GOVERNMENT ACTUARY'S DEPARTMENT

Bermuda Contributory Pension Fund

Actuarial review as at 1 August 2005

Report by the Government Actuary

June 2007

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1 Introduction

1.1 At the request of the Bermuda Department of Social Insurance (the Department), and in my capacity as actuarial adviser to the Department, I have carried out an actuarial review of the Contributory Pension Fund (the Fund) as at 1 August 2005, as required by Section 35 of the Contributory Pensions Act, 1970. The purpose of this report on the review is to indicate the potential financial effects of future increases to contribution and benefit rates and to consider the long-term sustainability of the Fund. The report represents an independent actuarial assessment of the financial condition of the Fund. There are no restrictions on its dissemination but it should not be quoted selectively.

Outline of the scheme

1.2 Under the Contributory Pensions Act, 1970, two classes of benefit 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

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

1.4 Flat-rate contributions are payable by employed persons over age 16. 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.

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

Increases to benefit and contribution rates

1.6 Benefit and contribution rates are reviewed annually, taking into account the increase in prices, as measured by the Consumer Price Index (CPI). Increases to benefits and contributions come into effect from August each year. Table B1 of Appendix B summarises price inflation and benefit and contribution increases in the period since August 1996. Table B2 summarises the rates of benefits and contributions payable in the years commencing August 2001 to August 2005. This report takes account of the benefit and contribution rates that came into force with effect from August 2005.

1.7 We have previously been advised by the Department of Social Insurance that the policy intention over the long term was that benefit rates would be increased broadly in line with prices and that contribution rates will be increased at the slightly higher rate of 1¼% a year more than benefits (prices). The Department has since advised us that the policy intention over the long term (as of August 2006) is to increase contribution rates at 1¾% a year more than benefits (prices).

1.8 At the request of the Department, this review therefore gives projections based on contribution rates being increased at 1¾% a year more than benefits (the main projections shown in section 6), and also projections based on contribution rate being increased at 1¼% and 2½% a year more than benefits (prices). This compares to the central assumption adopted at the last review that contributions would increase at 1¼% a year more than benefits (prices), together with the further assumptions that they would increase in line with benefits (prices) and at ¾% a year more than benefits (prices).

Previous review

1.9 The effective date of the previous actuarial review was 1 August 2002. The main financial projections were expressed in terms of the benefit rates and contribution rates effective from August 2002. The benefit and contribution rates that came into force with effect from August 2003 and August 2004 were taken into account, and it was assumed that benefits would increase in line with prices thereafter.

1.10 The results of the 2002 review indicated that total outgo would exceed contribution income within 5 years under all three of the alternative assumptions used in respect of future increases in contributions, ie assuming that contributions increase annually:

- in line with benefit rates
- by ¾% a year more than benefit rates
- 1¼% a year more than benefit rates

1.11 In order to maintain a balance of income over outgo for a longer period, the 2002 review indicated that contributions would need to increase at an even higher rate than 1¼% a year in excess of benefits. For example, in order to match the increased level of benefit outgo in the year 2042-43, contribution rates would need to be about double their levels in 2002-03 (in 2002-03 price terms). This would require contribution rates to be increased at about 1¾% a year in excess of benefit increases over the 40-year period.

1.12 The 2002 review also included projections of the Fund balance. These indicated that, if benefits and contributions were to increase in line with prices, and if the Fund were to earn a real investment return of 3½% a year, then, in real terms, the Fund would increase for about 15 years but would then decline quite rapidly. If, however, contributions were to increase annually by 1¼% a year more than benefits, then, in real terms, the Fund would increase more rapidly for about 15 years (and to a higher level) and would then start to decline, albeit at a slower rate.

2 Scope of the review

2.1 The main purpose of the review is to assess the implications for future contribution rates of maintaining benefits at their present levels in real terms. We understand that the Department's policy (as of August 2006) is to increase benefit rates in the future broadly in line with increases in the Consumer Price Index, with contribution rates increasing at 1¾% a year more than benefits. This therefore constitutes the central policy assumption for this review.

2.2 The review includes projections of contribution income and expenditure (on benefits and administration), 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.

2.3 The review is based on a long-term population projection carried out by the Government Actuary's Department and this includes another important indicator of the likely longer-term development of the Fund, namely the projected ratio of the number of people of working age 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.

2.4 It is important to recognise that the financial projections for future years are based on reasonable assumptions but they should not be taken as forecasts of the outcome. The projections should be updated at successive actuarial reviews in the light of the latest information available. In order to indicate the sensitivity of the results to changes in the main assumptions, the review includes alternative projections. At the request of the Department of Social Insurance, we have included alternative projections considering the effects of increasing contribution rates at a lower rate of 1¼% a year more than benefits and at a higher rate of 2½% a year more than benefits. The review also considers the effect on the Fund's assets of assuming a higher and lower rate of investment return.

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

2.6 The effective date of the review is 1 August 2005. The financial projections are expressed in terms of the benefit and contribution rates applicable from August 2005.

3 Data

3.1 The Department provided data on benefits in payment during the month 16 August to 15 September for the years 2003, 2004 and 2005, and data on contributions paid during the calendar months of June 2003, 2004 and 2005.

3.2 Following discussions with the Department, we were provided with revised data in respect of benefits in payment during the month 16 August to 15 September 2005. The revised benefits data showed much closer agreement with information taken from the accounts.

Beneficiaries and benefits

3.3 Table C1 of Appendix C summarises the numbers and total amounts of benefits in payment for the month 16 August to 15 September 2005 and, for comparison, for the month 16 August to 15 September 2002. Table C2 of Appendix C summarises the average amounts of benefits in payment in 2005 and 2002.

3.4 The largest group of beneficiaries were those receiving contributory old-age pensions. There were 6,367 such beneficiaries in August 2005, compared to 6,428 in August 2002. The average amount of benefit in payment was about 16% higher, mainly due to the increase in the full rate of weekly pension (excluding increments) from $157.75 to $183.30.

3.5 The total number receiving non-contributory old-age pensions fell from 1,171 in August 2002 to 951 in August 2005. A spouse's allowance was in payment to 1,069 widows and 69 widowers in August 2005, slightly less than the 1,187 widows and 82 widowers in August 2002. The numbers receiving contributory disability benefit increased from 91 to 100, but the numbers receiving non-contributory disability benefit fell from 220 to 217.

Contributors and contributions

3.6 Table C3 of Appendix C summarises the number of persons paying or being credited with one or more contributions, and the average number of weekly contributions paid or credited, during the months of June 2005 and June 2002. The number of persons paying or being credited with one or more contributions increased slightly over the 3-year period to June 2005, from 34,732 in June 2002 to 35,339 in June 2005. The average number of weekly contributions in June 2005 (3.86) was about the same as that in June 2002 (3.87).

3.7 We were also provided with provisional information regarding the workforce for the year ending 31 July 2006 (although not all employees contribute to the Fund), based on the summary employment statistics for the year. This showed an increase in the workforce of about 2% over the previous year.

Income and expenditure

3.8 The Accountant General provided draft accounts of the Fund for the years ending 31 July 2003, 2004 and 2005. Contribution income in the year ending 31 July 2005 was $87.4 million, an increase of about 12% over the three years since the previous review. Expenditure on benefits and administration totalled $81.9 million in the year ending 31 July 2005, an increase of about 23% since the previous review. Table D1 of Appendix D summarises the income and expenditure of the Fund for the three years to 31 July 2005.

3.9 We were also provided with draft accounts for the year ending 31 July 2006, including a summary of the income and outgo for the year. Based on the draft accounts, contribution income in 2005/06 was $95.8 million, and benefit expenditure was $80.1 million.

The Fund

3.10 As at 31 July 2005, the market value of the Fund was $996.0 million, approximately 12¼ times the outgo in the year ending 31 July 2005. As at 31 July 2002, the Fund balance represented about 10½ times the outgo in the year ending 31 July 2002.

3.11 Table D2 of Appendix D shows the market value of the Fund investments as at 31 July 2005 in each of three main investment classes, as shown in the Accounts of the Fund. As at that date, the Fund was invested in equities (73%), bonds (21%), and short-term deposits (4%). Net receivables made up the other 2% of the Fund value.

Investment returns

3.12 The Accountant General provided information on the estimated Fund returns for the two years ending 31 December 2003, 2004 and the seven months ending 31 July 2005. Table D3 of Appendix D shows the estimated annual investment returns on the Fund for each year (ending 31 July) from 1996 to 2005. (These differ from those provided by the Accountant General because they relate to different accounting periods.) Over the three years ended 31 July 2005, the average rate of return earned on the Fund was about 11.6% a year. Allowing for price inflation over the same period, the average real rate of return earned on the Fund over the three years ended 31 July 2005 was about 8.0% a year.

3.13 Over the ten years ended 31 July 2005, the average rate of return earned on the Fund was just under 10% a year. Allowing for price inflation over the same period, the average real rate of return earned on the Fund over the ten years ended 31 July 2005 was about 7% a year.

4 Demographic assumptions

Introduction

4.1 This section briefly describes the estimating methods and demographic assumptions adopted for the review.

Population projections

4.2 In order to carry out the required financial projections, we have produced a long-term population projection for the 40-year period covered by the review (2005 to 2045). The baseline population for the long-term projection is the total numbers taken from the 2000 census of Bermuda. (The Statistical Department of Bermuda provided us with a population projection to 2030 based on the 2000 census but this did not extend over a sufficiently long period.) Appendix E contains a description of the assumptions adopted for the projection and the results.

4.3 The Statistical Department has confirmed that the long-term projection prepared by GAD is suitable for the purposes of the actuarial review.

4.4 Table 1 summarises the results of the projection. Table 1 also shows the projected ratio of the number of working age to the number over pension age, commonly known as the "pensioner support ratio".

Table 1: Projected population 2005 - 2045 (Males and Females)

As at 30 June	Births	Ages 1-19	Working age (20-64)	Pension age (over 65)	Total	Pensioner support ratio
2005	785	15,136	40,428	7,728	64,077	5.2
2010	677	15,005	40,635	9,029	65,346	4.5
2015	636	14,270	40,269	10,880	66,055	3.7
2020	657	13,502	39,362	12,955	66,476	3.0
2025	664	12,721	37,805	15,449	66,639	2.4
2030	645	12,415	35,292	18,045	66,397	2.0
2035	611	12,319	33,215	19,482	65,627	1.7
2040	575	12,062	31,893	19,788	64,318	1.6
2045	550	11,570	31,950	18,506	62,576	1.7

4.5 The numbers over pension age are expected to rise steadily over the next 35 years, at which point it is projected that the number over pension age will be more than 2½ times the present number. Thereafter the numbers over pension age are projected to stabilise, and then gradually decline.

4.6 The number of people of working age is expected to rise slightly over the next few years, reaching a peak in about five years' time, and to then decline, before stabilising towards the end of the projection period. This fall in numbers of working age is due to lower numbers of births in recent years and the projected continuation of a lower number of births.

4.7 The pensioner support ratio is a particularly useful indicator of future trends, and Table 1 shows a steady fall in the ratio. As at August 2005, there were approximately 5 people of working age per pensioner but, over the next forty years or so, this ratio is projected to fall to just under 2.

Projected contributors and beneficiaries

4.8 The results of the 40-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 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.

Projected numbers of contributors and contributions

4.9 The projected numbers of weekly contributions are based on the projected numbers of contributors and the assumed average annual number of weekly contributions per contributor. The projected number of contributors is derived by applying age-specific factors to the projected population in 5-year age groups, with the factors representing the long-term assumed proportions of the population in each age group that will contribute to the Fund. It has been assumed that the proportion of contributors in each 5-year age group will be similar to that obtained from the most recent data.

4.10 The projected number of contributors in the year ending 31 July 2006 has been adjusted to take account of summary employment statistics for 2006. Following discussion with the Department, this adjustment has also been applied to the projected number of contributors in all future years.

4.11 Table 2 summarises the projected number of contributors to the Fund.

Table 2: Projected numbers of contributors

Year ending 31 July	Males	Females	Total
2006	18,934	17,985	36,919
2011	18,866	17,974	36,840
2016	18,824	17,893	36,717
2021	18,687	17,601	36,288
2026	18,355	16,997	35,352
2031	17,831	16,201	34,032
2036	17,122	15,340	32,462
2041	16,478	14,664	31,142
2046	16,128	14,301	30,429

4.12 Table 2 indicates that the projected total number of contributors remains broadly unchanged for the next 10 years and then falls by almost 20% over the remaining period covered by the review, reflecting the trend in the projected population of working age over the same period. Due to the changing age distribution of the projected population, the proportion of the working age population contributing to the Fund increases from 91% to 95% over the projection period (although the population projection does not include an adjustment similar to that made to the numbers of contributors, described in paragraph 4.10).

4.13 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. Each contributor is assumed to contribute, on average, for about 50 weeks a year.

Average age of contributors

4.14 The Department of Social Insurance also requested that we provide information on the projected average age of contributors.

4.15 Table 3 summarises the average age of contributors to the Bermuda CPF, separately for men and women, over a 40-year period in 5-year intervals.

Table 3: Average age of contributors

30 June	Male	Female	Overall
2005	42.6	42.6	42.6
2010	43.8	43.8	43.8
2015	44.5	44.5	44.5
2020	44.9	44.8	44.8
2025	44.9	44.8	44.8
2030	44.6	44.5	44.6
2035	44.4	44.4	44.4
2040	44.3	44.2	44.3
2045	44.4	44.2	44.3

Benefits and beneficiaries

4.16 The projected amounts of benefits are based on the projected numbers of beneficiaries (contributory and non-contributory) and the average benefit payable. It has been assumed that, over the long term, about 95% of men and 85% of women reaching age 65 will qualify for a contributory old age pension, and that the remaining 5% of the male population, and 5% of the female population over age 65 will receive a non-contributory old age pension. The remaining 10% of females over age 65 are assumed to receive a widow's pension.

4.17 Table 4 summarises the projected total numbers of beneficiaries in receipt of a contributory or non-contributory old age pension.

Table 4: Projected numbers of OAP beneficiaries (aged 65 or over)

Year ending 31 July	Males	Females	Total
2006	3,432	4,863	8,295
2011	3,964	5,401	9,365
2016	4,766	6,297	11,063
2021	5,707	7,381	13,088
2026	6,781	8,786	15,567
2031	7,876	10,182	18,058
2036	8,401	10,998	19,399
2041	8,306	11,241	19,547
2046	7,581	10,690	18,271

4.18 For the earlier years, the projected numbers in Table 4 reflect the actual numbers of beneficiaries as at 31 July 2005 rather than the estimated (and projected) population.

4.19 Table 4 indicates that the total number of beneficiaries (contributory and non-contributory) over age 65 is expected to increase steadily, reaching a peak in about 35 years' time. Thereafter, a gradual decline in numbers is projected.

5 Financial assumptions

5.1 In order to simplify both the interpretation of the financial projections in relation to present monetary values and the understanding of the underlying trends arising from demographic changes and other factors, the results of the review are shown at constant 2005-2006 price levels. Thus, the projections allow for the assumed increases in benefits and contributions, as appropriate, but are then deflated by the assumed rate of price increases. (The review takes into account the actual benefit and contribution increases implemented with effect from August 2005.)

5.2 The three main financial assumptions are the rates at which benefits and contributions will increase (relative to prices) from August 2006, and the real rate of investment return (in excess of price increases). It is not necessary to make an explicit assumption in respect of future price increases because the assumed increases to both benefit and contribution rates are expressed relative to price increases.

Increases to benefit and contribution rates

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

- a rate of 1¼% a year more than benefits (i.e. price increases plus 1¼%);
- a rate of 1¾% a year more than benefits (i.e. price increases plus 1¾%); and
- a rate of 2½% a year more than benefits (i.e. price increases plus 2½%).

5.4 The assumed long-term increases to benefit rates are the same as those adopted for the previous review. The assumed long-term increases to contribution rates are higher than those adopted for the previous review, which used assumptions of contribution rates increasing in line with benefit rates, and contribution rates increasing at ¾% and 1¼% a year more than benefit rates. This change in assumptions has been made at the request of the Department of Social Insurance.

Real rate of investment return

5.5 The Fund is invested approximately two-thirds in equities and one-third in bonds. In order to project the Fund balance, it has been assumed that the average long-term real rate of investment return (in excess of price increases) will be 3½% a year. I consider that this represents a reasonable assumption for the real rate of return on a broadly balanced portfolio, invested with a long-term perspective, but it is not intended to be a target level of investment return. The assumed real rate of return of 3½% a year is the same as that assumed at the 2002 review.

5.6 Alternative projections of the Fund balance have been carried out using assumed real rates of return of 2% a year and 5% a year. This seems a reasonable range for the long-term real rate of return in view of the returns achieved over the past decade or so.

Administration expenses

5.7 For the purposes of the review, we have assumed that administration expenses will increase at a rate of 1½% a year in excess of price increases. Administration expenses for the year to 31 July 2005 amounted to $6.2 million. Appendix F includes further explanation of the assumed level of administration expenses.

6 Main results

6.1 This Section illustrates and discusses the results of the financial projections on the central assumptions over the 40-year period to the year ending 31 July 2046. The projections are expressed in terms of the benefit and contribution rates effective from August 2005.

6.2 Section 7 illustrates and discusses the results under variant assumptions for the rate of increase of contribution rates and the rate of investment return.

6.3 The results show projections of:

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

Projected income and outgo

6.4 Table 5 summarises at five-yearly intervals the projected contribution income, increasing in line with prices plus 1¾% a year, and the projected total outgo of the Fund, at 2005-2006 prices. Table G1 of Appendix G summarises the same results for each year of the projection period.

6.5 Contribution income and benefit outgo in the year ending 31 July 2006 have been adjusted to be consistent with the draft accounts for the year. Following discussion with the Department, these adjustments have been applied to the projected income and outgo in all future years.

Table 5: Projected income and outgo ($ million) at constant 2005-2006 prices

Year ending 31 July	Contribution income	Outgo			
	Increases in line with prices plus 1¾%	OAP benefits	Other benefits	Admin costs	Total outgo
(1)	(2)	(3)	(4)	(5)	(6)
2006	95.8	76.5	3.6	6.3	86.4
2011	101.9	92.4	5.8	6.8	105.0
2016	109.8	115.4	7.4	7.3	130.1
2021	117.3	141.6	8.5	7.8	157.9
2026	123.3	172.6	8.7	8.4	189.7
2031	128.2	202.7	8.1	9.1	219.9
2036	132.8	219.1	6.9	9.8	235.8
2041	139.0	221.4	5.8	10.6	237.8
2046	148.8	207.6	5.3	11.4	224.3

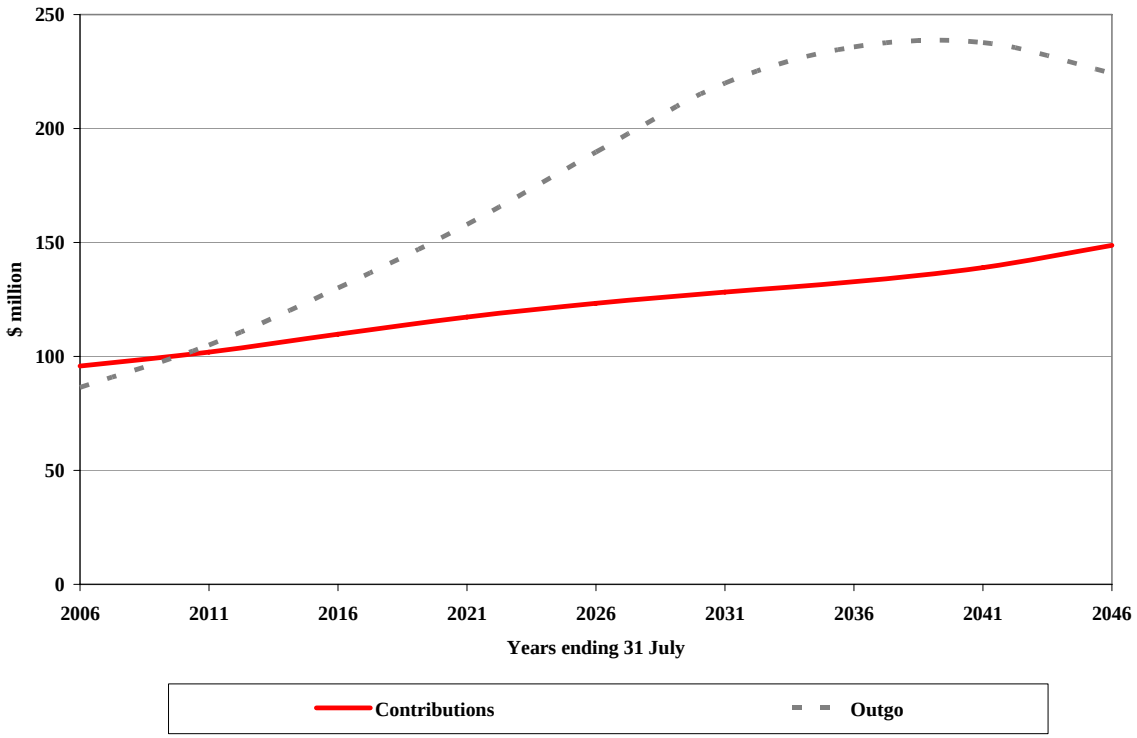
6.6 Over the next 35 years, total outgo is projected to increase to more than 2½ times its current level, from just over $85 million in 2006 to almost $240 million in 2041. Thereafter, total outgo is projected to fall, quite rapidly, to just under $225 million by the end of the projection period (2046).

6.7 Over the same period, contribution income is projected to increase from just over $95 million to just under $150 million.

6.8 Figure 1 illustrates the projected amounts of contribution income and total outgo, as shown in Table 5.

Figure 1: Projected contribution income and total outgo

($ million at constant 2005-06 prices)



6.9 Figure 1 indicates that total outgo will exceed contribution income in about 5 years. By the year 2046, contribution income would need to be more than double the current level in real terms in order to match the increased level of benefit outgo (ignoring any income from investments). This would require contributions to be increased by about 2¾% a year more than benefit increases over the next 40 years.

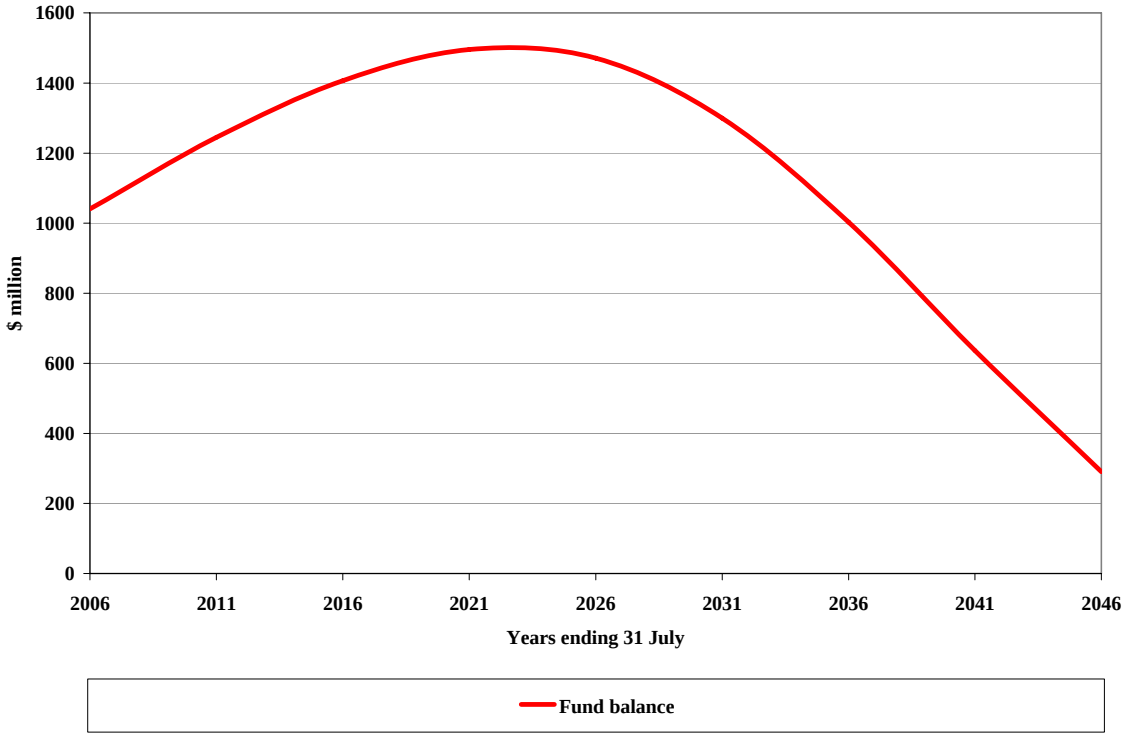
Projected fund balance

6.10 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.

6.11 Figure 2 illustrates the projected balance of the Fund in constant 2005-06 price terms, assuming a real rate of investment return of 3½% a year.

Figure 2: Projected Fund balance, Real rate of return of 3½% a year

($ million at constant 2005-06 prices)



6.12 Figure 2 indicates that, if contributions increase at 1¾% a year more than prices, then the Fund may be expected to increase steadily in real terms for about 18 years. Thereafter, the Fund is projected to decline steadily to just under $300m by the end of the projection period.

Further comments

6.13 Table H1 of Appendix H shows the Fund projections in detail under the main assumptions, including the multiple by which the projected Fund balance is estimated to cover annual outgo from the Fund ("ratio of Fund to outgo").

6.14 Table H1 indicates that, if contributions increase at 1¾% a year more than prices, and the real return is 3½% a year, then the projected Fund balance, expressed as a multiple of outgo, decreases gradually to begin with and then more rapidly over the projection period.

Comparison with previous review

6.15 The following paragraphs consider the results of the current review (which are expressed in 2005-2006 price terms) relative to those of the previous review (which were expressed in 2002-2003 price terms). Although expressed in different monetary terms, the projected financial position of the Fund at the current review is better in the longer term than at the previous review.

6.16 The main reason for the improvement in the Fund is that over the three years ended 31 July 2005, the real rate of return earned on the Fund was about 8% a year, as compared to the real rate of return of 3½% a year assumed at the 2002 review. As a result, the value of the Fund as at 31 July 2005 is about 25% higher than projected at the 2002 review (taking into account the different monetary values in which the current and previous reviews are expressed).

6.17 In addition to this, the base year for the population projection has changed from that used for the previous review, to take account of information from the 2000 Census on the age profile of the population of Bermuda. This information was not available for the 2002 review. The updated population projections show a lower number of pensioners relative to the working age population in the early years of the projection.

6.18 In most of the developed world, life expectancy continues to improve at faster rates than previously anticipated, and this has been reflected in a change in the mortality assumptions both for this review and for the most recent population projection carried out by the Bermuda Department of Statistics. This has led to the projected number of pensioners relative to the population of working age increasing over time to a greater extent than projected in the previous review. As a result of this, benefit outgo is projected to increase to higher levels in this review than in the previous review (taking into account the fact that outgo is expressed in different price terms for the two reviews).

6.19 The previous review allowed for the actual benefit rates up to and including those in force with effect from August 2004 and, thereafter, assumed that benefit rates would increase in line with prices. The current review allows for the actual benefit rates up to and including those in force with effect from August 2005 and, thereafter, assumes that benefit rates will increase in line with prices. The benefit increases in August 2005 of 3½% were in line with price increases over the same year. Thus, considering 2005 increase to benefit rates in isolation, we would expect the projected benefit outgo in the current review to be similar in the earlier years to that shown in the previous review.

6.20 The projected amounts of benefit outgo have been adjusted to be consistent with the draft 2005/06 accounts. In isolation, this adjustment slightly reduces benefit outgo in this review compared to the previous review.

6.21 The previous review allowed for the actual contribution rates up to and including those in force with effect from August 2004 and, thereafter, assumed that contribution rates would increase at 1¼% a year more than prices. The current review allows for the actual contribution rates up to and including those in force with effect from August 2005 and, thereafter, assumes that contribution rates will increase at 1¾% a year more than prices. Contribution rates were increased by 4¾% in August 2005 (i.e. 1¼% in excess of benefit rate increases), which is in line with the principal assumption for contribution rate increases adopted for the previous review. Thus, considering the 2005 increase to contribution rates in isolation, we would expect contribution income relative to benefit outgo to be similar in the early years to that shown in the previous review. However, the principal assumption for future increases in contribution rates has been increased at the current review and so, over time, we would expect projected contribution income to increase more rapidly in the current review than in the previous review.

6.22 The projected amounts of contribution income have been adjusted to be consistent with the draft 2005/06 accounts. In isolation, this adjustment increases contribution income in this review compared to the previous review.

6.23 The factors described in paragraphs 6.16, 6.17 and 6.20 to 6.22 all lead to an improvement in the financial position of the Fund as at 31 July 2005 relative to that at the previous review. These improvements outweigh the negative impact on the fund of life expectancy improving in the future (as described in paragraph 6.18).

6.24 In aggregate, the factors discussed in the preceding paragraphs, together with other miscellaneous changes to the projections, broadly account for the differences between the results of the current and previous reviews.

7 Variant results

7.1 This Section illustrates and discusses the results of the variant financial projections over the 40-year period to the year ending 31 July 2046. The projections are expressed in terms of the benefit and contribution rates effective from August 2005.

7.2 The results show projections of:

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

Variant rates of increases to contributions

7.3 Table 6 summarises at five-yearly intervals the projected contribution income, increasing in line with (a) prices plus 1¾% a year, (b) prices plus 1¼% a year and (c) prices plus 2½% a year, and the projected total outgo of the Fund, at 2005-2006 prices. Table G1 of Appendix G summarises the same results for each year of the projection period.

Table 6: Projected income and outgo main and variant assumptions for contribution rate increases

($ million) at constant 2005-2006 prices

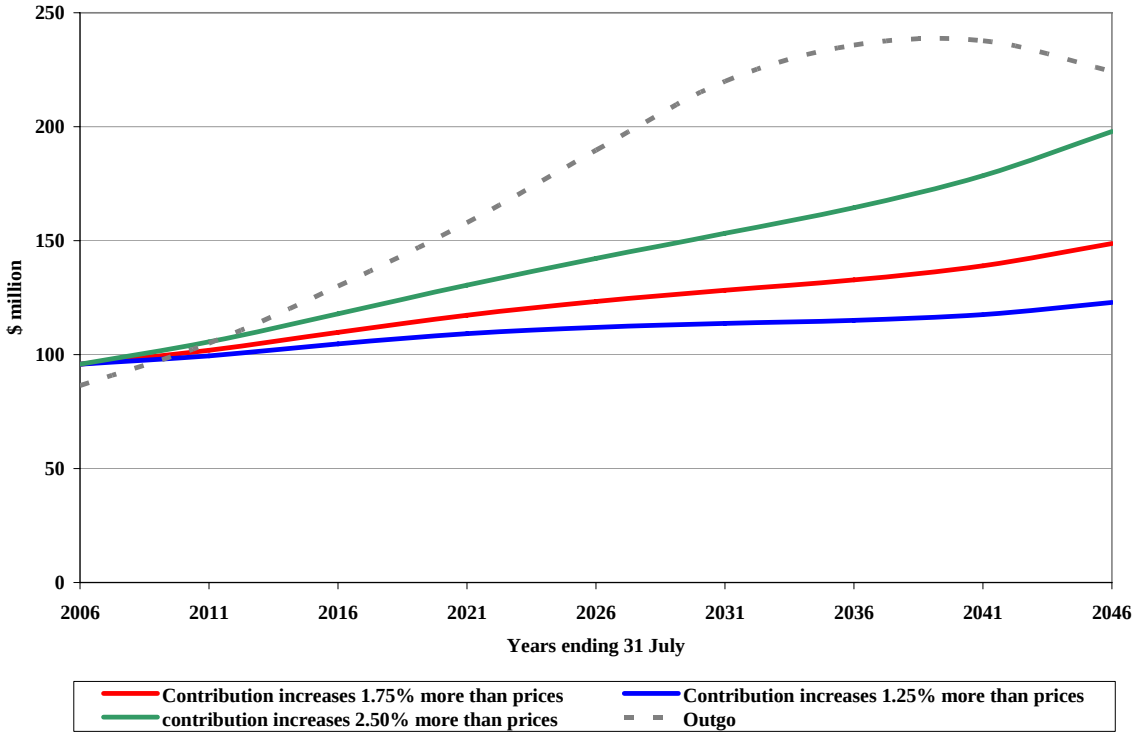
Year ending 31 July	Contribution income			Outgo			
	Increases in line with prices plus			OAP benefits	Other benefits	Admin costs	Total outgo
	1¾%	1¼%	2½%				
(1)	(2a)	(2b)	(2c)	(3)	(4)	(5)	(6)
2006	95.8	95.8	95.8	76.5	3.6	6.3	86.4
2011	101.9	99.5	105.6	92.4	5.8	6.8	105.0
2016	109.8	104.7	117.9	115.4	7.4	7.3	130.1
2021	117.3	109.2	130.5	141.6	8.5	7.8	157.9
2026	123.3	112.0	142.2	172.6	8.7	8.4	189.7
2031	128.2	113.7	153.2	202.7	8.1	9.1	219.9
2036	132.8	115.0	164.5	219.1	6.9	9.8	235.8
2041	139.0	117.6	178.5	221.4	5.8	10.6	237.8
2046	148.8	122.9	197.9	207.6	5.3	11.4	224.3

7.4 Over the next 40 years, under the variant assumption that contribution rates increase at 1¼% a year more than prices, contribution income is projected to increase from about $96 million to just under $125 million. Over the same period, under the variant assumption that contribution rates increase at 2½% a year more than prices, contribution income is projected to increase from about $96 million to just under $200 million.

7.5 Figure 3 illustrates the projected amounts of contribution income (under the three alternative assumed rates of increase) and total outgo, as shown in Table 6.

Figure 3: Projected contribution income and total outgo, main and variant assumptions for contribution rate increases

($ million at constant 2005-06 prices)



7.6 Figure 3 indicates that total outgo will exceed contribution income within 5 years under all three alternative rates of increase of contributions.

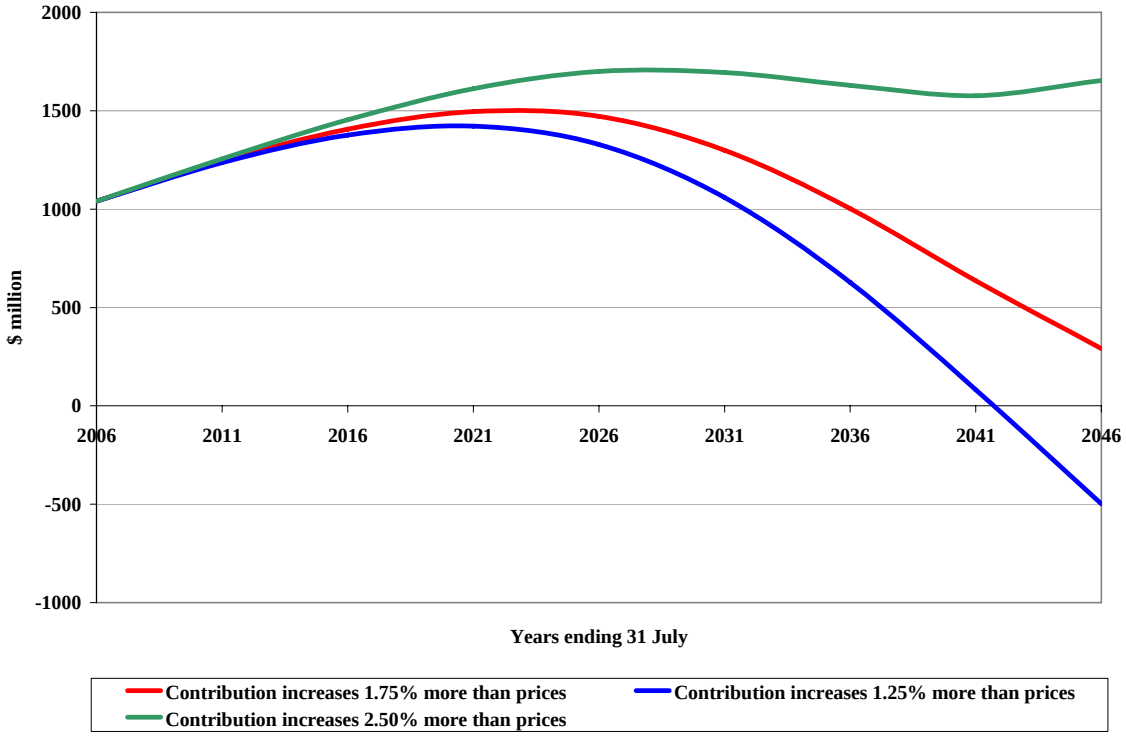
Projected fund balance

7.7 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.

7.8 Figure 4 illustrates the projected balance of the Fund in constant 2005-06 price terms, under the three alternative rates of increase of contributions, and assuming a real rate of investment return of 3½% a year in all cases.

Figure 4: Projected Fund balance main and variant assumptions for contribution rate increases, Real rate of return of 3½% a year

($ million at constant 2005-06 prices)



7.9 Figure 4 indicates that, if contributions increase at 1¼% a year more than prices, then the Fund may be expected to increase steadily in real terms for about 15 years. Thereafter, the Fund would be expected to decline quite rapidly and be exhausted shortly before the end of the projection period. However, if contributions increase at 2½% a year more than prices, then the Fund may be expected to increase steadily in real terms for about 20 years, then remain broadly level for about 15 years, before beginning to increase again towards the end of the projection period.

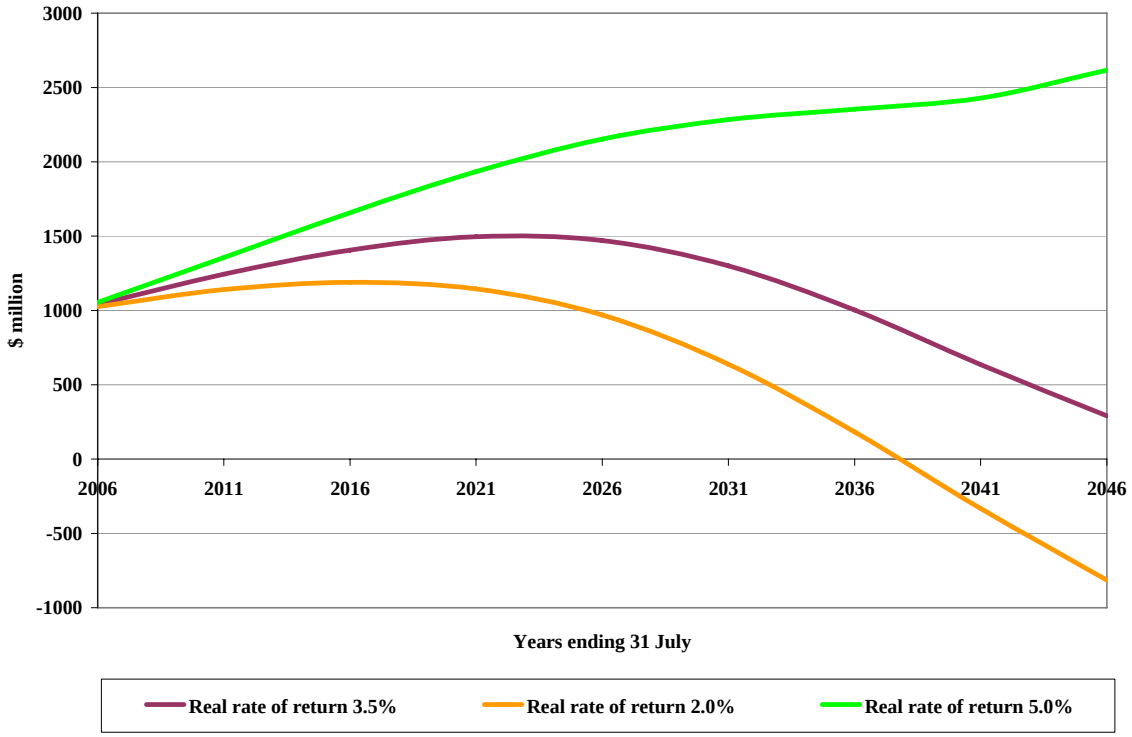
Variant fund returns

7.10 Figure 5 illustrates the projected balance of the Fund in constant 2005-06 price terms, assuming that contributions increase at 1¾% a year more than prices, and assuming alternative real rates of investment return of 2%, 3½% and 5% a year.

Figure 5: Projected Fund balance, Real rates of return of 2%, 3½% and 5% a year

Contributions increase at 1¾% a year more than prices

($ million at constant 2005-06 prices)



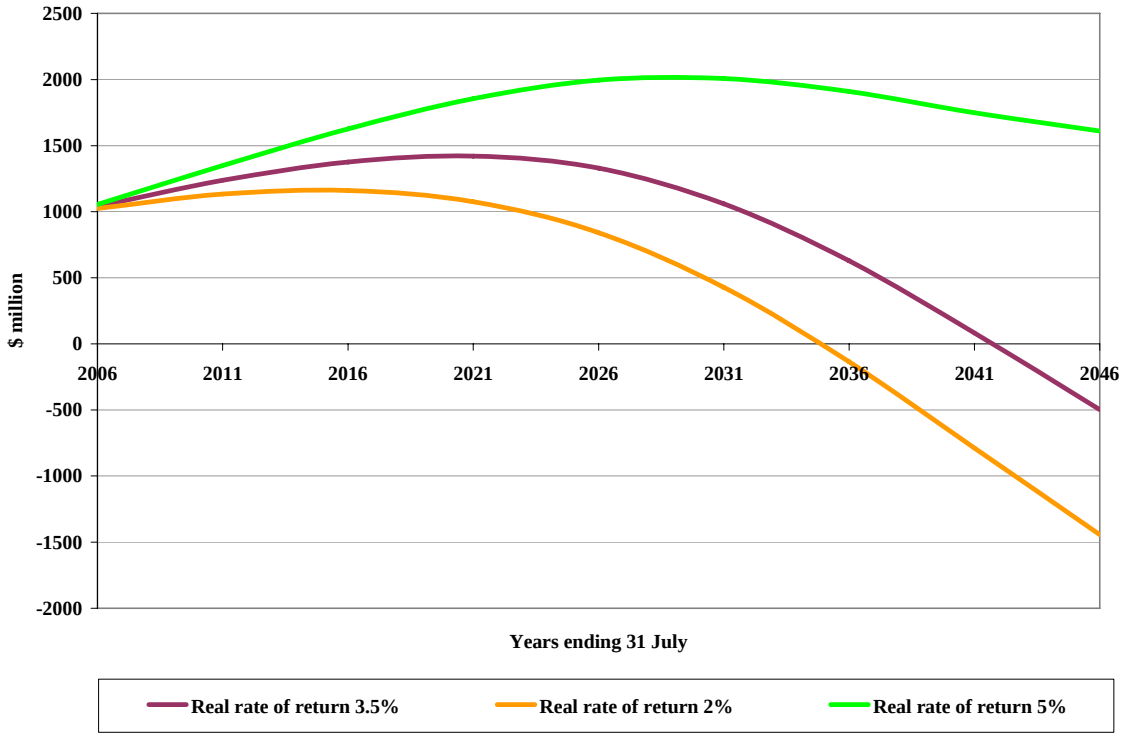
7.11 Figure 5 indicates that, if contributions increase at 1¾% a year more than prices, then, with a future real rate of return of 5% a year, the Fund balance is projected to increase fairly steadily up to the end of the projection period. However, with a future real rate of return of only 2% a year, the Fund balance is projected to remain broadly unchanged for about 15 years, and then decline steadily until it is exhausted after a little over 30 years.

7.12 Figure 6 illustrates the projected balance of the Fund in constant 2005-06 price terms, assuming that contributions increase at 1¼% a year more than prices, and assuming alternative real rates of investment return of 2%, 3½% and 5% a year.

Figure 6: Projected Fund balance, Real rates of return of 2%, 3½% and 5% a year

Contributions increase at 1¼% a year more than prices

($ million at constant 2005-06 prices)



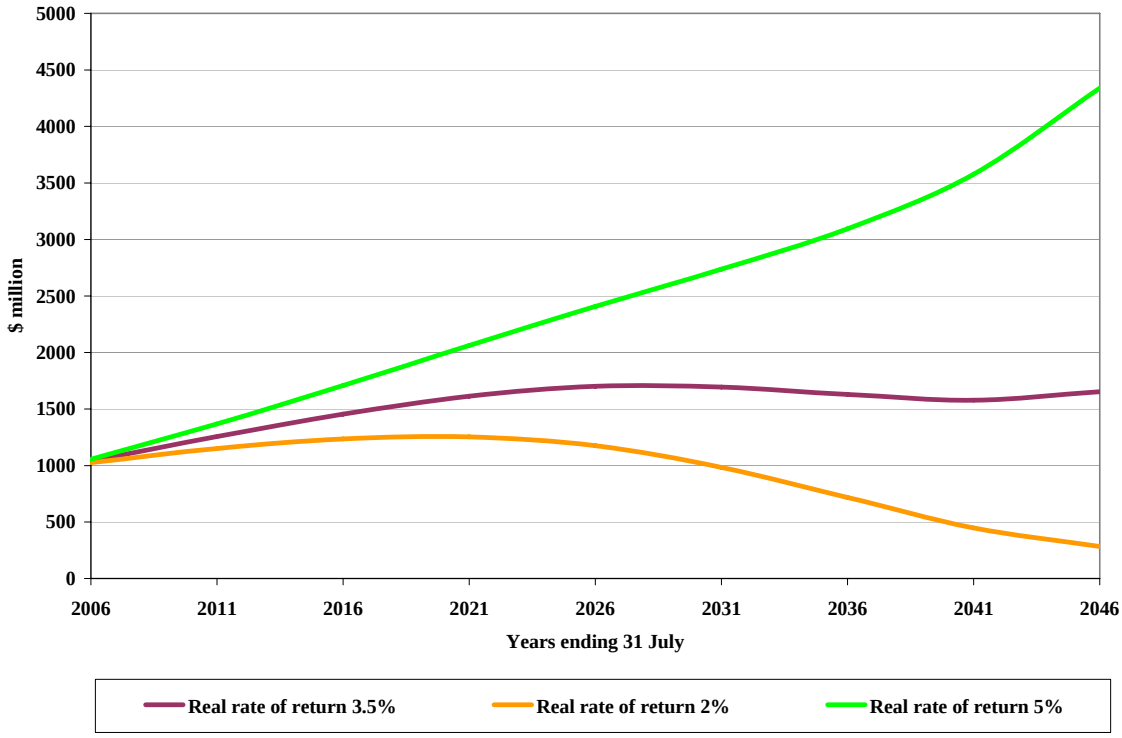
7.13 Figure 6 indicates that, if contributions increase at 1¼% a year more than prices, then with a future real rate of return of 5% a year, the Fund balance is projected to increase steadily for about 20 years before beginning to fall slightly for the remainder of the projection period. However, with a future real rate of return of only 2% a year, the Fund balance is projected to remain broadly unchanged for about 10 years, and then decline until it is exhausted in just under 30 years.

7.14 Figure 7 illustrates the projected balance of the Fund in constant 2005-06 price terms, assuming that contributions increase at 2½% a year more than prices, and assuming alternative real rates of investment return of 2%, 3½% and 5% a year.

Figure 7: Projected Fund balance, Real rates of return of 2%, 3½% and 5% a year

Contributions increase at 2½% a year more than prices

($ million at constant 2005-06 prices)



7.15 Figure 7 indicates that, if contributions increase at 2½% a year more than prices, then with a future real rate of return of 5% a year, the Fund balance is projected to increase throughout the projection period. However, with a future real rate of return of only 2% a year, the Fund balance is projected to rise slightly for 15 years, and then decline for the following 20 years, before beginning to level off towards the end of the projection period.

Further comments

7.16 Tables H1 to H9 of Appendix H show the main and variant 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").

7.17 Tables H1, H4 and H5 show the detailed projections underlying Figure 5, Tables H2, H6 and H7 show the detailed projections underlying Figure 6, and Tables H3, H8 and H9 show the detailed projections underlying Figure 7. As would be expected, these tables demonstrate that a lower real rate of return would cause the Fund to decline more rapidly, whereas a higher real rate of return either delays the decline of the Fund or reduces the rate of decline.

7.18 Table H2 indicates that, if contributions increase at 1¼% a year more than prices, and the real return is 3½% a year, then the projected Fund balance, expressed as a multiple of outgo, decreases gradually more rapidly until the Fund is exhausted shortly before the end of the 40-year projection period.

7.19 Table H3 indicates that if contributions increase at 2½% a year more than prices, and the real return is 3½% a year, then the projected Fund balance, expressed as a multiple of outgo, decreases gradually before starting to increase again towards the end of the projection period.

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

7.21 Overall, the results of the Fund projections demonstrate that there is considerable uncertainty relating to the long-term progress of the Fund in respect of the financial assumptions. The demographic assumptions introduce further uncertainty. Since benefit outgo is projected to increase significantly relative to contribution income, there is an argument for smoothing the impact by raising contributions by more than is necessary in the short term, thus building up a sizeable fund. (As a result, however, the future outlook would then be more sensitive to the real rates of return achieved in the Fund.)

8 Conclusions

8.1 The number of old age pension beneficiaries is projected to grow steadily over the next 35 years, after which time the number is expected to gradually decline. The population of working age is expected to remain broadly stable over the short term but decline more significantly in the longer term. Hence, over the long term, the cost of benefits is expected to increase substantially relative to the contribution base represented by the employed population. In order to keep pace with benefit outgo, contributions would therefore need to increase at a faster rate than benefits over the long term.

8.2 The rate at which contributions would need to increase relative to benefits depends on the future experience, both in terms of demographic developments and the investment performance of the Fund. Under the three contribution rate scenarios considered in this review, expenditure is projected to exceed contribution income within 5 years.

8.3 If contributions were to increase by 1¾% a year more than benefits, and the Fund were to earn a real rate of return of 3½% a year, then the Fund is likely to increase for about 18 years and, thereafter, decline steadily for the remainder of the projection period. If the real rate of return were only 2% a year, then the Fund would be exhausted in a little over 30 years, but if the real rate of return were 5% a year, then the Fund would increase fairly steadily throughout the whole of the projection period.

8.4 Lower increases in contribution rates relative to benefits would slow down the build up of the Fund in the short term, all other things being equal. For example, if contributions were to increase by 1¼% a year more than benefits, then it is likely that the Fund would be exhausted within the 40-year projection period, assuming a real rate of return of 3½% a year. Thus, over the longer term, this would be likely to necessitate higher increases in contribution rates relative to benefits.

8.5 Higher increases in contribution rates relative to benefits would defer the run-down of the Fund over the medium and longer term, all other things being equal. For example, if contributions were to increase by 2½% a year more than benefits, then it is likely that the Fund would generally increase over the 40-year projection period, assuming a real rate of return of 3½% a year. Thus, over the longer term, this would be likely to allow smaller increases in contribution rates relative to benefits.

8.6 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.

C D Daykin, CB FIA

Government Actuary's Department
London, United Kingdom
28 June 2007

Appendix A Main provisions of Scheme from August 2005

Benefits

A1 A **contributory old-age pension** is payable to any person over age 65, provided that:

- at least 484 contributions have been paid or credited in respect of the person; and
- an average of not less than 25 paid or credited contributions a year has been achieved between attaining age 21 (or 5 August 1968 if later) and commencement of pension.

A2 The full rate of pension, payable if the yearly average contributions paid or credited is 50 or more, is $183.30 a week plus increments of $1.08 for every 26 contributions paid or credited in excess of 484. The increments are at half this rate for contributions after age 65. If the contribution average is between 25 and 50, lower rates of pension are payable. Although the lower limit for increments was raised from 250 to 484 in 1986, it has remained the same since then. Since 1986, the increment rate has been increased only in line with prices.

A3 A **non-contributory old-age pension** is payable to any person aged over 65, who possesses Bermudian status and has been ordinarily resident in Bermuda for a period of not less than 10 years during the 20 years immediately preceding the application for non-contributory pension. These pensions are payable only to persons who are not entitled to a contributory old-age pension. The rate of pension is $84.12 a week, increased to $86.57 a week for persons whose income from all sources does not exceed $4,000 a year excluding any pension granted under the scheme. During 1988 to 1990, the higher rate of non-contributory old age pension was increased by less than the lower rate, with the result that the difference between the two rates of benefit was reduced. It is now just under $2.50 a week.

A4 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.

A5 A **contributory widow's allowance** is payable to any widow who has been married for not less than 3 years, subject to contribution conditions based on her husband's record similar to those for contributory old-age pensions. The allowance is payable for 26 weeks after the husband's death and continues thereafter if the widow has a child under school-leaving age or if she is incapable of self-support. If the widow is over 50 when the allowance is due to cease, it is continued until remarriage or death. The rate of allowance is $183.30 a week (subject to reduction if the husband's contribution average was less than 50) with an additional $18.29 a week for each child under school-leaving age.

A6 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.

A7 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.

A8 A **contributory widower's allowance** or **contributory widower's gratuity** have been payable to widowers whose wives died on or after 16 April 1985, under the same terms and conditions as the corresponding widows' benefits.

A9 A **contributory disability pension** of $122.18 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.

A10 A **non-contributory disability pension** of $84.12 a week is payable if a person does not qualify for a contributory disability pension, has lived in Bermuda for 10 years, 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

A11 Contributions are payable in respect of employed and self-employed persons. The employer pays $25.34 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.

Increases to benefits and contributions

A12 Benefit and contribution rates are reviewed annually by reference to the increase in the CPI over the previous calendar year.

Appendix B Benefit and contribution rates 1996 to 2005

Increases to benefits and contributions

B1 Table B1 summarises the annual increases to benefit and contribution rates since August 1996, together with the increase in the CPI over the previous calendar year.

Table B1: Annual increases in CPI, benefits and contributions

Year	CPI *	Increase in	
		Benefits †	Contributions †
1996	2.5%	-	-
1997	2.5%	-	-
1998	2.1%	3.0%	3.0%
1999	2.0%	-	-
2000	2.4%	3.0%	4.25%
2001	2.7%	-	-
2002	2.4%	3.0%	4.25%
2003	2.3%	3.0%	-
2004	3.2%	9.0%	4.25%
2005	3.6%	3.5%	4.75%

* CPI in previous calendar year

† Increase in August of calendar year

Benefit and contribution rates, 2001 to 2005

B2 Table B2 summarises the main rates of benefits and contributions in force for the years commencing August 2001 to August 2005

Table B2: Benefit and contribution rates, 2001-2005

Benefits	From 16/8/01	From 16/8/02	From 16/8/03	From 16/8/04	From 16/08/05
Contributory Old-Age Pension					
Full pension p.w.	$153.16	$157.75	$162.48	$177.10	$183.30
Limit for increments	484	484	484	484	484
Increment p.w.	89 cents	92 cents	95 cents	$1.04	$1.08
Non-Contributory Old-Age Pension					
Income limit p.a.	$4,000	$4,000	$4,000	$4,000	$4,000
Pension, for those below limit, p.w.	$72.32	$74.49	$76.73	$83.64	$86.57
Pension, for those above limit, p.w.	$70.29	$72.40	$74.57	$81.28	$84.12
Contributory Widow's or Widower's Allowance					
Personal rate p.w.	$153.16	$157.75	$162.48	$177.10	$183.30
Addition per child p.w.	$15.28	$15.74	$16.21	$17.67	$18.29
Contributory Disability pension p.w.	$102.08	$105.14	$108.30	$118.05	$122.18
Non-Contributory Disability Pension p.w.	$70.29	$72.40	$74.57	$81.28	$84.12
Rate of increase in benefits	nil	3.0%	3.0%	9.0%	3.5%

Contributions	From 6/8/01	From 6/8/02	From 16/8/03	From 16/8/04	From 16/08/05
Contributions p.w.	$22.25	$23.20	$23.20	$24.19	$25.34
Total Contributions p.w.	$44.50	$46.40	$46.40	$48.38	$50.68
Rate of increase in contributions from previous yr	nil	4.25%	nil	4.25%	4.75%

Appendix C Membership data

Table C1: Numbers and amounts of benefits in payment

Benefit	16/8/02 – 15/9/02		16/8/05 – 15/9/05	
	Number in payment	Amount ($000 pm)	Number in payment	Amount ($000 pm)
Contributory old-age pension	6,428	4,509	6,367	5,189
Non-contributory old-age pension:				
higher rate	784	252	647	243
lower rate	387	121	304	110
Contributory widow's allowance	1,187 *	747	1,069 †	773
Contributory widower's allowance	82	49	69	45
Contributory disability pension	91	34	100	41
Non-contributory disability pension	220	69	217	80
Total	**9,179**	**5,781**	**8,773**	**6,481**

* of whom 238 were under age 65

† of whom 213 were under age 65

Table C2: Average amounts of benefits in payment

Benefit	Average benefit ($ pm)	
	2002	2005
Contributory old-age pension	701.43	814.98
Non-contributory old-age pension:		
higher rate	321.95	375.58
lower rate	313.42	361.84
Contributory widow's allowance	629.00	723.11
Contributory widower's allowance	599.79	652.17
Contributory disability pension	368.33	410.00
Non-contributory disability pension	314.45	368.66
Total	**629.80**	**738.74**

Table C3: Contributions data, June 2002 and June 2005

	June 2002	June 2005
Number of contributors	34,732	35,339
Average weekly contributions in month	3.87	3.86

Appendix D Financial data

Table D1: Income and Expenditure, 2002 to 2005 ($ million) *

	Year ending 31 July			1 August 2002 to 31 July 2005
	2003	**2004**	**2005**	
Fund at beginning of year	694.6	769.2	872.3	694.6
Income				
Contributions	80.7	81.5	87.4	249.6
Interest and dividends	17.9	16.1	19.7	53.7
Realised gains (losses)	(57.2)	66.1	59.8	68.7
Unrealised gains (losses)	102.8	12.6	38.5	153.9
Foreign exchange gains (losses)	-	-	-	
Total income	**144.2**	**176.3**	**205.4**	**525.9**
Expenditure				
Pensions	64.7	68.0	75.7	208.4
Administration	4.9	5.1	6.2	16.2
Total expenditure	**69.6**	**73.1**	**81.9**	**224.6**
Excess of income over expenditure	74.6	103.2	123.5	301.3
Fund at end of year	**769.2**	**872.3**	**996.0**	**996.0**

* Numbers may not sum to totals due to rounding

Table D2: Fund assets at market value, 31 July 2005 *

Asset	**$ million**	**%**
Investments:		
Equities	722.6	73
Bonds	213.8	21
Cash and deposits	40.9	4
	977.4	**98**
Net receivables	18.6	2
Net assets	**996.0**	**100**

* Numbers may not sum to totals due to rounding

Table D3: Estimated annual investment returns of Fund

Year ending 31 July	Nominal % p.a. (1)	Inflation % p.a. (2)	Real % p.a. (3)
1996	9.7	2.4	7.2
1997	31.9	2.1	29.2
1998	11.3	2.0	9.1
1999	15.0	2.4	12.3
2000	12.7	2.7	9.7
2001	- 1.3	2.4	- 3.7
2002	- 12.2	2.3	- 14.2
2003	9.1	3.2	5.7
2004	12.2	3.6	8.3
2005	13.5	3.1	10.1
Average (3 years)	**11.6**	**3.3**	**8.0**
Average (10 years)	**9.7**	**2.6**	**6.9**

Appendix E Population projection

Introduction

E1 This Appendix describes the assumptions used by GAD to prepare the 40-year population projection for Bermuda required for the actuarial review of the CPF as at 31 July 2005.

E2 The Statistics Department provided GAD with their own projection, based on the 2000 census and projected to year 2030. The Statistics Department also provided GAD with a summary of the mortality, fertility and migration assumptions used to derive these projections.

E3 The projections by GAD make use of the 2000 census figures (total numbers of males and females, split into five year age groups), and cover a 40-year period after the current review date. Tables E4, E5 and E6 summarise the results of the projection. A particularly important feature of the projection is the relative sizes and trends of the working age population and the pensioner population over the projection period. Table E5 also shows the projected pensioner support ratio (PSR).

Base year

E4 The base year for the projections is the 2000 census year. The census data giving the male and female population split into five year age groups was used to create a population split by individual age. Table E1 summarises the population in 2005, as estimated by GAD.

Table E1: Estimated population as at 30 June 2005

Age last birthday	2005		
	Males	Females	Total
0-19	8,007	7,914	15,921
20-64	19,657	20,771	40,428
> 65	3,234	4,494	7,728
All ages	30,898	33,179	64,077

Mortality

E5 We have based Bermuda mortality for the year 2005 on the mortality assumptions used to derive the most recent (2004) United Kingdom population projection. To produce expectations of life at birth which are consistent with those implied by the Statistics Department's projections, no age rating has been applied to male or female mortality rates.

E6 We have assumed that the rate of future mortality improvement in Bermuda will be the same as that assumed in the UK 2004-based projections for females, but one half of the UK rate for males. This is to achieve broad consistency between the Statistics Department's view of current and expected future life expectancy in Bermuda and those used in the population projection derived for the purposes of the review.

E7 Table E2 summarises the projected life expectancy for males and females under the mortality assumptions adopted for the 40-year projection.

Table E2: Projected life expectancy at birth

Year to 30 June	Expectation of life at birth	
	Males	Females
2005	76.9	81.2
2015	78.1	83.1
2025	78.8	84.5
2035	79.3	85.5
2045	79.9	86.5

E8 When producing a population projection for the purposes of a long-term actuarial review, it is also important to consider the life expectancy of people currently at pension age (age 65) and of those attaining pension age in future. Table E3 summarises the projected life expectancy for males and females aged 65 under the mortality assumptions adopted for the 40-year projection.

Table E3: Projected life expectancy at age 65

Year to 30 June	Expectation of life at age 65	
	Males	Females
2005	17.0	19.7
2015	18.0	21.4
2025	18.6	22.6
2035	18.9	23.4
2045	19.3	24.1

Fertility

E9 We have assumed a long-term total period fertility rate (TPFR) of 1.7. This is based on the fertility rates assumed in the Statistics Department's own projection.

E10 However, the numbers of actual births in recent years suggests that an even higher fertility assumption may be required in the short term (for example, a TPFR of about 1.9). We have incorporated an additional fertility allowance by increasing the number of births for the next ten years, by a factor of about 10% in 2005 reducing to nil over the first 10 years of the projection.

E11 We have assumed a male/female sex ratio of 1.05:1 for future births.

Migration

E12 The projection does not include any allowance for future migration, either inward or outward. (The migration assumptions used by the Department of Statistics in Bermuda suggest a net overall outward migration of just 50 persons a year, which represents an insignificant proportion of the total population.) This is the same allowance as was made for our previous projection.

Results

E13 Tables E4, E5 and E6 summarise, at five-yearly intervals, the projected numbers below working age (under 20), of working age (between 20 and 64), and over age 65, for males, females and males and females combined respectively. Table E6 also shows the projected numbers of births and the ratio of the number of working age to the number over pension age, commonly known as the "pensioner support ratio".

Table E4: Projected population 2005 - 2045 (Males)

	Males			
Year to 30 June	**Under age 20**	**Working age (20-64)**	**Pension age (over 65)**	**Total**
2005	8,007	19,657	3,234	30,898
2010	7,937	19,805	3,843	31,585
2015	7,588	19,667	4,701	31,956
2020	7,270	19,214	5,663	32,147
2025	6,854	18,592	6,732	32,178
2030	6,688	17,428	7,874	31,990
2035	6,621	16,463	8,453	31,537
2040	6,471	15,925	8,433	30,829
2045	6,206	16,034	7,696	29,936

Table E5: Projected population 2005 - 2045 (Females)

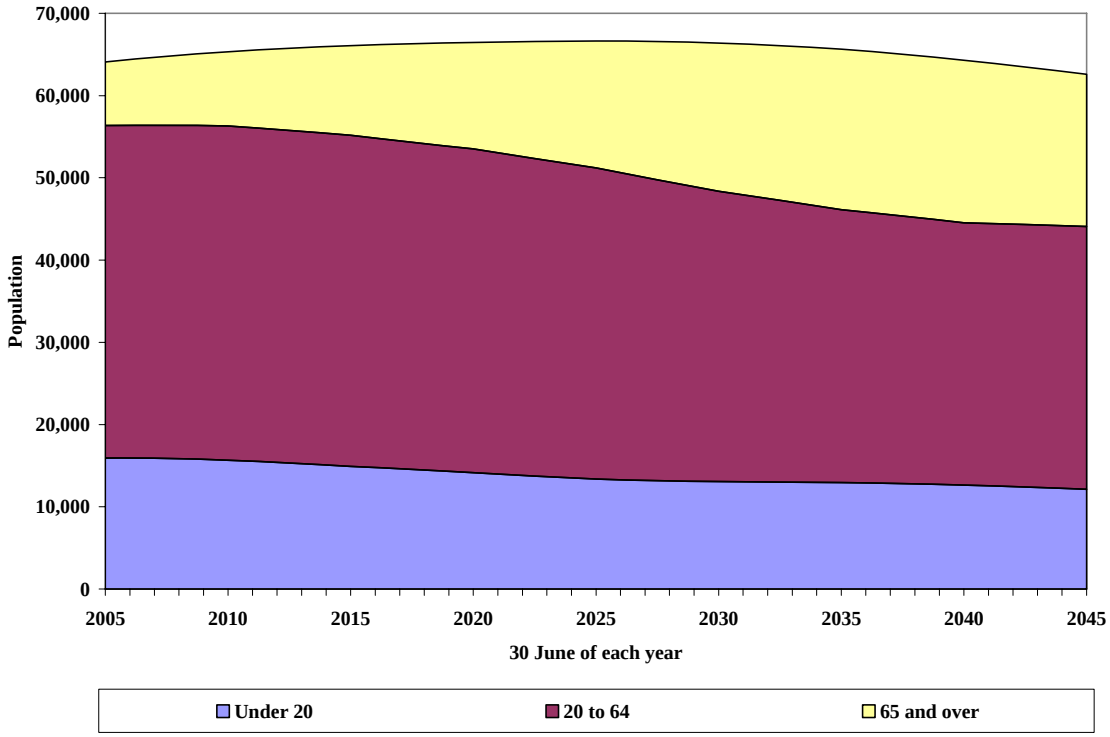
	Females			
Year to 30 June	**Under age 20**	**Working age (20-64)**	**Pension age (over 65)**	**Total**
2005	7,914	20,771	4,494	33,179
2010	7,745	20,830	5,186	33,761
2015	7,318	20,602	6,179	34,099
2020	6,889	20,148	7,292	34,329
2025	6,531	19,213	8,717	34,461
2030	6,372	17,864	10,171	34,407
2035	6,309	16,752	11,029	34,090
2040	6,166	15,968	11,355	33,489
2045	5,914	15,916	10,810	32,640

Table E6: **Projected population 2005 - 2045 (Males and females)**

Year to 30 June	Males and females					
	Births	Ages 1-20	Working age (20-64)	Pension age (over 65)	Total	Pensioner support ratio
2005	785	15,136	40,428	7,728	64,077	5.2
2010	677	15,005	40,635	9,029	65,346	4.5
2015	636	14,270	40,269	10,880	66,055	3.7
2020	657	13,502	39,362	12,955	66,476	3.0
2025	664	12,721	37,805	15,449	66,639	2.4
2030	645	12,415	35,292	18,045	66,397	2.0
2035	611	12,319	33,215	19,482	65,627	1.7
2040	575	12,062	31,893	19,788	64,318	1.6
2045	550	11,570	31,950	18,506	62,576	1.7

E14 Figure E1 illustrates the results with the population split into the three main age groups (below working age, of working age, and above pension age).

Figure E1: Projected population 2005 - 2045 (Males and females)



Appendix F Estimating methods

Introduction

F1 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. Contribution income and benefit outgo in the year ending 31 July 2006 have been adjusted to be consistent with the draft accounts for the year. Following discussion with the Department, these adjustments have been applied to the projected income and outgo in all future years. It should be noted that the projections are subject to increasing uncertainty in later years.

Benefits in respect of current beneficiaries

F2 The projected future amount of benefits payable to current beneficiaries is based on the numbers receiving benefits in the period 16 August to 15 September 2005. In projecting future amounts of benefits payable to current beneficiaries, allowance was made for future mortality and future increases to benefits.

F3 Allowance was also made for the effect of a gradual replacement of female non-contributory old-age pensions by widow's allowance at higher ages, on the assumption that 70% of women assumed to be awarded non-contributory old-age pensions on reaching age 65 are married, therefore becoming entitled to widow's allowance on the death of their husband.

Benefits in respect of future beneficiaries

F4 Future benefit award amounts are derived from the projected Bermuda population 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.

F5 For men, it is assumed that, of those qualifying for old-age pension in the longer term, 95% will be entitled to a contributory pension and 5% will be entitled to a non-contributory pension. For women, it is assumed that, of those qualifying for old-age pension in the longer-term, 85% will be entitled to contributory pension, 5% will be entitled to non-contributory pension and 10% will be entitled to a widow's allowance.

F6 Allowance was also made for the effect of a gradual replacement of non-contributory old-age pensions by widow's allowance at higher ages, on the assumption that 70% of women assumed to be awarded non-contributory old-age pensions on reaching age 65 are married and so become entitled to widow's allowance on the death of their husband.

F7 Allowance is also included for the average pension of those qualifying for contributory pension to increase in line with the maximum number of contributions that could have been paid between 5 August 1968 (or their 21st birthday, if later) and attaining age 65.

F8 Future payments of disability (both contributory and non-contributory) allowance, widow(er)'s allowance for widow(er)s aged below 65, and future gratuity payments were also modelled. These, however, represent a very small proportion of total outgo.

F9 Overall, about 95% 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

F10 The projected amount of contributions is derived from the projected number of future contributors, the projected number of weekly contribution earned and the weekly contribution rate.

F11 The data provided for this review included the numbers of contributors and contributions paid or credited in the months of June 2003, 2004, and 2005, according to year of birth and sex. These were combined with estimates of the corresponding population to give the age and sex-specific estimates of the proportions of the population contributing to the Fund and the average number of weekly contributions paid per year.

F12 The future number of contributors is derived by applying the age and sex-specific factors (based on the recent experience) to the projected population in 5-year age groups, with the factors representing the long-term assumed proportions of the population in each age/sex group that will contribute to the Fund. The projected number of future contributors has been adjusted to reflect the summary employment statistics for 2006.

F13 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. Each contributor is assumed to contribute, on average, for about 50 weeks a year.

Administration expenses

F15 Administration expenses charged to the Fund for the year ending 31 July 2005 totalled $6.2 million. This may be compared with charges of $5.1 million and $4.9 million for the years ending 31 July 2004 and 2003 respectively. Administration expenses would be expected to be broadly related to both the number of contributors and 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.

F16 For the purposes of the review, we have assumed that administration expenses will increase at a real rate of 1½% a year (i.e. 1½% a year in excess of price increases).

Appendix G Detailed results

Table G1: Projected income and outgo ($ million at constant 2005-06 prices)

Year ending 31 July	Contribution income, increasing in line with prices plus			Outgo			
	1¾%	1¼%	2½%	OAP benefits	Other benefits	Admin costs	Total outgo
(1)	(2a)	(2b)	(2c)	(3)	(4)	(5)	(6)
2006	95.8	95.8	95.8	76.5	3.6	6.3	**86.4**
2007	95.8	95.3	96.4	79.9	4.2	6.4	**90.5**
2008	97.3	96.4	98.7	82.8	4.6	6.5	**93.9**
2009	98.8	97.4	101.0	85.6	5.0	6.6	**97.2**
2010	100.4	98.5	103.3	88.5	5.4	6.7	**100.6**
2011	101.9	99.5	105.6	92.4	5.8	6.8	**105.0**
2012	103.5	100.5	108.0	97.0	6.1	6.9	**110.0**
2013	105.0	101.6	110.4	101.6	6.5	7.0	**115.1**
2014	106.6	102.6	112.9	106.1	6.8	7.1	**120.0**
2015	108.3	103.7	115.5	110.5	7.2	7.2	**124.9**
2016	109.8	104.7	117.9	115.4	7.4	7.3	**130.1**
2017	111.3	105.6	120.4	120.7	7.7	7.4	**135.8**
2018	112.8	106.5	122.9	125.9	7.9	7.5	**141.3**
2019	114.4	107.5	125.5	130.9	8.2	7.6	**146.7**
2020	115.9	108.4	128.1	135.9	8.4	7.7	**152.0**
2021	117.3	109.2	130.5	141.6	8.5	7.8	**157.9**
2022	118.5	109.8	132.8	148.0	8.6	8.0	**164.6**
2023	119.7	110.4	135.2	154.3	8.6	8.1	**171.0**
2024	120.9	110.9	137.5	160.3	8.8	8.2	**177.3**
2025	122.2	111.5	139.9	166.2	8.8	8.3	**183.3**
2026	123.3	112.0	142.2	172.6	8.7	8.4	**189.7**
2027	124.3	112.5	144.4	179.2	8.6	8.6	**196.4**
2028	125.4	112.8	146.7	185.7	8.5	8.7	**202.9**
2029	126.3	113.2	148.9	191.9	8.4	8.8	**209.1**
2030	127.2	113.4	151.0	197.8	8.3	9.0	**215.1**
2031	128.2	113.7	153.2	202.7	8.1	9.1	**219.9**
2032	129.2	114.1	155.5	206.7	7.8	9.2	**223.7**
2033	130.1	114.3	157.8	210.4	7.6	9.4	**227.4**
2034	131.0	114.6	159.9	213.8	7.3	9.5	**230.6**
2035	131.8	114.7	162.0	217.0	7.1	9.7	**233.8**
2036	132.8	115.0	164.5	219.1	6.9	9.8	**235.8**
2037	133.9	115.5	167.1	220.3	6.6	9.9	**236.8**
2038	135.1	115.9	169.7	221.3	6.4	10.1	**237.8**
2039	136.2	116.3	172.4	222.1	6.1	10.2	**238.4**
2040	137.4	116.8	175.1	222.6	5.9	10.4	**238.9**
2041	139.0	117.6	178.5	221.4	5.8	10.6	**237.8**
2042	140.9	118.6	182.1	218.8	5.7	10.7	**235.2**
2043	142.7	119.6	185.9	216.0	5.6	10.9	**232.5**
2044	144.7	120.6	189.8	213.2	5.4	11.0	**229.6**
2045	146.7	121.7	193.8	210.2	5.3	11.2	**226.7**
2046	148.8	122.9	197.9	207.6	5.3	11.4	**224.3**

Appendix H Projections of Fund balance

Table H1: Contributions increase at prices plus 1¾%, Real rate of return of 3½% a year
($ million at constant 2005-06 prices)

Year ending 31 July	Contribution income	Total outgo	Estimated Fund balance	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2006	95.8	86.4	1,040.4	12.0
2011	101.9	105.0	1,244.4	11.9
2016	109.8	130.1	1,406.6	10.8
2021	117.3	157.9	1,495.5	9.5
2026	123.3	189.7	1,471.1	7.8
2031	128.2	219.9	1,299.6	5.9
2036	132.8	235.8	1,002.7	4.3
2041	139.0	237.8	636.1	2.7
2046	148.8	224.3	290.5	1.3

Table H2: Contributions increase at prices plus 1¼%, Real rate of return of 3½% a year
($ million at constant 2005-06 prices)

Year ending 31 July	Contribution income	Total outgo	Estimated Fund balance	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2006	95.8	86.4	1,040.4	12.0
2011	99.5	105.0	1,236.8	11.8
2016	104.7	130.1	1,375.9	10.6
2021	109.2	157.9	1,421.6	9.0
2026	112.0	189.7	1,329.0	7.0
2031	113.7	219.9	1,059.3	4.8
2036	115.0	235.8	627.9	2.7
2041	117.6	237.8	82.5	0.3
2046	122.9	224.3	- 498.0	- 2.2

Table H3: Contributions increase at prices plus 2½%, Real rate of return of 3½% a year
($ million at constant 2005-06 prices)

Year ending 31 July	Contribution income	Total outgo	Estimated Fund balance	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2006	95.8	86.4	1,040.4	12.0
2011	105.6	105.0	1,255.9	12.0
2016	117.9	130.1	1,454.3	11.2
2021	130.5	157.9	1,612.5	10.2
2026	142.2	189.7	1,700.2	9.0
2031	153.2	219.9	1,694.3	7.7
2036	164.5	235.8	1,629.1	6.9
2041	178.5	237.8	1,577.1	6.6
2046	197.9	224.3	1,653.7	7.4

Table H4: Contributions increase at prices plus 1¾%, Real rate of return of 2% a year
($ million at constant 2005-06 prices)

Year ending 31 July	Contribution income	Total outgo	Estimated Fund balance	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2006	95.8	86.4	1,025.4	11.9
2011	101.9	105.0	1,140.2	10.9
2016	109.8	130.1	1,189.6	9.1
2021	117.3	157.9	1,144.2	7.2
2026	123.3	189.7	968.6	5.1
2031	128.2	219.9	637.5	2.9
2036	132.8	235.8	182.5	0.8
2041	139.0	237.8	- 332.8	- 1.4
2046	148.8	224.3	- 814.6	- 3.6

Table H5: Contributions increase at prices plus 1¾%, Real rate of return of 5% a year

($ million at constant 2005-06 prices)

Year ending 31 July	Contribution income	Total outgo	Estimated Fund balance	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2006	95.8	86.4	1,055.4	12.2
2011	101.9	105.0	1,356.3	12.9
2016	109.8	130.1	1,657.6	12.7
2021	117.3	157.9	1,934.5	12.3
2026	123.3	189.7	2,153.0	11.3
2031	128.2	219.9	2,284.1	10.4
2036	132.8	235.8	2,354.2	10.0
2041	139.0	237.8	2,428.5	10.2
2046	148.8	224.3	2,616.0	11.7

Table H6: Contributions increase at prices plus 1¼%, Real rate of return of 2% a year

($ million at constant 2005-06 prices)

Year ending 31 July	Contribution income	Total outgo	Estimated Fund balance	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2006	95.8	86.4	1,025.4	11.9
2011	99.5	105.0	1,132.8	10.8
2016	104.7	130.1	1,160.5	8.9
2021	109.2	157.9	1,075.8	6.8
2026	112.0	189.7	840.7	4.4
2031	113.7	219.9	427.3	1.9
2036	115.0	235.8	- 135.7	- 0.6
2041	117.6	237.8	- 788.8	- 3.3
2046	122.9	224.3	- 1,444.4	- 6.4

Table H7: Contributions increase at prices plus 1¼%, Real rate of return of 5% a year
($ million at constant 2005-06 prices)

Year ending 31 July	Contribution income	Total outgo	Estimated Fund balance	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2006	95.8	86.4	1,055.4	12.2
2011	99.5	105.0	1,348.6	12.8
2016	104.7	130.1	1,625.2	12.5
2021	109.2	157.9	1,854.4	11.7
2026	112.0	189.7	1,994.6	10.5
2031	113.7	219.9	2,007.7	9.1
2036	115.0	235.8	1,908.7	8.1
2041	117.6	237.8	1,747.5	7.3
2046	122.9	224.3	1,611.0	7.2

Table H8: Contributions increase at prices plus 2½%, Real rate of return of 2% a year
($ million at constant 2005-06 prices)

Year ending 31 July	Contribution income	Total outgo	Estimated Fund balance	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2006	95.8	86.4	1,025.4	11.9
2011	105.6	105.0	1,151.4	11.0
2016	117.9	130.1	1,234.9	9.5
2021	130.5	157.9	1,252.5	7.9
2026	142.2	189.7	1,175.2	6.2
2031	153.2	219.9	983.8	4.5
2036	164.5	235.8	717.0	3.0
2041	178.5	237.8	447.3	1.9
2046	197.9	224.3	283.5	1.3

Table H9: Contributions increase at prices plus 2½%, Real rate of return of 5% a year

($ million at constant 2005-06 prices)

Year ending 31 July	Contribution income	Total outgo	Estimated Fund balance	Ratio of Fund to outgo = (4)/(3)
(1)	(2)	(3)	(4)	(5)
2006	95.8	86.4	1,055.4	12.2
2011	105.6	105.0	1,368.2	13.0
2016	117.9	130.1	1,707.9	13.1
2021	130.5	157.9	2,061.2	13.1
2026	142.2	189.7	2,408.1	12.7
2031	153.2	219.9	2,736.7	12.4
2036	164.5	235.8	3,095.1	13.1
2041	178.5	237.8	3,578.5	15.0
2046	197.9	224.3	4,338.2	19.3

Appendix J Value of accrued and future benefits

J1 The Department of Social Insurance has requested additional information relating to the present value of accrued and future benefits, and the present value of retired liabilities. This appendix sets out this information.

J2 The Department specifically asked for an assessment of:

- the value of pension and other benefits which have already "accrued" in respect of contributions paid to date (both including and excluding allowance for future increases to benefits). Accrued rights include all benefits in payment at the valuation date, plus the proportion of the future benefits payable to existing contributors that is attributable to contributions already paid (the 'PBO' and the 'ABO');
- the value of the total benefits payable to existing members: that is, including the benefits payable in respect of expected future contributions by existing contributors (the 'PVFB'); and
- the present value of retired liabilities over the next 10 years for existing pensioners.

J3 It should be noted that the assessments in this appendix do not include any allowance for the future cost of administering the scheme.

The Projected Benefit Obligation ('PBO')

J4 The value of the accrued rights (or the accrued liability), referred to as the PBO, has been estimated by discounting the expected future payments in respect of accrued rights (assuming that benefits rates increase in line with future price increases) at a real rate of return of 3% a year (in excess of prices). In order to indicate the sensitivity of the assessment, the PBO has also been estimated at real rates of return of 2% and 4% a year.

J5 Table J1 shows the assessed value of the PBO (excluding administration expenses) as at 31 July 2003, 2004 and 2005 on the three alternative real rates of return.

Table J1: Estimated accrued liability (PBO), ($ million)

As at 31 July	Real rate of return of		
	2% pa	3% pa	4% pa
2003	3,240	2,610	2,140
2004	3,300	2,680	2,220
2005	3,370	2,770	2,310

J6 As at 31 July 2005, the PBO, valued at 3% real a year, is $2,770 million. This compares to the Fund market value of $996 million and so the unfunded liability in respect of accrued benefits is estimated to be $1,774 million. The Fund covers about 36% of the accrued benefits (excluding future administration expenses).

J7 In the previous report, the PBO, valued at 3% real a year, as at 31 July 2002 was $2,080 million, and the corresponding funding level was 33%. The increase in PBO is due to the value at 31 July 2005 being expressed in 2005-06 price terms, whilst the PBO as at 31 July 2002 given in the previous report was expressed in 2002-03 price terms. Revised assumptions reflecting increased life expectancy have also contributed to the increase in the PBO.

The Accumulated Benefit Obligation ('ABO')

J8 At the request of the Department of Social Insurance, the accrued liability has also been estimated assuming that there are no future increases to benefit rates, referred to as the ABO. The ABO has been estimated by discounting expected future payments, excluding administration expenses, at 6% a year nominal, which is broadly equivalent to assuming future price increases of about 3% a year and a real rate of return (in excess of prices) of 3% a year.

J9 As at 31 July 2005, the ABO is estimated to be $1,690 million.

The Present Value of Future Benefits ('PVFB')

J10 The value of the total liability attributable to existing members, referred to as the PVFB, has been estimated by discounting the expected future payments in respect of past and future service rights, assuming that benefit rates increase in line with future price increases and excluding administration expenses, at a real rate of return of 3% a year (in excess of prices).

J11 As at 31 July 2005, the PVFB is estimated to be $4,700 million.

J12 Table J2 shows the PVFB (valued at 3% real a year) as at 31 July 2005 split between the values of the rights of existing pensioners, the accrued liability of existing contributors and the future service liability of existing contributors.

Table J2: Breakdown of PVFB, ($ million)

Liability in respect of	Liability
Accrued rights	
Existing pensioners	780
Existing contributors	1,990
Total accrued rights ("PBO")	2,770
Future service rights	
Existing contributors	1,930
Total service rights ("PVFB")	**4,700**

Present Value of retired liabilities

J13 The Department of Social Insurance have requested that we provide the present value of retired liabilities over the next 10 years, for existing pensioners and gratuitants.

J14 As at 31 July 2005, the Present Value of retired liabilities for existing beneficiaries over the next 10 years is estimated to be $533 million.

J15 The present value of gratuities expected to be paid over the next 10 years is around $1.7 million (assuming contribution rates increase at 1¾% a year in excess of benefit rates in future years).

Government Actuary's Department

London, United Kingdom

June 2007