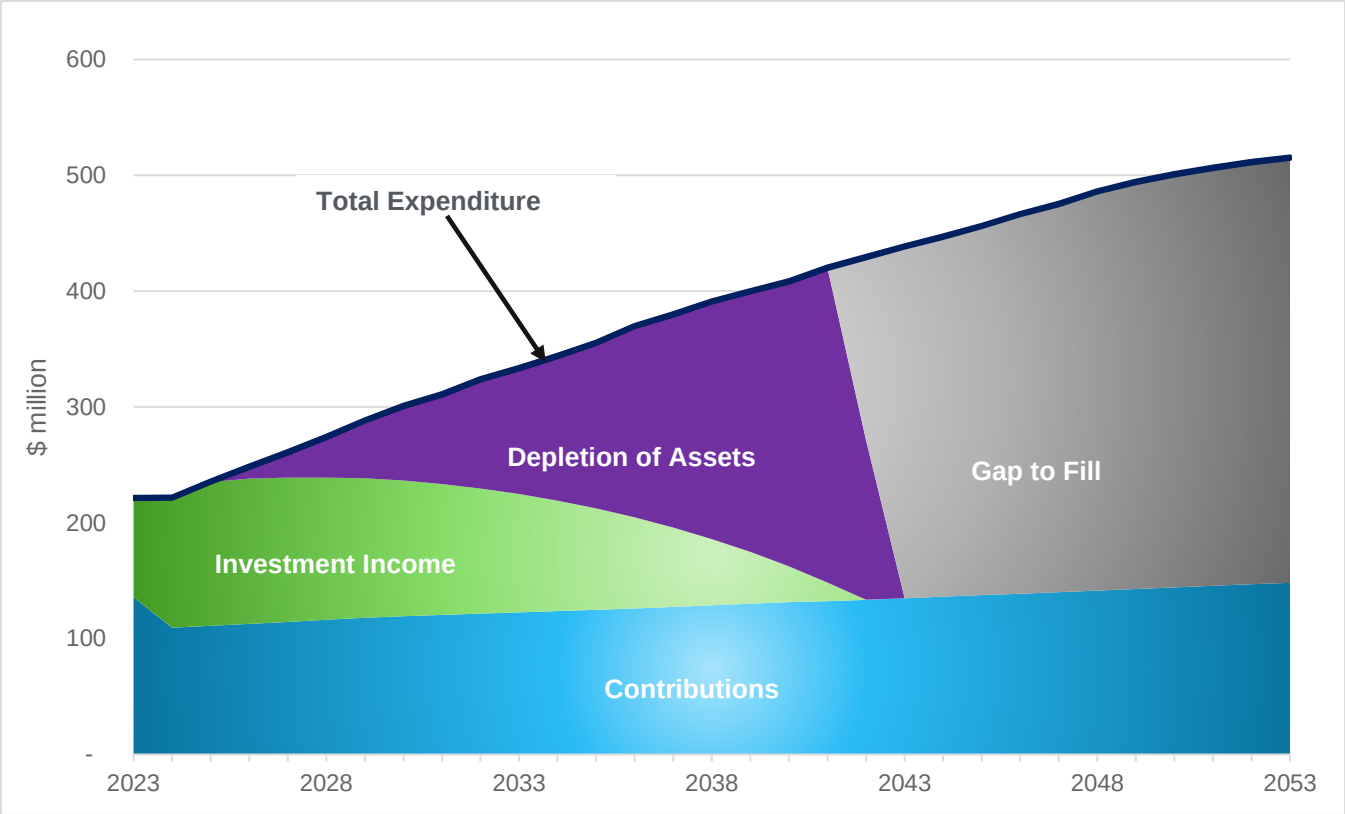


Figure 4.1 indicates that total outgo exceeds contribution income throughout the projection period.

The following chart illustrates how the sources of financing expenditure will change as the Fund moves from a state of expenditure being 63% more than contributions in 2023 to 3.2 times contributions when all reserves are exhausted in 2042.

Figure 4.2 Sources of Financing Expenditure, 2023 to 2053



In 2023, $85m of the $124m in investment income was required to meet expenditure.

With expenditure projected to first exceed contributions (blue section) plus investment income (green section) in 2026, assets will have to be liquidated to help meet expenditure (purple section).

As more and more assets are sold to meet expenditure they will eventually run out (2042). The income shortfall (grey section) is estimated at an annual average of 238% of contribution income from 2043 onwards. The contribution rate would have to more than triple thereby reducing the ratio of the benefit rate to the contribution rate from 369% to 109%.

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 4.3 illustrates the projected balance of the Fund, assuming a rate of investment return of 6.5% a year.

Figure 4.3 Projected Fund Balance, Rate of Return of 6.5% a year ($ million)

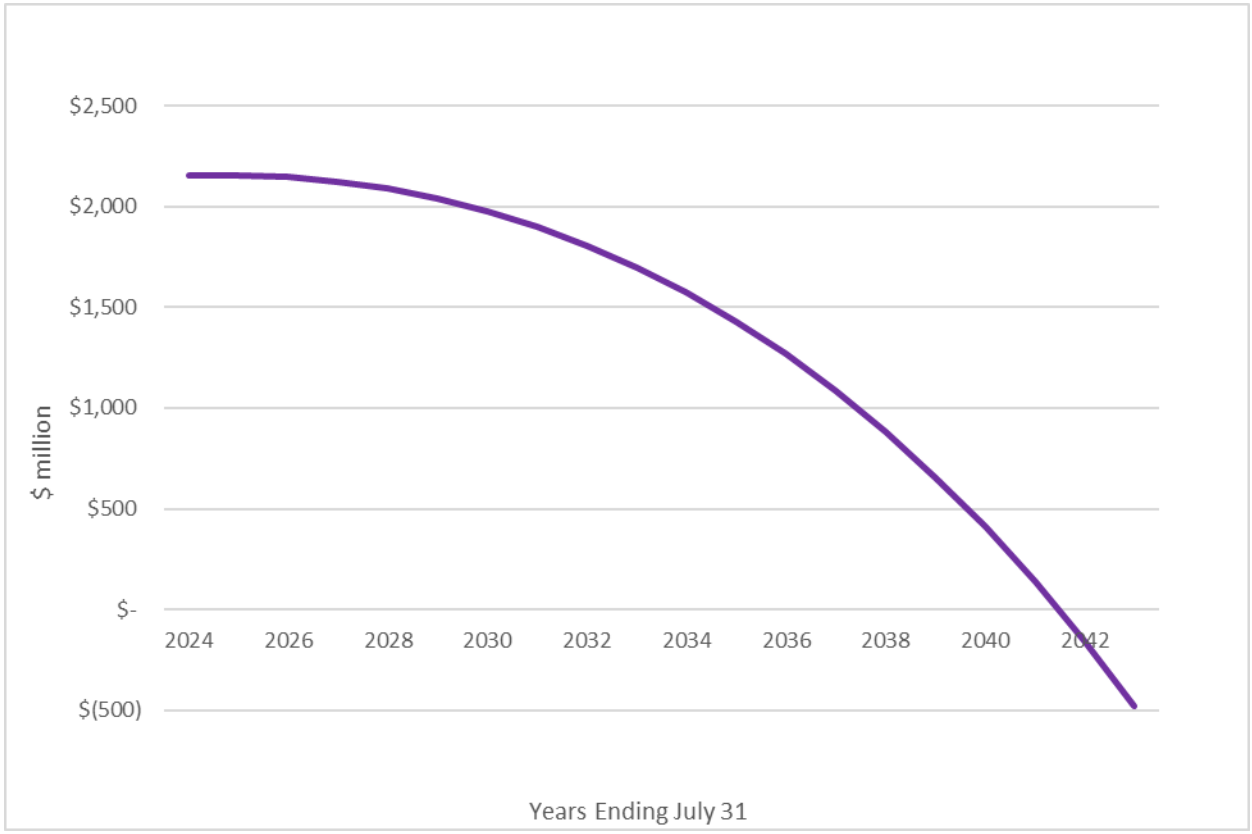


Figure 4.3 indicates that the Fund is projected to decline steadily until it is completely exhausted in 2042, or after 19 years.

Table H1 of Appendix H shows the Fund projections in detail under the best estimate 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 9.7 years of annual outgo. The ratio steadily decreases over the projection period.

Chapter 5 Alternative Scenarios

The projections presented earlier in this report are based on reasonable or "best estimate" assumptions. Given the uncertainty in forecasting such a long period, two alternative scenarios that highlight the sensitivity of the results to differences in assumptions regarding future outlook have been performed. These alternative projection sets encompass assumptions that are generally more optimistic and more pessimistic than those of the Best Estimate projections.

In addition, the review illustrates the impact on the Fund of various contribution policies and increased retirement ages. We have also shown the impact on the Fund of more and less favourable investment returns.

5.1 Optimistic and Pessimistic Scenarios

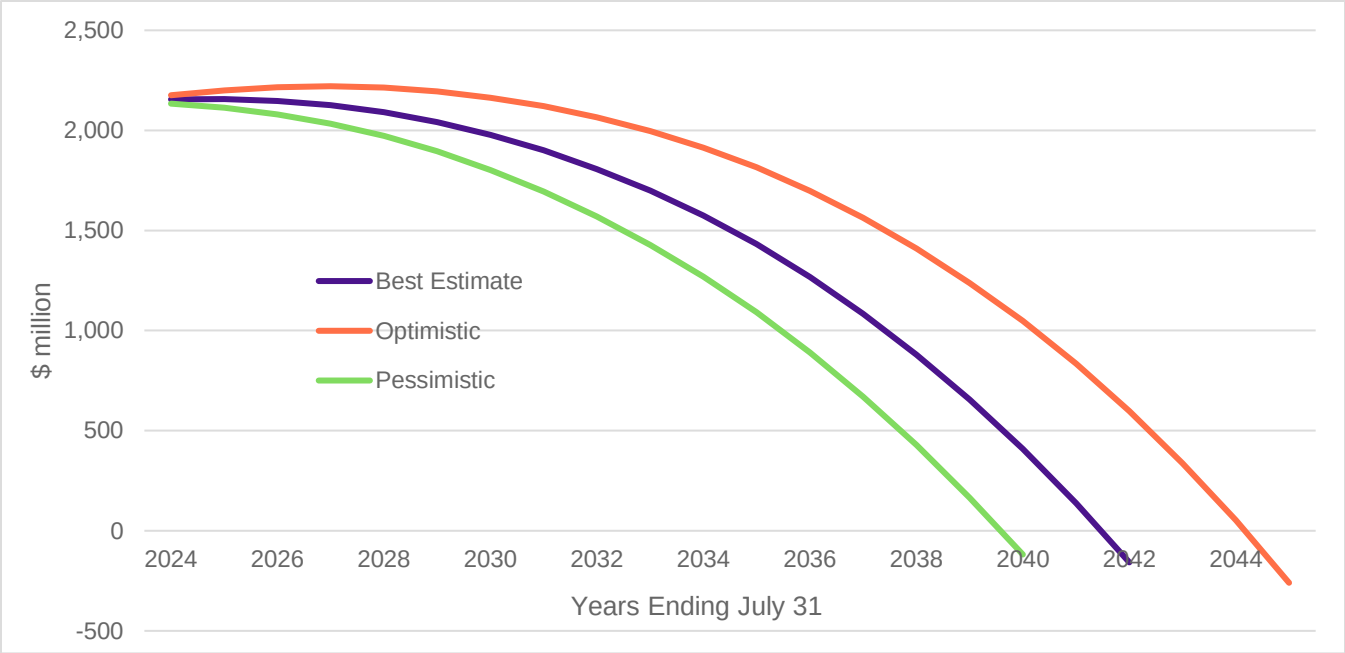
The Optimistic scenario represents a larger population with more contributors per pensioner and higher investment returns while the Pessimistic scenario represents a smaller population with fewer contributors per pensioner, and lower investment returns. Following is a summary of the main assumptions for the three projection scenarios. The values for all other assumptions are similar across scenarios.

Table 5.1 Principal Demographic & Economic Assumptions

	Pessimistic	Best Estimate	Optimistic
Fertility Rate	1.3%	1.4%	1.5%
Mortality Rate	115% of 2014 CPM Private table (sex distinct) for ages greater than or equal to age 18	125% of 2014 CPM Private table (sex distinct) for ages greater than or equal to age 18	135% of 2014 CPM Private table (sex distinct) for ages greater than or equal to age 18
Net Annual In-migration	None	50 persons in 2024 increasing to 125 by 2040 before reducing to 100 by the end of the projection	33 persons in 2024 increasing to 225 by 2030 and 300 by 2040 remaining at that level to the end of the projection
Fund Rate of Return	5.5%	6.5%	7.5%

Figure 5.1 illustrates the projected Fund balance for the three projection sets.

Figure 5.1 Projected Fund Balance, Optimistic and Pessimistic Scenarios ($ million)



As expected, the outlook for the Fund is closely linked to the size and age distribution of the general population as well as to investment returns. Figure 5.1 shows that the Fund is depleted between 2040 and 2045 under a reasonable range of assumptions.

5.2 Additional Scenarios

In this section, we illustrate the impact of various approaches that could be taken to future contribution rate increases. We also explore increasing the retirement age to match the public sector retirement age and further to age 70. The sensitivity of the progression of the fund to more and less favourable investment returns is shown. Each scenario uses the same assumptions as the best estimate scenario except for the particular item highlighted.

In particular, we looked at:

(i) Increasing future contributions by 4.5% up to 2034 and 3.75% thereafter (i.e. the same assumption as the 2020 review)

(ii) Increasing future contributions by 3% p.a.

(iii) Increasing future contributions by 10% in August 2025 and by 2% p.a. thereafter

(iv) Increasing the retirement age from 65 to 68 over a 7-year period from 2027 to 2033

(v) Increasing the retirement age from 65 to 70 over a 9-year period from 2027 to 2035; and

(vi) Investment returns of 1% higher and 1% lower than the best estimate projection (i.e. 7.5% and 5.5% respectively).

Figure 5.2 Projected Fund Balance – Contribution Scenarios ($ million)

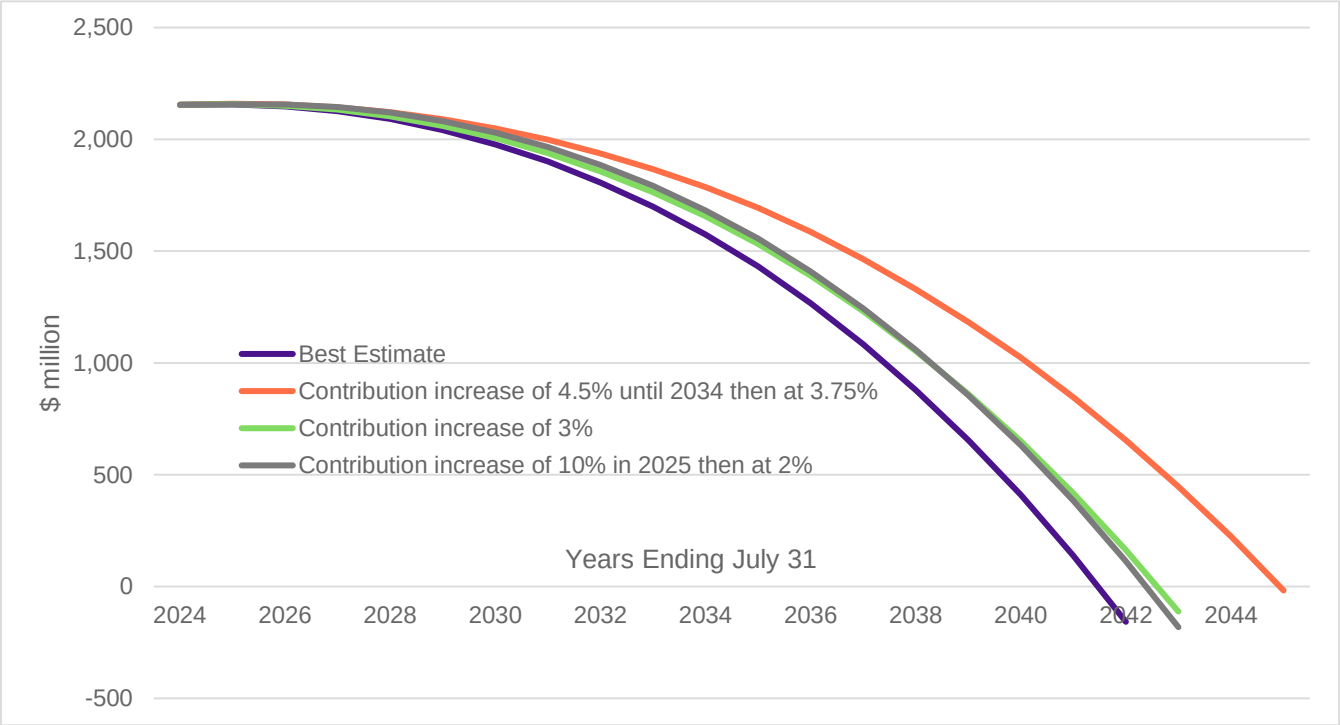


Figure 5.2 shows that reverting to the policy announced in 2010 to increase contributions by 2.5% p.a. more than benefits is estimated to extend the life of the fund by 3 years until 2045. Increasing future contributions by 3% p.a. produces an equivalent result to hiking contributions by 10% next year and thereafter reverting to annual increases of 2.0%. Both add 1 year to the life of the Fund.

Figure 5.3 Projected Fund Balance, Increase Retirement Age to 68 and 70 ($ million)

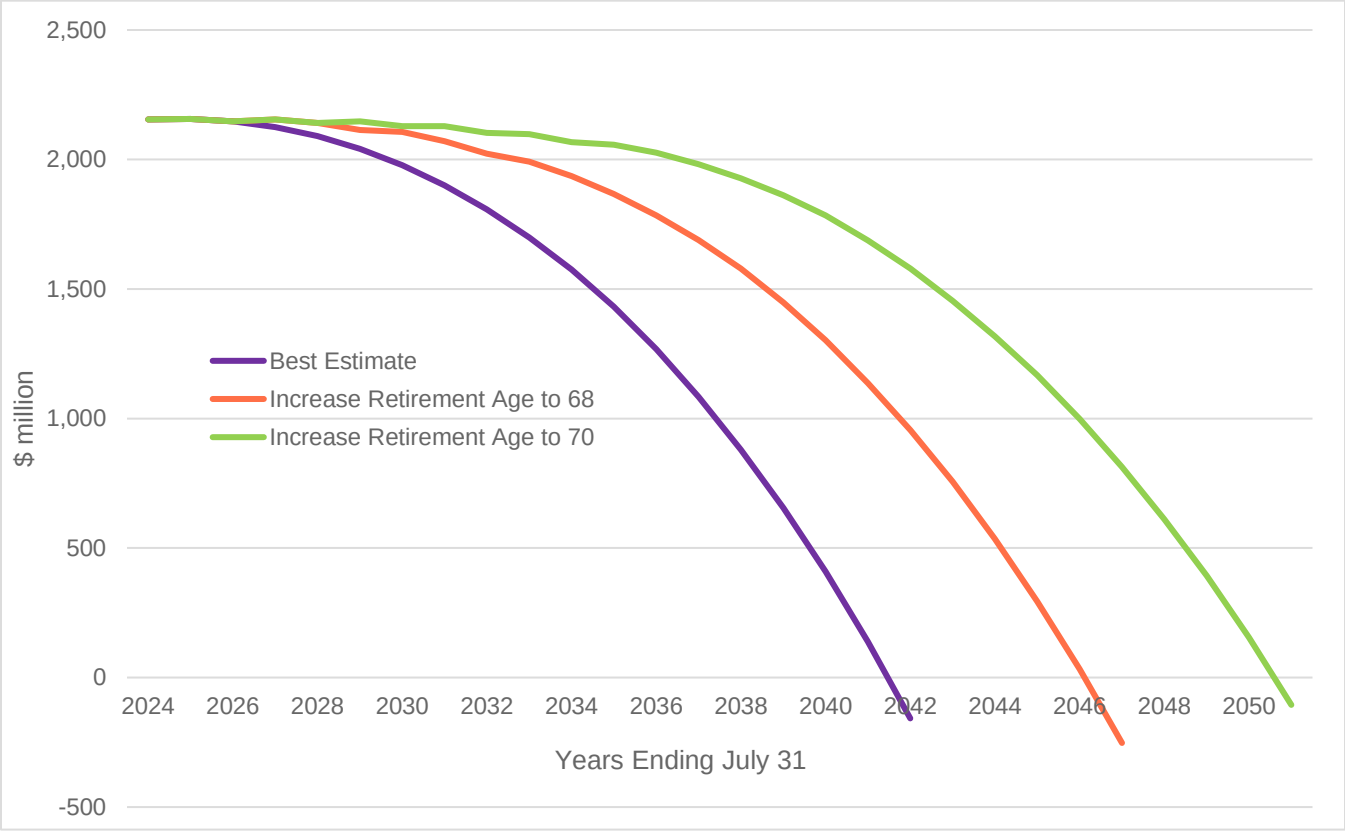


Figure 5.3 shows that increasing the retirement age to 68 extends the life of the fund to 2047. Increasing the retirement age to 70 adds a further 4 years (fund is depleted in 2051).

Figure 5.4 Projected Fund Balance – Investment Return Scenarios ($ million)

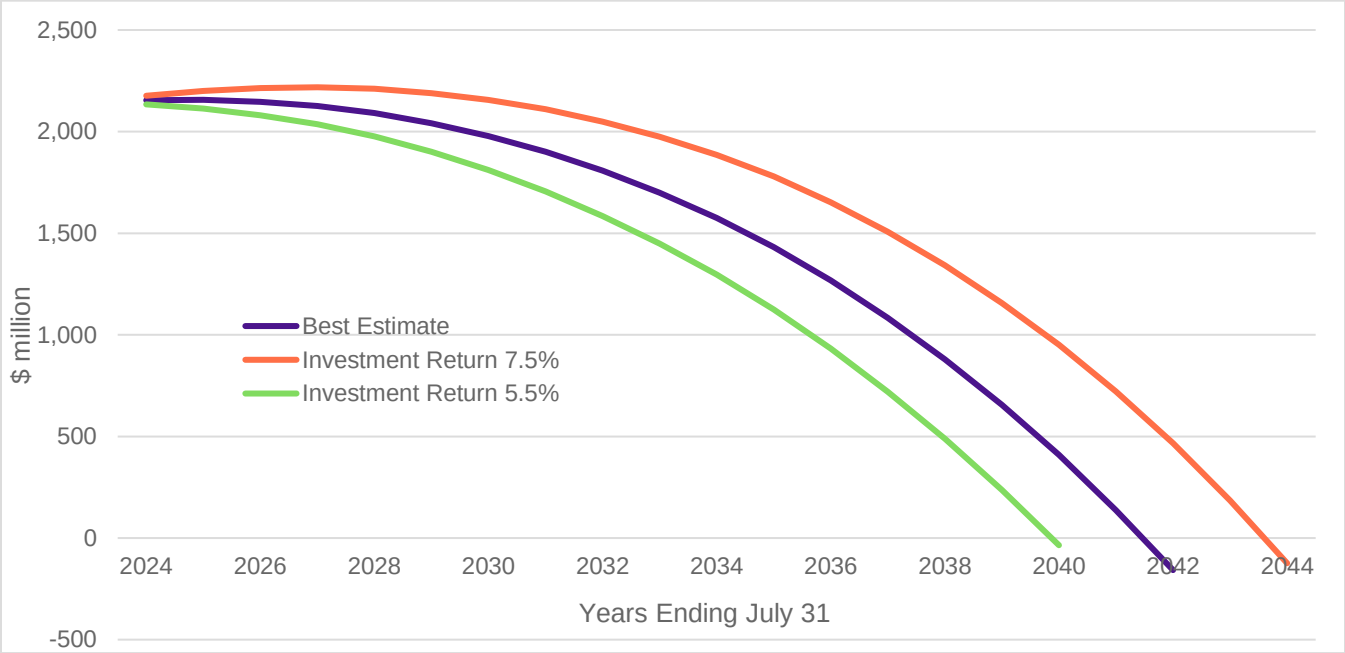


Figure 5.4 shows the impact of future investment returns on fund depletion. Investment returns 1% higher than the best estimate assumption of 6.5% is estimated to extend the life of the fund by 2 years. Conversely, investment returns 1% lower is estimated to reduce the life of the fund by 2 years.

5.3 Further Comments

Tables H1 to H10 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").

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. Since benefit outgo is projected to increase significantly relative to contribution income, consideration might be given to 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 rates of return achieved in the Fund. It should be noted that historically, the increase in contribution rates has been lower than stated Government policy. As shown in Appendix B, over the last 10 years contributions have increased 1.1% per annum compared to 4.3% (CPI + 2.5%). The CPI + 2.5% target was a policy set by the Government that dates back to at least 2008. This may need to be reviewed.

The scenarios showing increased contributions and increased retirement age both have significant positive impacts on the sustainability of the Fund. An increase in retirement age would be in line with global retirement age trends and increasing longevity.

5.4 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 partly 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 9.7 years of the current level of benefits and expenses. 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. 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 55.2% of benefits accrued in respect of contributions paid up to the Review Date including allowance for future benefit increases. The Fund is estimated to be 72.9% funded on the same basis as above but excluding future benefit increases. If benefits continue to accrue and contributions are made assuming increases to both, then the Fund is estimated to be 65.9% 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 $1,241 million and $85 million respectively.

Chapter 6 Conclusions and Recommendations

The Fund's performance during the inter-valuation period has had a positive impact on the Fund's financial position. Contribution income and investment income was higher than expected. Benefit payments were lower than expected. This was tempered by higher-than-expected expenses.

The viability of the Fund in the short to medium term is good with the Fund being positive for the next 19 years.

The projections indicate that the future sustainability of the Fund is sensitive to the rate of investment returns, the rate of increase in contributions relative to benefits, 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.

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.

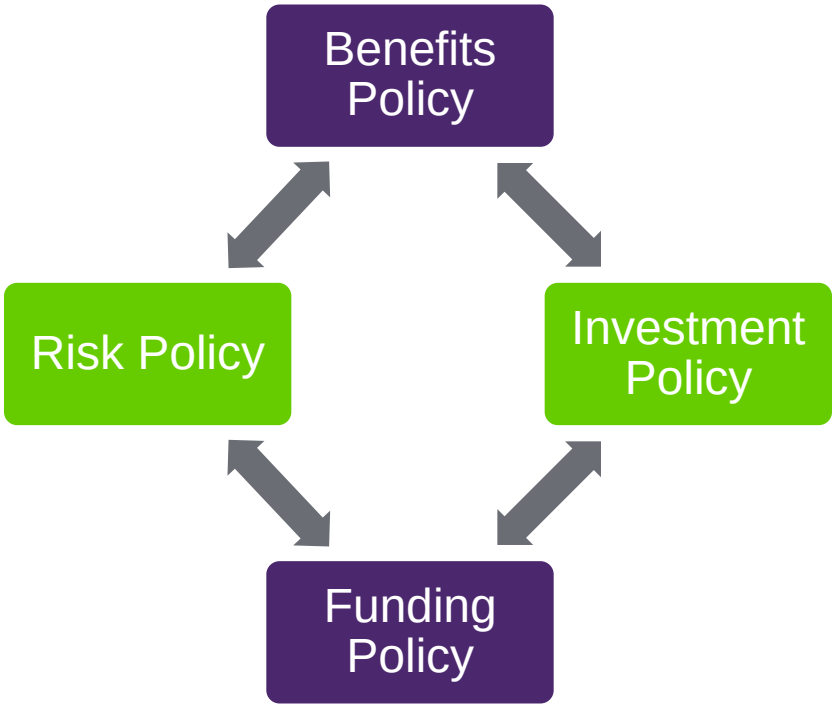
As presented in Chapter 4 and Appendix I, the CPF is not financially sustainable for the long-term: assets are 55.2% of projected accrued liabilities and the fund is projected to be exhausted around 2042. While full funding is not required for national pension systems, there should be a viable financing strategy that ensures that future generations will not be overly burdened or forced to receive significantly reduced benefits.

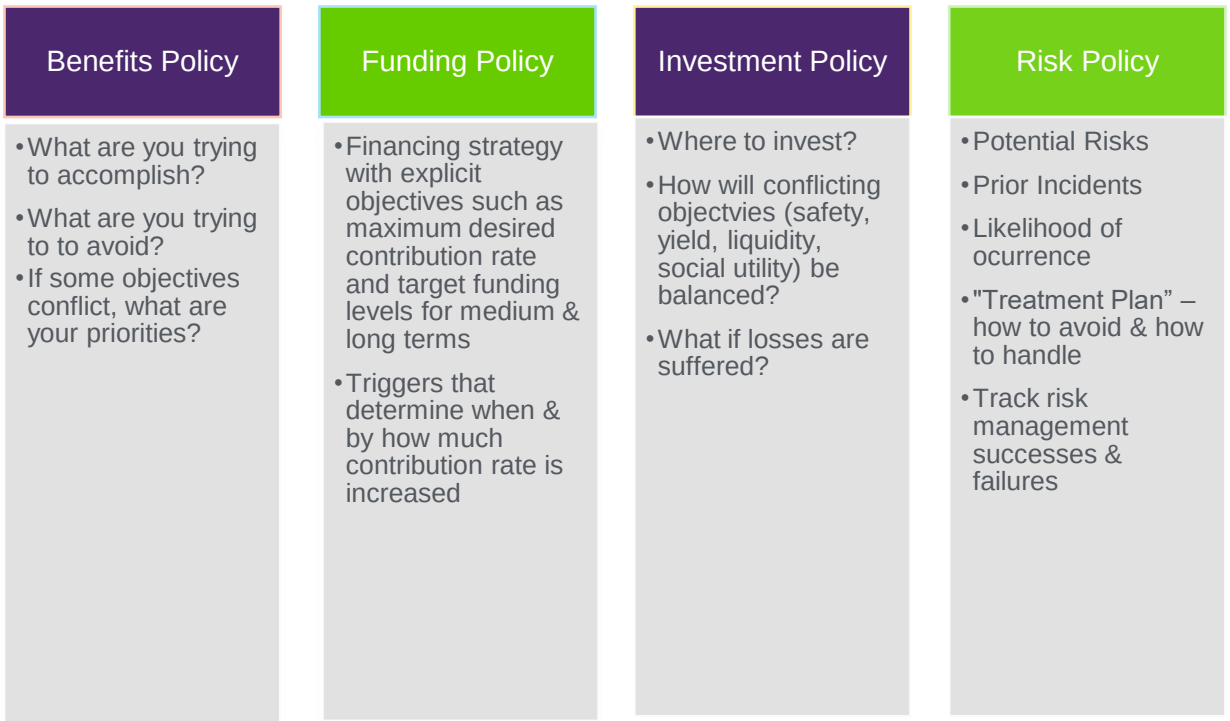
CPF sustainability is inextricably linked to the local economy for contributions. Investment returns are primarily linked to US financial markets. A "good economy" that experiences sustained economic growth with increasing employment and wage levels is considered the first of the four ingredients necessary for long-term CPF sustainability. The other three ingredients, over which policymakers have greater control, are:

1. Good design – a system that provides relevant, equitable and affordable benefits that are consistent with prevailing socio-economic and labour market conditions, other employment linked benefits and available technology.
2. Efficient & effective administrative systems – low-cost accurate record keeping that enables timely and transparent benefit processing.
3. Honest & responsible government (good governance) – proactive and prudent decision making in the best long-term interest of Bermuda at all governance levels.

Good governance not only requires best practices and guidelines for day-to-day operations, but it also requires the following four interconnected policies to prevent undesired outcomes and appropriate and timely responses to actual outcomes.

Figure 6.1. Interconnected Policies for Long-term Sustainability





An Investment Policy is already in place, but the CPF does not have a Benefits Policy, Risk Policy or a Funding/Contribution Policy.

Given the financial challenges that lie ahead and the lack of any reforms to the CPF, even after the NPS was introduced, we recommend that a comprehensive review of all pension programs in Bermuda be conducted. This review should focus on the following six "good design" objectives:

1. **Coverage:** How well workers of all sectors are covered for income security in old age.
2. **Adequacy**: The ability of pensions to provide a decent standard of living while not being overly generous to any specific groups or categories of workers.
3. **Financial sustainability**: The affordability of the system to future contributors and taxpayers.
4. **Work incentives**: Having rules that do not encourage people to cease working but instead encourage them to work longer.
5. **Administrative efficiency**: Maintaining accurate records while keeping operating and management costs as low as possible.
6. **Diversity**: Income security in old age coming from various sources with different financing mechanisms.

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 of August 1, 2023. Our review reflects the provisions of the Fund in effect on August 1, 2023, and in addition, takes into account the contribution and benefit rates effective August 2023.

The financial status of the Fund as of August 1, 2023 was determined based on the Fund information and actuarial assumptions appropriate as at that date.

We hereby certify that, in our opinion, as of August 1, 2023:

- 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 of August 1, 2026.

TELUS Health (formerly LifeWorks)

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June 2024

Appendix A Main Provisions of Scheme from August 2023

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; and
ii. an average of not less than 25 paid or credited contributions a year has been achieved between attaining age 21 (or August 5, 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 $265.15 a week plus increments of $1.56 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. Effective August 2021 the full rate of pension and excess increment increased to $254.71 and $1.50 respectively and effective August 2023, increased again to $265.15 and $1.56 respectively.

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. Effective August 2023, the rate of pension is $121.67 a week, increased to $125.22 a week for persons whose income from all sources does not exceed $4,000 a year excluding any pension granted under the scheme.

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 $265.15 a week (subject to reduction if the husband's contribution average was less than 50) with an additional $26.45 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 April 16, 1985, under the same terms and conditions as the corresponding widows' benefits.

A **contributory disability pension** of $176.73 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 $121.67 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 $35.92 per week 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. There has been no change to contribution rates since August 2018. However, a temporary amendment was made to the Contributory Pensions Act allowing employees, employers (with employee consent) and self-employed persons to opt to suspend contributions for the period July 1, 2020 to June 30, 2021.

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 7.5% in August 2016 and by 4.2% in August 2018. Benefits were increased by 5.0% in August 2016, 1.7% in August 2017, 1.4% in August 2018, 1.2% in August 2019, 2.75% in August 2021 and 4.1% in August 2023.

Appendix B Benefit and Contribution Rates, 2006 to 2023

Increases to Benefits and Contributions

Table B1 summarises the annual increases to benefit and contribution rates since August 2006, together with the increase in the CPI over the prior 12 months to July of the respective year.

Table B1 Annual increases in CPI, benefits and contributions

	Increase in	Increase in	Increase in
Year	CPI *	Benefits †	Contributions †
2006	3.1%	4.0%	5.75%
2007	3.1%	4.5%	6.25%
2008	4.7%	5.0%	6.75%
2009	1.2%	5.0%	-
2010	2.3%	-	-
2011	2.8%	3.0%	-
2012	2.5%	-	5.5%
2013	1.8%	-	-
2014	1.9%	-	-
2015	1.9%	-	-
2016	1.6%	5.0%	7.5%
2017	1.7%	1.7%	-
2018	1.4%	1.4%	4.2%
2019	1.2%	1.2%	-
2020	-1.4%	-	-
2021	2.2%	2.75%	-
2022	4.5%	-	-
2023	2.8%	4.1%	-
Average (3 years to 2023)	**3.2%**	**2.3%**	**-**
Average (10 years to 2023)	**1.8%**	**1.6%**	**1.1%**

** CPI increase over previous 12 months to July.*

† Increase in August of calendar year.

Source: https://www.gov.bm/bermuda-business-statistics

Benefit and contribution rates, 2008 to 2023.

Table B2 summarises the main rates of benefits and contributions in force for the years commencing August 2008 to August 2023.

Table B2 Benefit and contribution rates, 2008-2023

Benefits	Aug 2008	Aug 2011	Aug 2014	Aug 2017	Aug 2020	Aug 2023
Contributory Old-Age Pension						
Full pension p.w.	$209.17	$226.22	$226.22	$241.57	$247.89	$265.15
Limit for increments	484	484	484	484	484	484
Increment p.w.	$1.23	$1.33	$1.33	$1.42	$1.46	$1.56
Non-Contributory Old-Age Pension						
Income limit p.a.	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000
Pension, for those below limit, p.w.	$98.78	$106.83	$106.83	$114.08	$117.07	$125.22
Pension, for those above limits, p.w.	$95.99	$103.81	$103.81	$110.85	$113.75	$121.67
Contributory Widow's or Widower's Allowance						
Personal rate p.w.	$209.17	$226.22	$226.22	$241.57	$247.89	$265.15
Addition per child p.w.	$20.87	$22.57	$22.57	$24.10	$24.73	$26.45
Contributory Disability pension p.w.	$139.43	$150.79	$150.79	$161.02	$165.23	$176.73
Non-Contributory Disability Pension p.w.	$95.99	$103.81	$103.81	$110.85	$113.75	$121.67
Contributions p.w.	$30.40	$30.40	$32.07	$34.47	$35.92	$35.92
Total Contributions p.w.	$60.80	$60.80	$64.14	$68.94	$71.84	$71.84

Appendix C Membership Data

Table C1 Numbers and amounts of monthly benefits in payment

	As at Aug 2020		As at Aug 2023	
Benefit	**Number in payment**	**Amount ($000 pm)**	**Number in payment**	**Amount ($000 pm)**
Contributory old-age pension	10,691	12,344	11,457	13,844
Non-contributory old-age pension:				
higher rate	1,094	557	1,157	592
lower rate	348	172	269	138
Contributory widow's allowance	1,148	1,071	1,083	1,035
Contributory widower's allowance	109	100	111	105
Contributory disability pension	207	116	178	103
Non-contributory disability pension	329	163	283	144
Total	**13,926**	**14,523**[1]	**14,538**	**15,960**[1]

[1]: Totals may not sum due to rounding.

Table C2 Average monthly benefits in payment

Benefit	Average benefit ($ pm)	
	2020	2023
Contributory old-age pension	1,154.65	1,208.30
Non-contributory old-age pension:		
higher rate	508.69	511.97
lower rate	494.27	514.08
Contributory widow's allowance	933.21	955.42
Contributory widower's allowance	921.86	943.19
Contributory disability pension	560.57	578.01
Non-contributory disability pension	494.27	507.82
Gratuity[1]	-	-
Total	**1,042.89**	**1,097.83**

[1]: Not sufficient credible data to determine an average.

Table C3 Contributions data

	2021	2022	2023
Number of contributors[1]	30,385	33,680	33,770
Av. no. of weekly cont. per month	3.02[2]	3.84	3.78

[1]: No of persons making contributions in the 12-month period ending July 31 as per contributions data received.

[2]: Temporary amendment to the Contributory Pensions Act allowed contributions to be suspended during the period July 1, 2020 - June 30, 2021

Appendix D Financial Data

Table D1 Income and Expenditure - 2021 to 2023 ($ million)[1]

	Year ending July 31			August 1, 2020 to July 31, 2023
	2021	2022	2023	
Fund at start of year	**1,970.4**	**2,269.4**	**2,102.2**	**1,970.4**
Income				
Contributions	85.9	101.4	135.8	323.1
Interest and dividends	13.4	17.0	15.8	46.3
Realised gains (losses)	91.4	131.0	55.8	278.1
Unrealised gains (losses)	288.7	(214.5)	43.5	117.7
F/X gains/(losses)	4.0	(3.1)	(4.3)	(3.4)
Other	22.6	12.6	13.6	48.8
Total income	506.0	44.4	260.3	810.7
Expenditure				
Pensions	183.5	189.1	203.5	576.1
Investment Management Fees	18.6	20.5	11.9	51.0
Administrative Costs	4.1	2.5	3.4	10.1
Increase in Bad Debt Provision	0.7	(0.4)	2.2	2.5
Total expenditure	206.9	211.7	221.0	639.6
Excess of income over expenditure	299.1	(167.2)	39.2	171.1
Fund at end of year	**2,269.4**	**2,102.2**	**2,141.4**	**2,141.4**

Figures may not sum to totals due to rounding

[1]Draft Financials for 2021, 2022, 2023

Table D2 Fund assets at market value June 2023

Asset	$ million[1]	%[1]
Global Equity	780	38.9%
Core Bonds	297	14.8%
High Yield	36	1.8%
Opportunistic Credit	52	2.6%
Emerging Market Debt	83	4.1%
Risk Parity	77	3.9%
Private Markets	470	23.5%
Hedge Funds	94	4.7%
Real Assets	98	4.9%
Cash	15	0.7%
Total Invested Assets	**2,003**	**100.0**
Non-Invested Assets	138	
Net Assets Available for Benefits	**2,141**	

[1] *Numbers may not sum to totals due to rounding*

Figures are based on quarterly investment reports

Table D3 Annual net investment returns of Fund

Year ending July 31	Nominal % p.a.	Inflation % p.a.	Real % p.a.
	(1)	(2)	(3)
2008	-2.2	4.7	-6.5
2009	-11.8	1.2	-12.8
2010	12.5	2.3	10.0
2011	16.5	2.8	13.3
2012	0.6	2.5	-1.9
2013	9.1	1.8	7.2
2014	11.4	1.9	9.3
2015	-1.2	1.9	-3.0
2016	0.3	1.6	-1.3
2017	14.4	1.7	12.5
2018	3.4	1.4	1.9
2019	4.3	1.2	3.1
2020	4.3	-1.4	5.8
2021	20.7	2.2	18.1
2022	-3.6	4.5	-7.7
2023	5.3	2.8	2.4
Average (3 years)	**7.0**	**3.2**	**3.7**
Average (10 years)	**5.7**	**1.8**	**3.9**

The inflation rates 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 of August 1, 2023.

The population projection was based on the latest population census as of May 20, 2016 along with data on births and deaths as set out in the 2023 Bermuda Digest of Statistics. The fertility and mortality assumptions were set considering the actual births and deaths. Migration assumptions were utilized that produced reasonable population projections.

Base year

The base year for the projections starts at 2023. The population distribution as at 2023 was derived from the 2016 census with the application of mortality and fertility assumptions for the period from 2016 to 2023. Projections in future years incorporate a similar methodology plus allowance for immigration. Table E1 summarizes the estimated population in 2023.

Table E1 Estimated population in 2023

Age last birthday	2023		
	Males	Females	Total
0-19	5,964	5,758	11,722
20-64	18,551	19,293	37,844
>65	5,974	7,686	13,660
All ages	30,489	32,738	63,227

Figures may not sum to totals due to rounding

Mortality

We compared the actual number of deaths from 2016 and onwards with our projections using the mortality assumption from the previous actuarial review. Actual mortality was heavier than the mortality assumed in the past review. For this review, we have increased the assumption for ages 18 and above to 125% (100% in 2020 review) of the 2014 Canadian Private Mortality Table (Sex Distinct) with generational mortality improvement. The assumption for ages less than 18 remained unchanged, namely the UK GAD interim life table 2005-2007 (sex distinct).

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 July 31	Expectation of life at birth		Expectation of life at age 65	
	Males	Females	Males	Females
2023	83.6	87.6	19.5	21.7
2033	84.3	88.1	20.0	22.2
2043	84.9	88.6	20.5	22.7
2053	85.5	89.1	20.9	23.1
2063	86.1	89.5	21.4	23.5
2073	87.1	90.5	21.9	23.9

Fertility

We have assumed a long-term total period fertility rate (TPFR) of 1.4. This is consistent with the assumption used in the *Bermuda Population Projections 2016 to 2026*. That study states that

"The assumed total fertility rate (TFR) in 2026 of 1.4 children per woman was based on a three-year average of births recorded from 2015 to 2017. This is in alignment with the United States Census Bureau's recommendations where the TFR is assumed to remain constant for the next 10 years if the most recent estimated TFR is less than 1.7 births per woman"

We have retained the male/female sex ratio of future births of 1.05:1 as was used at the prior actuarial review.

Migration

The projection includes an allowance for future inward migration. Inward migration increases from 50 persons p.a. to 125 by 2040 reducing thereafter to 100 p.a. by the end of the projection. No migration was assumed in the previous review.

Results

Tables E3 summarises, at five-yearly intervals, the projected numbers below age 20, between ages 20 and 64, and over age 65. The table 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".

Table E3 Projected total population 2023 - 2073

Males and Females						
Year to July 31	**Births**	**Ages 0-19**	**Ages 20-64**	**Ages 65+**	**Total**	**Old-age support ratio**
2023	481	11,722	37,844	13,660	63,227	2.8
2028	455	10,844	35,605	16,565	63,014	2.1
2033	451	9,876	33,893	18,614	62,383	1.8
2038	452	9,385	32,102	19,914	61,401	1.6
2043	434	9,163	30,471	20,372	60,006	1.5
2048	407	8,955	28,702	20,450	58,107	1.4
2053	377	8,653	27,381	19,797	55,832	1.4
2058	355	8,205	26,772	18,451	53,427	1.5
2063	345	7,736	26,283	17,134	51,153	1.5
2068	337	7,343	25,342	16,394	49,079	1.5
2073	326	7,050	24,169	15,957	47,176	1.5

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 of July 31, 2023. 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. 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 persons greater than or equal to age 65 adjusted by a factor of 101.4% to account for other persons 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 July 31, 2023.
- Projected age 65 population adjusted for migrant beneficiaries no longer resident in Bermuda: This consists of all persons aged 65 adjusted by a similar factor of 101.4% to account for persons 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	82.7%
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	8.35%
lower rate	Projected greater than or equal to age 65 population adjusted for migrant beneficiaries no longer resident in Bermuda	1.94%
Contributory widow's allowance	Projected females greater than or equal to age 18	3.93%
Contributory widower's allowance	Projected males greater than or equal to age 18	0.44%
Contributory disability pension	Projected males and females greater than or equal to age 18	0.34%
Non-contributory disability pension	Projected males and females greater than or equal to age 18	0.54%
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, 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 widower's gratuities, these were assumed to be 2.92% and 1.08% 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 97% of the expenditure on benefits is in respect of persons aged over 65. Also, about 95% 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 August 1, 2020 to July 31, 2023. 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 2022 Labour Force Survey 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 95.8% 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 July 31, 2023 according to the actual contributor data. The number of contributors in the period ending July 31, 2023 was 33,770 which was lower than the number of contributors in the period ending July 31, 2020 (34,629).

The proportion of a full 50 weekly contribution paid was assumed to be 90.8% for each contributor. This was derived from the median of the average number of contributions paid per contributor in each year over the period July 31, 2019, to July 31, 2023 excluding the period impacted by the COVID contribution holiday (July 31, 2020 to July 31, 2021).

Note that any indexation of contributions was only assumed to be effective after the year ending July 31, 2024.

Administration and Investment expenses

Administration and investment expenses charged to the Fund for the year ending July 31, 2023 totalled $15.3 million. Higher amounts of $23.0 million and $22.7 million were recorded for the years ending July 31, 2022 and 2021, respectively. Of the total expenses in each of the three years, actual administrative costs were $3.4 million, $2.5 million, and $4.1 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 modelled investment expenses as 0.50% of assets and have assumed that administration expenses will increase at a rate of 0.5% a year.

Table F2 Summary of baseline projection assumptions

Contribution annual increase	2% p.a. i.e. in line with assumed inflation
Administration expense increase	0.50%
Fund rate of return	6.50%
Investment expenses	0.50% of assets p.a.
Joint Contribution rate in 2023	$ 71.84
- Projection Basis	Starts from Bermuda's 2016 Population Census
- Mortality Assumption	125% of 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	1.4%
- Newborn sex ratio	1.05:1 male to female ratio
- Net In-migration	50 persons p.a. in 2024 increasing to 125 by 2040 before reducing to 100 p.a. by the end of the projection period
- Benefit rates	Updated to in force July 31, 2024
- Rate of benefit increase	Actual for August 2023 and thereafter to match inflation (CPI)
- Gratuity amounts	Based on contribution assumptions
- Pension amounts	In accordance with Table C2

- Rate of contribution increase	Actual for August 2023 and thereafter 2% p.a. in line with CPI
- Employed population	Based on extrapolations from the 2022 Labour Force Survey Report
- Contributing proportion	Static percentage of employed population based on contribution data for the month ending July 31, 2023

Appendix G Detailed Results

Table G1 Projected income and outgo $ million – Best Estimate Scenario

Year ending July 31	Contribution income, increasing in line with inflation	Outgo		
		Benefits	Expenses	Total outgo[1]
(1)	(2)	(3)	(4)	(5)
2024	109.6	217.9	3.4	221.3
2025	111.2	231.7	3.4	235.1
2026	112.9	244.5	3.4	247.9
2027	114.6	256.9	3.4	260.3
2028	116.3	270.3	3.4	273.7
2029	118.0	284.4	3.5	287.8
2030	119.5	296.9	3.5	300.4
2031	120.5	306.9	3.5	310.4
2032	121.7	319.8	3.5	323.3
2033	122.8	329.5	3.5	333.0
2034	123.7	339.9	3.5	343.5
2039	130.1	395.8	3.6	399.4
2044	136.1	442.9	3.7	446.6
2049	142.8	489.9	3.8	493.7
2054	149.7	515.6	3.9	519.5
2059	159.6	525.6	4.0	529.6
2064	171.9	547.3	4.1	551.4
2069	184.9	580.6	4.2	584.8
2073	193.6	618.2	4.3	622.5

[1]*Totals may not sum due to rounding.*

Appendix H Projections of Fund Balance

Table H1 Best Estimate Scenario

Year ending July 31	Contribution income $ million	Total Outgo $ million	Estimated Fund $ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2024	109.6	221.3	2,154.8	9.7
2029	118.0	287.8	2,041.4	7.1
2034	123.7	343.5	1,574.7	4.6
2039	130.1	399.4	654.8	1.6
2044	136.1	446.6	(828.2)	(1.9)
2049	142.8	493.7	(3,048.2)	(6.2)
2054	149.7	519.5	(6,187.1)	(11.9)
2059	159.6	529.6	(10,434.1)	(19.7)
2064	171.9	551.4	(16,137.2)	(29.3)
2069	184.9	584.8	(23,865.4)	(40.8)
2073	193.6	622.5	(32,003.1)	(51.4)

Table H2 Optimistic Scenario

Year ending July 31	Contribution income $ million	Total Outgo $ million	Estimated Fund $ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2024	109.6	221.1	2,175.9	9.8
2029	118.0	286.5	2,195.2	7.7
2034	126.8	341.4	1,913.8	5.6
2039	136.2	397.2	1,238.0	3.1
2044	146.6	445.0	52.9	0.1
2049	157.8	494.3	(1,833.0)	(3.7)
2054	169.9	524.9	(4,642.5)	(8.8)
2059	183.0	543.6	(8,646.4)	(15.9)
2064	197.0	579.1	(14,337.9)	(24.8)
2069	212.1	632.3	(22,509.6)	(35.6)
2073	225.0	690.2	(31,552.4)	(45.7)

Table H3 Pessimistic Scenario

Year ending July 31	Contribution income $ million	Total outgo $ million	Estimated Fund balance $ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2024	109.6	221.4	2,133.8	9.6
2029	117.7	289.2	1,895.6	6.6
2034	121.5	345.9	1,269.1	3.7
2039	125.5	402.6	165.1	0.4
2044	128.3	450.0	(1,508.0)	(3.4)
2049	131.1	496.1	(3,891.2)	(7.8)
2054	133.4	519.0	(7,108.9)	(13.7)
2059	138.2	523.2	(11,262.4)	(21.5)
2064	145.3	535.6	(16,567.9)	(30.9)
2069	151.2	556.0	(23,402.1)	(42.1)
2073	154.4	580.9	(30,284.8)	(52.1)

Table H4 Contributions increase at 4.5% until 2034 then at 3.75%

Year ending July 31	Contribution income $ million	Total outgo $ million	Estimated Fund balance $ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2024	109.6	221.3	2,154.8	9.7
2029	133.2	288.0	2,090.0	7.3
2034	157.7	344.0	1,786.9	5.2
2039	180.5	400.7	1,183.4	3.0
2044	205.6	448.8	223.7	0.5
2049	234.8	497.5	(1,181.7)	(2.4)
2054	268.0	524.2	(3,093.5)	(5.9)
2059	311.2	535.0	(5,529.9)	(10.3)
2064	364.7	560.5	(8,603.5)	(15.3)
2069	427.1	597.6	(12,567.8)	(21.0)
2073	478.8	640.4	(16,602.2)	(25.9)

Table H5 Contributions increase at 3% p.a.

Year ending July 31	Contribution income $ million	Total outgo $ million	Estimated Fund balance $ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2024	109.6	221.3	2,154.8	9.7
2029	123.9	287.9	2,060.5	7.2
2034	136.4	343.7	1,656.0	4.8
2039	150.6	399.9	860.6	2.2
2044	165.5	447.5	(408.8)	(0.9)
2049	182.2	495.3	(2,291.0)	(4.6)
2054	200.6	521.5	(4,917.2)	(9.4)
2059	224.6	531.9	(8,406.1)	(15.8)
2064	253.9	555.3	(13,008.8)	(23.4)
2069	286.7	590.2	(19,165.2)	(32.5)
2073	312.2	630.1	(25,594.1)	(40.6)

Table H6 Contributions increase at 10% in 2026 but otherwise at 2% p.a.

Year ending July 31	Contribution income $ million	Total outgo $ million	Estimated Fund balance $ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2024	109.6	221.3	2,154.8	9.7
2029	127.2	288.0	2,081.8	7.2
2034	133.5	343.7	1,682.9	4.9
2039	140.3	399.8	855.4	2.1
2044	146.8	447.2	(501.9)	(1.1)
2049	154.0	494.5	(2,552.0)	(5.2)
2054	161.4	520.3	(5,460.9)	(10.5)
2059	172.2	530.4	(9,396.2)	(17.7)
2064	185.3	552.5	(14,678.3)	(26.6)
2069	199.4	586.2	(21,839.0)	(37.3)
2073	208.8	624.3	(29,384.5)	(47.1)

Table H7 Increase Retirement Age to 68

Year ending July 31	Contribution income $ million	Total outgo $ million	Estimated Fund balance $ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2024	109.6	221.3	2,154.8	9.7
2029	121.0	271.8	2,114.3	7.8
2034	131.7	301.1	1,936.4	6.4
2039	138.3	356.9	1,448.4	4.1
2044	144.3	402.7	535.3	1.3
2049	151.6	444.2	(896.2)	(2.0)
2054	157.0	479.3	(3,009.0)	(6.3)
2059	166.2	494.5	(5,925.9)	(12.0)
2064	179.5	505.4	(9,827.1)	(19.4)
2069	193.4	532.7	(15,078.8)	(28.3)
2073	203.0	560.3	(20,614.4)	(36.8)

Table H8 Increase Retirement Age to 70

Year ending July 31	Contribution income $ million	Total outgo $ million	Estimated Fund balance $ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2024	109.6	221.3	2,154.8	9.7
2029	124.0	243.4	2,147.1	8.8
2034	135.1	287.7	2,067.1	7.2
2039	146.0	321.5	1,861.8	5.8
2044	152.4	370.4	1,317.4	3.6
2049	161.0	409.2	392.6	1.0
2054	166.7	448.3	(1,026.1)	(2.3)
2059	175.1	468.4	(3,054.7)	(6.5)
2064	189.3	475.2	(5,772.2)	(12.1)
2069	205.5	495.7	(9,390.7)	(18.9)
2073	216.5	521.9	(13,204.1)	(25.3)

Table H9 **Investment Return of 7.5% p.a.**

Year ending July 31	Contribution income $ million	Total Outgo $ million	Estimated Fund $ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2024	109.6	221.3	2,175.7	9.8
2029	118.0	287.8	2,189.4	7.6
2034	123.7	343.5	1,885.6	5.5
2039	130.1	399.4	1,156.8	2.9
2044	136.1	446.6	(123.9)	(0.3)
2049	142.8	493.7	(2,161.5)	(4.4)
2054	149.7	519.5	(5,192.1)	(10.0)
2059	159.6	529.6	(9,490.6)	(17.9)
2064	171.9	551.4	(15,539.4)	(28.2)
2069	184.9	584.8	(24,121.6)	(41.2)
2073	193.6	622.5	(33,528.8)	(53.9)

Table H10 **Investment Return of 5.5% p.a.**

Year ending July 31	Contribution income $ million	Total Outgo $ million	Estimated Fund $ million	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2024	109.6	221.3	2,134.0	9.6
2029	118.0	287.8	1,900.7	6.6
2034	123.7	343.5	1,296.1	3.8
2039	130.1	399.4	236.2	0.6
2044	136.1	446.6	(1,362.0)	(3.0)
2049	142.8	493.7	(3,631.6)	(7.4)
2054	149.7	519.5	(6,691.5)	(12.9)
2059	159.6	529.6	(10,641.7)	(20.1)
2064	171.9	551.4	(15,702.8)	(28.5)
2069	184.9	584.8	(22,256.1)	(38.1)
2073	193.6	622.5	(28,889.8)	(46.4)

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 July 31, 2023. 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 (including annual increases of 2%), at 8% a year. This is equivalent to discounting future payments (excluding future increases) at 6% a year. The PBO and PVFB have been estimated by assuming that benefits increase in line with future prices (2% p.a.) and discounting those benefit payments in respect of both past and future service at a nominal rate of return of 6% 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 July 31, 2023

($million)

Yr. Ending July 31	2023[2]		
	ABO	PBO	PVFB
Accrued Rights			
Current Beneficiaries	1,638	1,888	1,888
Future Beneficiaries[1]	1,299	1,990	1,990
Total accrued rights	**2,938**	**3,879**	**3,879**
Future Service Rights			
Future Beneficiaries[1]	-	-	1,649
Total service rights	**2,938**	**3,879**	**5,528**
Present Value of Future Contributions	-	-	1,504
Assets per accounts	2,141	2,141	2,141
Total Assets	**2,141**	**2,141**	**3,645**
Ratio	**73%**	**55%**	**66%**

[1]*Includes non-contributors who are entitled to future benefits*

[2]*Totals may not sum due to rounding*

The ABO, which assumes no further increases to benefits, is estimated to be $2,938 million as at July 31, 2023. The Fund at $2,141 million covers approximately 73% of the accrued benefits (excluding future administration expenses).

As at July 31, 2023, the estimated accrued liability assuming future increases to benefits is $3,879 million. The Fund at $2,141 million covers approximately 55% of the accrued benefits (excluding future administration expenses). This level of coverage is higher than that indicated in the previous review (53%).

The PVFB for the total expected period of participation in the Fund is estimated to be $5,528 million as at July 31, 2023. The present value of expected future contributions is estimated to be $2,141 million as at July 31, 2023. The Fund along with future contributions covers approximately 66% of both current and future benefits (excluding future administration expenses).

Present value of retired liabilities and gratuities

As at July 31, 2023, the present value of retired liabilities for existing beneficiaries over the next 10 years is estimated to be $1,241 million.

The present value of gratuities expected to be paid over the next 10 years, is estimated to be $85 million.

List of Tables and Figures

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