

Barbados

Report to the Government

**Eleventh Actuarial Review
of the National Insurance,
Unemployment and Severance Funds
as of 31 December 2002**



**International Financial and Actuarial Service
Social Protection Sector
International Labour Organization Geneva
July 2004**

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Foreword

The National Insurance Scheme (NIS) began operations in June 1967. Three separate funds are currently administered by the NIS, namely the National Insurance, Unemployment and Severance Funds. Section 34 of the *National Insurance and Social Security Act* requires that an actuarial review of the NIS be conducted at least every three years. This, the eleventh review of the NIS, was performed as at 31 December 2002.

In 1999, the International Labour Organisation (ILO) and six Caribbean countries, including Barbados, entered into bilateral agreements under which the social security scheme of each country will receive two actuarial reviews and training for its in-house actuarial and statistical personnel. This five-year programme is known as the ILO Umbrella Programme for Actuarial Reviews to Selected Countries of the Caribbean (the Umbrella Programme).

The main objectives of the *Eleventh Actuarial Review* are to determine the long-term financial condition of the National Insurance Fund (NIF) and to review contribution and benefit provisions, making recommendations where appropriate. The report is divided into two sections – the main report and the appendices. The main report contains an analysis of recent experience and results of population, economic and NIF projections up to 2062. An analysis of experience and a short-term outlook of the Unemployment, Severance and Sugar Workers' Provident Funds are also included.

The appendices that follow contain a summary of main NIS contribution and benefit provisions, a description of the methodology used for the valuation and detailed tables of data, assumptions and projection results. They also provide an analysis of experience during the inter-valuation period – 2000 to 2002. While several data items were either not provided or were incomplete and their quality questionable due to system limitations, the omissions should not materially affect the projection results.

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Abbreviations and acronyms

BB\$	Barbadian dollars
E'ee	Employee
E'er	Employer
GAP	General average premium
GDP	Gross domestic product
IE	Insurable earnings
p.a.	per annum
PAYG	Pay-as-you-go cost rate
PV	Present value
RER	Reserve-to-expenditure ratio (RER) for a given year. This indicator is closely related to the funding-ratio indicator defined as the reserve at year-end divided by projected expenditure for the following year
TFR	Total fertility rate
US\$	United States dollar

Exchange rate

As of 31 December 2002: 1 US\$ = 2 BB\$

Acknowledgements

The programme's Project Actuary, Mr. Derek Osborne, was appointed by the ILO to undertake this assignment. Mr. Osborne visited Barbados in April 2003 to gather necessary data and hold discussions with the Director of the National Insurance Scheme and with representatives of workers' and employers' organisations. He visited again Barbados in April 2004 to present the preliminary version of this report and to receive responses to it. The International Financial and Actuarial Service (ILO/FACS) of the ILO assumed overall technical supervision and responsibility for the project.

This *Eleventh Actuarial Review* is the product of contributions by Mr. Darwin Rouse and Mrs. Norma King-Brathwaite, Barbados' two national counterparts under the ILO Umbrella Programme, and by Mr. Richard Nunez, Consulting Actuary, and Mr. Abram Bend, Senior Data Processing Officer. Together, their tasks included gathering the data and assisting the Actuary during his visit to Barbados.

The ILO Director-General wishes to express his sincere thanks to the Director of the National Insurance Board, Mr. Ian Carrington, and the national counterparts and staff of the National Insurance Office for their collaboration and assistance provided throughout the project.

Executive summary

Some of the benefits that current National Insurance contributors anticipate receiving will be paid more than fifty years from today. Therefore, to determine whether or not Barbados' social security system is sustainable over the long-term, periodic actuarial reviews are conducted. In these reviews an examination of the Fund's current and projected financial status is made. The actuary is also expected to recommend steps that may be taken to help ensure that the scheme remains solvent for future generations, while providing meaningful benefits to current workers and pensioners.

This actuarial review follows closely the enactment of an extensive set of amendments to NIS contribution and benefit provisions that took effect in 2003. These changes include increases to the contribution rate, annual indexation of the earnings ceiling and pensions, gradual reductions in the amount of new old-age pensions, an increase to the normal pension age and the introduction of flexible pension ages beginning at age 60. With the oldest population, highest contribution rate and highest expenditure rate of regional social security schemes, the reforms made in Barbados were timely, served to strengthen the long-term sustainability of the Fund, and have eliminated the need for more drastic changes in the future. The ILO compliments the National Insurance Board and the Government of Barbados on these recent reforms. Special congratulations too, for the consultative process and inclusive approach taken to these reforms, which are indeed models for other social security schemes throughout the world.

During the three-year period since the *Tenth Actuarial Review*, for 2000 to 2002, the economy slowed with a direct impact on NIS contribution income, which rose in 2001 but declined in 2002, to below its 2000 level. Benefits, meantime, continued to increase. Although investment income also increased, the return on reserves fell from 7.7 per cent in 1999 to 6.5 percent in 2002. Overall, annual surpluses from regular business declined, although the relative funding level, as measured by the reserve-to-expenditure ratio (RER), increased. As expected, both the number of contributors and the number of pensioners increased, with the greater-than-expected increase in active insured persons allowing the support ratio to remain at 3.7 contributors per pensioner.

Along with a review of the National Insurance Fund's (NIF) experience since inception and its financial position as of 31 December 2002, this report includes an analysis of current design parameters and performance indicators, and projections of Fund income, expenditure and reserves through 2062. Since the estimation of future experience is uncertain and depends on many demographic and financial assumptions, three economic and demographic scenarios for the base case projections under status quo benefit and financing provisions are presented to show the plausible range of likely outcomes. These scenarios have been for the NIS dubbed *Pessimistic*, *Intermediate* and *Optimistic*, and differ with respect to future population, economic and NIS-specific assumptions.

The main results of NIF projections and the impact of the 2002 reforms are illustrated in the following two charts. Chart ES1 shows the projected trend for NIS reserves under the *Intermediate* scenario assumptions for the current provisions, and what the projections would have been had reforms not been made, and assuming that the current contribution rate and benefit provisions remain unchanged throughout the projection period. The projected pay-as-you-go cost rates (PAYG cost rate(s)), or total expenditure expressed as a percentage of insurable earnings (IE), are shown in Chart ES2.

Both charts indicate that the past benefit changes, recently implemented, will lower the increasing trend in long-term costs significantly. The combined effect of a higher contribution rate and lower pension promise will result in the NIF being solvent until 2060.

Chart ES1. NIS projected reserves under current benefit and financing provisions, using *Intermediate* scenario assumptions (in billions of BB\$)

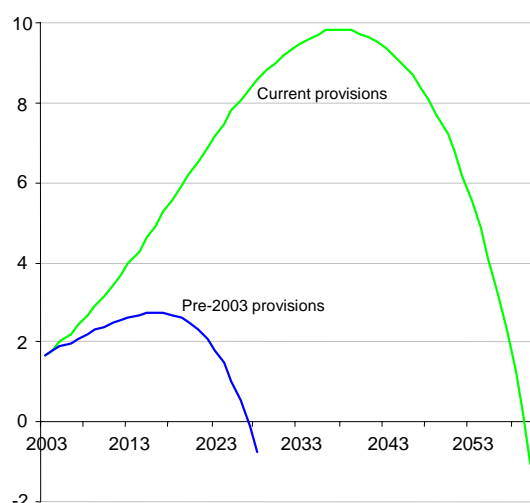
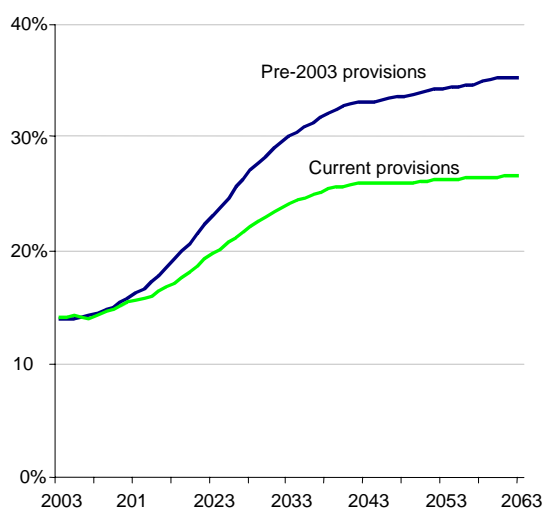


Chart ES2. NIS projected PAYG cost rates under status quo benefit and financing provisions



The main results of the *Intermediate* scenario projections based on the contribution and benefit provisions in place on January 1, 2003 are:

- Barbados' population will grow slowly reaching just over 300,000 in the next 30 years, before declining slightly thereafter;
- The ageing of the general population will have a major impact on the ratio of workers to retirees. For NIS, it is projected that the number of contributors for each pensioner will fall from 3.7 in 2002 to only 1.6 in 2062;
- Contribution income is expected to be sufficient to meet total expenditure through 2019;
- Reserves are expected to begin decreasing in 2039 when total expenditure will exceed total income for the first time, and become exhausted in 2060;
- The PAYG cost rate, or the contribution rate that would be required to be collected each year to produce just enough income to meet expenditure if there is no reserve

fund left, will increase gradually from 13.6 per cent in 2002 to 26.5 per cent in 2062,

- The constant contribution rate beginning in 2003 that would make the present value of contributions equal to the present value of expenditure through 2062 is 20.3 per cent.

For the *Pessimistic* scenario, the first revenue and expenditures deficit is expected in 2028 with Fund depletion in 2044, while under *Optimistic* assumptions total income is projected to exceed total expenditure throughout the projection period. The GAP is 22.3 per cent and 18.7 per cent of IE, respectively.

As illustrated in the two charts above, the financial impact of recent reforms is significant. The changes to benefit provisions and the increased contribution rate that became effective in 2003 have reduced long-term costs by 3.9 per cent of IE with the change in normal retirement ages and flexible early retirement ages having the greatest isolated effect – 3.0 per cent approximately. The changes to future benefit accrual rates reduced long-term costs by 1.2 per cent approximately while the change in the old-age pension calculation from a three-year to five-year average reduces costs by 0.3 per cent of IE approximately. The following table shows a comparison of some of the main results for the projections under the new provisions with those that existed prior to 2003.

Table ES1. Summary results – Pre-2003 versus current provisions

	Before reforms	After reforms
General average premium (per cent of insurable earnings)	24.2	20.3
PAYG cost rate in 2032 (per cent of insurable earnings)	29.6	23.8
PAYG cost rate in 2062 (per cent of insurable earnings)	35.3	26.5
Reserve-to-expenditure ratio, 2030	-1.6	7.0

While the recent reforms have made a significant positive overall difference for future NIF finances, workers and employers will face higher contribution rates, and some future pensioners will receive smaller pensions. However, the transition periods for the various pension changes are lengthy and thus adequate time has been provided for those affected by the changes. Under the revised rules, the less generous accrual rates that will be in place from 2022 will still provide an adequate pension and the combined 18 per cent contribution rate appears to be acceptable to workers and employers.

In the coming years, the Board should review all other benefit provisions to ensure that adequate and equitable benefits and pensions are provided as social and economic changes warrant. For example, greater equity may be brought to old-age pensions by using indexed earnings over one's career to calculate the old-age pension. Also, more security could be provided to survivor pensioners, who are only entitled to receive the greater of their old-age and survivors' pension, by paying the old-age pension together with a portion of the survivors' pension. For persons receiving invalidity pensions, provisions for them to return to work and continue to receive their pension for limited periods, may also be considered.

The low level of participation among self-employed persons needs to be addressed. Presently, fewer than 25 per cent of all self-employed persons are regular NIS contributors. As the contribution requirements increase by an additional 4 per cent over a four-year

period, many self-employed persons may feel that they can no longer afford NIS contributions. Therefore, adequate education on the benefits of contributing and a more flexible and simple way of contributing should be devised.

With a higher contribution rate, contributions alone will be sufficient to meet total expenditure extending to 2020, annual surpluses in the coming years will be much higher than in recent years, and reserves are projected to grow to almost BB\$10 billion, or 50 per cent of GDP. In a small economy with limited suitable investment opportunities, additional avenues for the placement of new funds will be required. The Board is, therefore, encouraged to seek innovative ways of investing funds locally, while at the same time, placing increasing amounts overseas. Also, additional investments either directly or indirectly in government securities should be minimal so that the proportion of reserves held in this form remains below its current level of 61 per cent.

Under the *Intermediate* scenario, the NIF is projected to remain solvent until 2060 and keep growing for at least 60 years under the *Optimistic* scenario. The Board is encouraged to develop a formal funding objective for the short, medium and long term so that future actuarial reviews may assess whether the scheme is financially sound, both currently and for the future. For example, a short-term funding objective may be to have contributions alone cover expenditure for at least the next ten years and contributions plus investment income cover expenditure for at least 25 years. For the longer term, the objective may be to have projected reserves of at least five times expenditure thirty years into the future and a reserve of twice expenditure 60 years in the future. While no changes to contribution rates or benefit provisions will be absolutely required to bring the projected finances in line with established objectives, the introduction of specific benchmarks will assist in making timely changes in the future.

While the projections of this actuarial review suggest that the Fund is secure for nearly sixty years, reductions in investment returns, increases in inflation, the potential negative economic effects of HIV/AIDS and other social, economic and demographic factors could produce less favourable experience. Therefore, the Board is encouraged to closely monitor experience and ensure that the increasing amount of reserves are invested prudently and not perceived by future governments, or the public, as being excessive and thus capable of affording overly generous pension increases.

In relation to the Unemployment Fund, experienced deficits in 2001 and 2002 were due mainly to the large increase in benefit expenditure of 2001 and a decline in investment returns in 2002. The Unemployment Fund remains well funded with reserves equivalent to over three times annual expenditure. Although total expenditure exceeded the contribution income in each of the three years under review, no change to the contribution rate is recommended due to the relatively large reserves accumulated and available to cover possible negative fluctuations in future years. The benefits of the Unemployment Fund are of a short-term nature such that actuarial reviews and expenditure forecast should be made only for short-to-medium term periods in future (as opposed to the long-term projections for pensions).

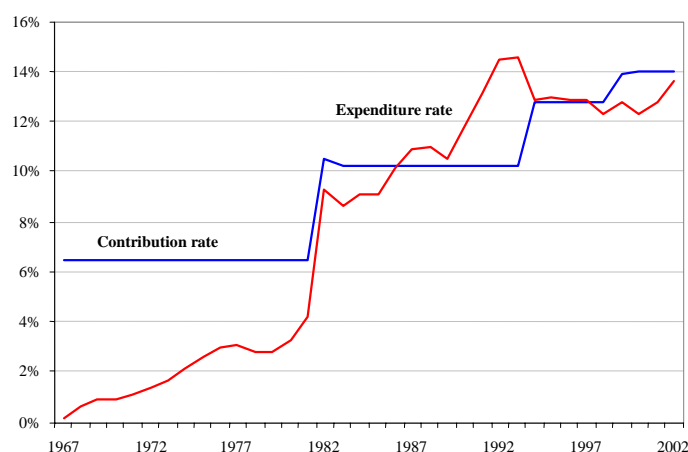
The Severance Fund continued to experience annual surpluses over recent years despite a reduction in the level of the contribution rate from 1 per cent to half of 1 per cent of IE in 2001. The reserve of the Severance Fund is equivalent to over 12-times annual expenditure. Total expenditure was reported to be only slightly more than contribution income after the change in the contribution rate change. No further adjustment to the contribution rate and financing of the Severance Fund are recommended at this stage.

1. Review of past financial experience and other developments

1.1. Financial experience, 1967-2002

The National Insurance Scheme (NIS) began operations in June 1967. Three separate funds are currently administered by the NIS, namely the National Insurance, Unemployment and Severance Funds. The following charts illustrate several aspects of National Insurance Fund (NIF) financial experience between 1967 and 2002, with experience of the other funds presented in Section 4. Together these charts highlight the gradual maturing of Barbados' social security system firstly by comparing annual contribution and expenditure rates, and then by noting the trend in the NIF relative-funded level over time and the change in proportion of each major benefit type. The trends noted in each chart are consistent with the defined-benefit type of social security scheme and the partially-funded financing method adopted at inception.

Chart 1.1. Contributions and expenditure (as percentage of insurable earnings)



When expenditure is expressed as a percentage of insurable earnings (IE), it can be readily compared with the contribution rate. As shown, there have been several adjustments to the contribution rate as expenditure has trended upwards, exceeding contributions on several occasions. In 2002, the average contribution rate was 14.0 per cent with expenditure totalling 13.6 per cent of IE.

When expenditure exceeds contributions, portions of investment income are needed to meet expenses.

The trend in the RER reflects the size of the year-end reserve relative to that year's expenditure and is a useful measure of how well a social security scheme is funded at any time. As seen from the chart, funding levels generally declined from inception through 1992, but have gradually increased since then, due to increases to the contribution rate.

At the end of 2002, the RER stood at 5.4. While this does not mean that the Fund can only meet five to six more years of expenditure, a ratio this low for a scheme that is not yet mature confirms its partially-funded status.

Chart 1.2. Trend in the reserve-to-expenditure ratio (RER)

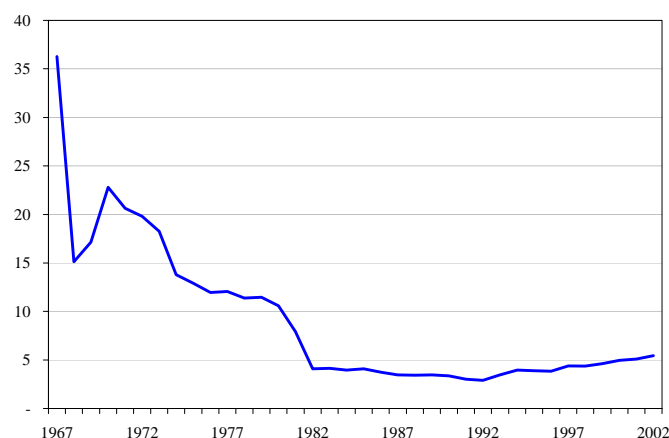
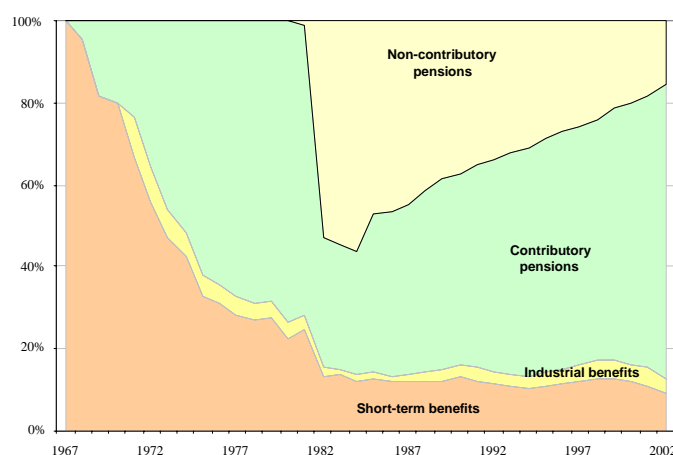


Chart 1.3. Distribution of benefit expenditure



As NIS has matured, the proportion of benefit expenditure related to pensions has increased to 87.5 per cent in 2002. As illustrated, non-contributory pensions, which were introduced in 1981, and once represented more than 50 per cent of NIS expenditure, are gradually decreasing. This is due to more people qualifying for a contributory pension, and also because NIS no longer covers the cost of new non-contributory pensioners which is now met by Government.

In, 2002, short-term and employment-injury benefits accounted for 9 per cent and 3.6 per cent, respectively.

1.2. Developments since the *Tenth Actuarial Review of 1999*

The *Tenth Actuarial Review of the NIF* was performed as of 31 December 1999. In 2000, the NIS embarked on a process of pension reform that ended in December 2002 with several far-reaching amendments to the *NIS Act* and Regulations. These changes came after extensive consultation with stakeholders and the other general public, through polls and surveys in which the public was given three main options for reform. The major changes made are listed below.

1.2.1. Amendments to the National Insurance and Social Security Act and regulations

Effective October 2001:

- maternity grant increased from BB\$500 to BB\$800;
- funeral grant increased from BB\$1,000 to BB\$1,400;
- pensions-in-payment were increased by 6.95 per cent with the minimum contributory pension increasing from BB\$98 to BB\$105 per week and the non-contributory pension increasing from BB\$80 to BB\$86 per week,
- the contribution rate for the Severance Fund was reduced from 1.0 per cent to 0.5 per cent.

The changes made as a result of pension reform were¹:

- increase the contribution rate by 1 per cent of IE each year for four years (shared equally by employees and employers);
- raise the retirement age of 65 for full pensions by six months every four years starting in 2006 until age 67 is reached in 2018;
- introduce a flexible NIS retirement age so that in due course persons may be pensionable at any age from 60 to 70 with actuarially-adjusted pensions for early or late retirement;²
- increase the ceiling on IE each year by the increase in national-average wages, beginning 2004;
- increase pensions and grants each year by the lesser of the three-year average of wage or price increases, beginning 2004.
- change the definition of final average earnings for the calculation of contributory old-age pensions to use the average IE over the best five instead of the best three years,
- change the old-age pension formula from the actual calculation (40 per cent of average IE for the first 10 years of contributions incremented by a factor of 1 per cent of total IE thereafter) to gradually reach the ultimate formula by year 2023 of 2 per cent of average IE for each of the first 20 years of contributory service incremented by 1.25 per cent of average IE for each contributory year accumulated in excess of the initial 20 years. Between 2003 and 2012, the current accrual schedule will apply and from 2013 to 2022, the sum of 50 per cent of the pensions resulting from both accrual sets would apply.

A summary of NIS coverage, contribution and benefit provisions is provided in Appendix 1.

¹ Further details on benefit and financing provisions can be found in Appendix I.

² Allowance for early retirement has thus far been made only for age 63 but may be lowered to 60 after monitoring experience and, if below pension age, the insured must be retired from regular employment.

1.2.2. Financial experience

The following table provides a summary of income and expenditure for 2000 to 2002 for the NIF. Additional details may be found in Appendix V.

Table 1.1. NIF summary of finances, 2000 – 2002 (millions of BB\$)

	2000	2001	2002
Income			
Contributions	296.7	307.0	294.6
Investment	88.6	92.1	93.4
Other	6.6	3.0	19.0
Total	391.9	402.1	407.0
Expenditure			
Benefits	242.0	259.4	258.7
Administrative	16.6	17.3	20.0
Other	2.9	4.0	6.7
Total	261.5	280.7	285.3
Surplus	130.4	121.4	121.7
Year-end reserves	1,299.4	1,429.8	1,551.2

Following is a brief comparison of actual experience during 2000 to 2002 compared with the projections of the *Tenth Actuarial Review*.

- Contribution income was less than projected due to the economic downturn with collections in 2002 falling below 2000 and 2001 figures. Even though contributions were down in 2002, the number of active-insured persons increased from 119,968 in 2001 to 123,100 in 2002.
- Investment income, which includes rental income, was slightly lower than projected. Over the three-year period, the rate of return on reserves, excluding realised gains on sale of equities, fell each year by 0.5 per cent from 7.5 per cent in 2000 to 6.5 per cent in 2002.
- Most of the “Other Income” in 2002 was the gain on the sale of Life of Barbados shares.
- Administrative expenditure was slightly lower than projected.
- Benefits were slightly lower than projected, with expenditure in 2002 less than in 2001, due mainly to a significant number of claims that were received in 2002 not being processed until 2003. (See Appendix IV for a detailed analysis of benefit experience)
- When income and expenditure are combined, 2002 year-end reserves were BB\$14 million lower than projected but the RER rose to 5.4 as projected.

1.3. Review of performance indicators

Given the broad range of objectives of a social security scheme, evaluating its performance could be rather difficult. Such an assessment should consider the achievement of the scheme’s overall goals as they pertain to the level of coverage and the provision of adequate and reasonable pensions, as well as how efficiently it is administered and how

prepared it may be to meet rising costs over time. The following table provides a summary of performance indicators, highlighting changes between 1999 and 2002.

Table 1.2. Current NIS design parameters and performance indicators

	1999	2002	Comments and analysis
1. Ratio of ceiling to average insurable earnings	1.9	1.8	Ceiling fixed since 1991, now at low end of acceptable range.
2. Minimum pension as percentage of average insurable earnings	26%	26%	Adequate pension for all.
3. Average old-age pension as percentage of average insurable earnings	40%	42%	High replacement rate.
4. Active-insured persons as percentage of employed population	90%	95%	High level of social protection.
5. Percentage of self-employed persons making NIS contributions*		22%	Much improvement needed.
6. Number of contributors per pensioner	3.4	3.7	Gradual decline expected but higher than expected increase in number of insured persons in review period.
7. Percentage of over-65 population receiving an NIS pension	90%	91%	Very high, indicating high level of social protection.
8. NIS benefits and pensions as percentage of GDP	4.8%	5.3%	Gradual increase expected as scheme matures.
9. Reserve as percentage of GDP	24%	30%	Gradual increased expected.
10. Average contribution rate (excluding unemployment and severance)	13.9%	14.0%	Different rates for permanent government workers and others.
11. Expenditure rate (excluding unemployment and severance)	12.7%	13.6%	Gradual increase expected as scheme matures.
12. Investment income as percentage of insurable earnings	4.1%	4.4%	Fund still growing.
13. Three-year average nominal yield on reserves	7.8%	7.0%	Declining in recent years.
14. Three-year average real yield on reserves	5.1%	5.2%	Low inflation in recent years.
15. Administrative expenses as percentage of contributions	5.7%	6.8%	Operating cost on the increase.
16. Reserve-to-expenditure ratio (RER)	4.6	5.4	Reserves increasing faster than expenditure.

Notes: All the above information relates to the NIF only. * Based on the 2000 estimate of number of self-employed persons.

1.4. Investment portfolio and performance

At the end of 2002, National Insurance investments stood at BB\$1.4 billion, up from BB\$1.1 billion at the end 1999. The asset mix of the investment portfolio, by major category, at year-ends 2002 and 1999 is presented in the following table.

Table 1.3. Summary of investments at year-ends 2002 and 1999

Investment category	2002		1999	
	Millions of BB\$	Per cent	Millions of BB\$	Per cent
Treasury bills and notes	205.7	14.7	185.2	16.9
Debentures	690.8	49.4	562.3	51.5
Fixed deposits	164.5	11.8	149.0	13.6
Development bonds	146.9	10.5	105.9	9.7
Equity investments	105.8	7.6	49.0	4.5
Loans	27.7	2.0	18.4	1.7
Real estate	22.3	1.6	8.0	0.7
Foreign investments	33.0	2.4	15.0	1.4
Total	1,396.7	100.0	1,092.8	100.0

Further analysis of NIF investments at the end of December 2002 reveals that 61 per cent of the portfolio was held directly in Government of Barbados securities and that 9 per cent was domiciled outside of Barbados.

2. Population and economic projections

Future National Insurance Scheme (NIS) income and expenditure will be closely linked to changes in the size and age structure of the population, employment levels, economic and wage growth, inflation, and rates of return on investments. Therefore, to best estimate future NIS finances, projections of Barbados' total population and economic activity are required. Population projections provide estimates of the size and composition of the labour force, while projections of gross domestic product (GDP) and worker-productivity growth indicate how many workers are needed in the economy and what their likely incomes will be. Since these factors are both directly and indirectly interrelated – for example, changes in population directly affect the economy and economic performance impacts personal behaviour such as migration – population and economic projections are performed together to ensure that the assumptions made produce consistent results.

For this review 60-year projections of the population, economy and National Insurance Fund (NIF) finances have been performed. Given the significant uncertainty inherent in forecasting such a long period, projections have been performed using three sets of demographic and economic assumptions. These assumptions have been developed following analysis of historical trends and based on plausible future experience. The population and economic projections underlie NIS projections. Further details on background assumptions and related projections may be found in Appendices 2 and 3.

2.1. Demographic assumptions

The main determinants of future population changes are fertility, mortality and net migration. Fertility rates determine the number of births while mortality rates determine how many, and at what ages, people are expected to die. Net migration represents the difference between the number of persons who permanently enter and leave Barbados and is the most volatile of these three factors.

Between the 1990 and 2000 population censuses the total population increased by slightly more than 8,000, an average annual growth rate of 0.3 per cent. Given that births exceeded deaths by around 13,000 over the ten-year period, net outward migration averaged approximately 500 per annum.

The total fertility rate (TFR) represents the average number of children each woman of childbearing age would have if she had all her children in a particular year. If there is no migration, a TFR of 2.1 is required for each generation to replace itself. Over the past few years, fertility rates have risen gradually and reached an estimated 1.9 in 2001, after being around 1.7 during the early 1990's.

Using the preliminary 2000 *Barbados Abridged Life Tables*, life expectancy at birth in 2002 has been estimated at 73.2 for males and 79.0 for females. While further improvements in life expectancy are expected, the increasing prevalence of HIV and AIDS in Barbados may retard the rate of previously expected improvements. For these projections improvements in mortality are assumed to occur in accordance with UN estimates. While deaths due to HIV and AIDS have not been explicitly accounted for, the rate of mortality improvements chosen considers the effects of the HIV/AIDS pandemic. With the above assumptions, life expectancy at birth in 2062 for the *Intermediate* scenario is estimated to be 79.4 for males and 84.8 for females. At age 65, life expectancy is projected to increase from 16.7 to 19.7 years and from 19.8 to 24.3 years for males and females, respectively.

Barbados has historically seen more people permanently leaving than entering. However, net outward migration appears to be on the decline and given the ageing of Barbados' population, further decreases are expected. This is so as there is likely to be more persons moving to Barbados to provide the required skills of the workforce.

2.2. Economic assumptions

After eight years of positive GDP growth the Barbadian economy contracted in 2001 and again in 2002.³ Between 1993 and 2002, annual real GDP growth averaged 2.2 per cent and inflation 2.0 per cent. The economic projections prepared for this report assume stable and positive economic growth and labour productivity in all years. Although simplistic, they approximate usual economic cycles and volatility that encompass periods of expansion and recession. They also account for projected changes in the population and labour force that will provide the capacity for additional output through more workers and increased productivity.⁴

The following table indicates the principal demographic and economic assumptions used for the three scenarios for the base-case projections under status quo benefit and financing provisions of the NIS. For each scenario, long-term inflation has been assumed to be 2.5 per cent. Further details may be found in Appendix II.

Table 2.1. Principal assumptions for population and economic projections

		Pessimistic	Intermediate	Optimistic
Ultimate total fertility ¹ rate (TFR)		1.75 in 2020	1.85 in 2020	2.0 in 2020
Mortality improvements ²		Slow	Medium	Fast
Net migration ³		Decrease from 400 in 2000 to 125 in 2020, constant thereafter	Decrease from 250 in 2000 to 0 in 2020, then net inward migration increasing to 125 in 2040, constant thereafter	From 0 in 2000 to net in migration of 125 in 2010 increasing to 250 in 2020, constant thereafter
Real GDP growth	Short-term	1.5% p.a.	2.0% p.a.	2.5% p.a.
	Medium-term	1.25% p.a.	1.75% p.a.	2.25% p.a.
	Long-term	0.75% p.a.	1.25% p.a.	1.75% p.a.
Labour productivity growth		0.75% p.a.	1.0% p.a.	1.5% p.a.

¹ Initial level of TFR of 1.9 children per woman of child-bearing age.

² UN mortality improvement rates.

³ Net migration equals number of immigrating persons minus number of emigrating persons.

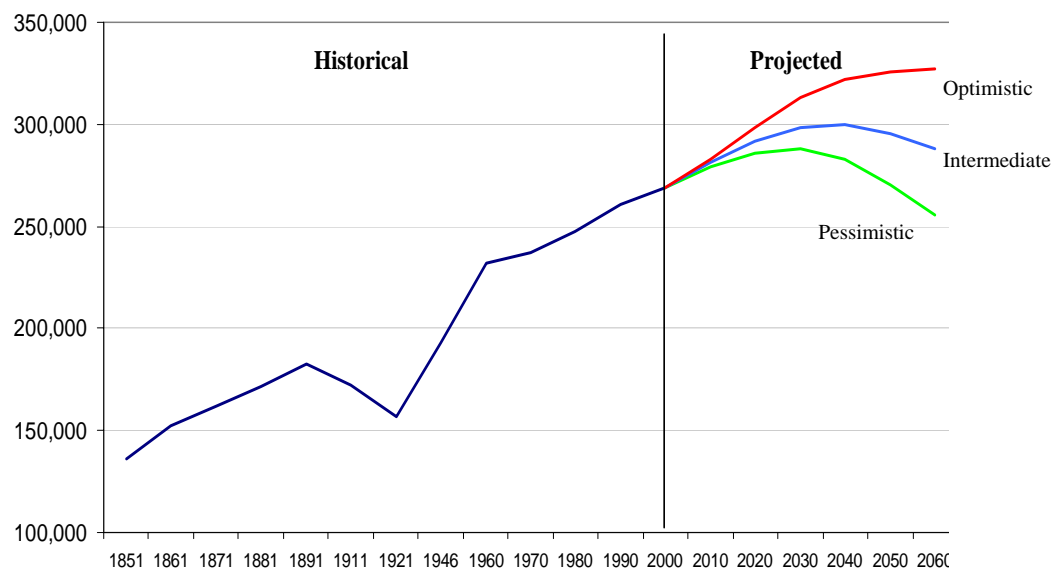
³ IMF Article IV Consultation, 2002.

⁴ The difference between GDP growth and labour productivity growth represents employment growth. If, however, unemployment falls to 5 per cent, the lowest level assumed in these projections, additional output is assumed to come from increased labour productivity.

2.3. Population projections

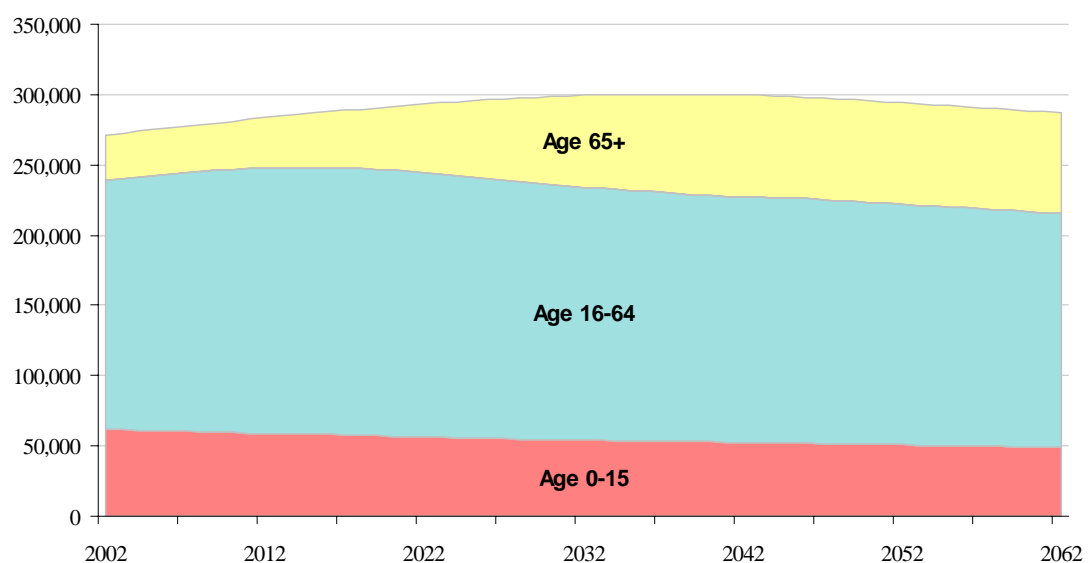
The following chart shows how Barbados' population changed between 1851 and 2000, along with projections for each of the three assumption scenarios. While continued population growth is projected for the near- to medium-term, two of the three base-case economic and demographic scenarios suggest declines beginning around 2030.

Chart 2.1. Historical Barbados population and projections under three base-case economic and demographic scenarios



For the projections under the *Intermediate* scenario, the age distribution of the total population is shown in the chart and table below. The changes in the relative size of each age group – fewer children and working-age persons and more pension-age persons – illustrate the forecasted ageing of Barbados's population.

Chart 2.2. Projected Barbados population (*Intermediate* scenario)



Highlights of *Intermediate* scenario population projections are:

- The total population will continue to grow for another 30 years nearing 300,000, before declining gradually thereafter.
- The number of children will decrease by nearly 25 per cent, while the number of pension-age residents will more than double.
- After 2025, Barbados will have more pension-age residents than children.
- The number of working-age persons for each pension-age resident will fall from 5.4 to 2.3.

Table 2.2. Projected Barbados population (*Intermediate* scenario)

Year	Total	Age 0-15	Age 16-64	Age 65 and over	Ratio of persons 16-64 to 65-and-over
2000	268,792	61,948	174,323	32,521	5.4
2002	271,365	61,589	177,013	32,763	5.4
2003	272,629	61,409	178,290	32,930	5.4
2004	273,885	61,226	179,573	33,086	5.4
2005	275,125	61,004	180,908	33,213	5.4
2006	276,351	60,725	182,302	33,324	5.5
2007	277,563	60,397	183,749	33,417	5.5
2012	283,444	58,794	188,969	35,681	5.3
2022	293,246	56,296	188,187	48,763	3.9
2032	299,345	54,166	179,940	65,239	2.8
2042	299,659	52,472	174,835	72,352	2.4
2052	294,151	50,746	171,216	72,189	2.4
2062	287,034	49,150	166,388	71,496	2.3

Although different in overall size, the age distributions for populations under the *Optimistic* and *Pessimistic* scenarios are quite similar. Detailed results of these projections may be found in Appendix III.

For NIS, where pension payments to the elderly already represent 75 per cent of benefit payments, and contributions from workers are needed to meet expenditure, the projected change in the population's age structure has significant long-term consequences. Population ageing will also create major challenges for the Barbados Government, as an older society will place increased and different demands on physical infrastructure, health and other social programmes. Therefore, continued monitoring of experience and timely reactions to social and demographic changes are required to ensure that the needs of future generations will be sufficiently met.

3. Financial and demographic projections of the National Insurance Fund

This Section presents and analyses projections of National Insurance Fund (NIF) finances up to 2062. The purpose of these projections is twofold. First, they are used to identify long-term trends for contributions, benefits and the reserve, so that the financial viability of the Barbados' social security system may be assessed. Secondly, by using these projections as a base, the impact of each of the recent reforms and the sensitivity of the results to changes in the assumptions may be identified.

Consistent with the population and economic projections presented in the previous Section, three sets of financial projections have been modelled. Each of these projections is based on results of the population and economic projections presented in Section 2, several NIS-specific assumptions and the contribution rate schedule and benefit provisions in place on January 1, 2003.

The main NIS assumptions made include:

- The announced changes emanating from pension reform, even though not all have been legislated, will be enacted. (See Section 1.2.1)
- The ceiling on wages will increase annually by the increase in average wages beginning with a 3 per cent increase in 2004.
- Annual increases to pensions-in-payment as shown in the table below.
- Short-term benefits⁵ expenditure will increase from 1.5 per cent to 1.6 per cent of insurable earnings (IE) between 2003 and 2062.
- Other expenditure will be 0.3 per cent of beginning-of-year reserves.
- Other income will be 1.25 per cent of contribution income.

Other scheme-specific assumptions that vary for the three scenarios are also shown in the following table.

Table 3.1. Additional NIS scheme-specific assumptions associated to the three base-case economic and demographic projections

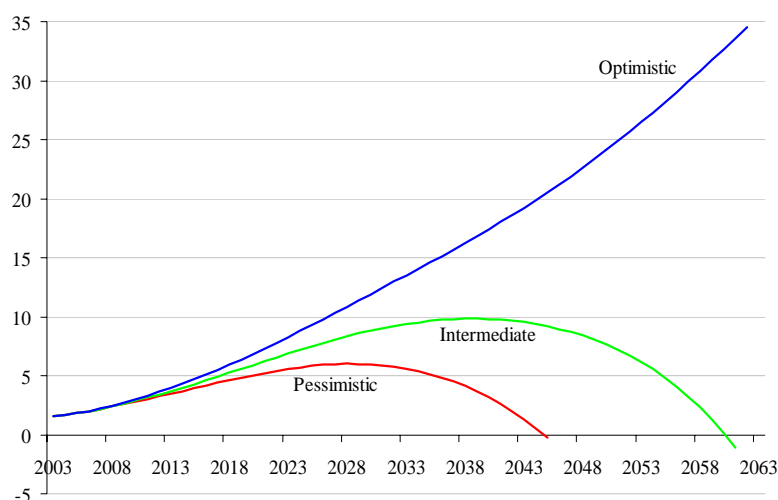
	Pessimistic	Intermediate	Optimistic
Annual pension increases	3.0%	2.5%	2.0%
Long-term yield on reserves	5.0%	5.5%	6.0%
Administrative expenses as percentage of insurable earnings	<i>Constant at 0.9%</i>	<i>Decreasing over 60 years from 0.9% to:</i>	
		0.7%	0.5%

⁵ Non-pension benefits, including employment injury benefits.

3.1. NIF projection results under current provisions

Projected total NIF reserves under the three scenarios are illustrated in the following chart.

Chart 3.1. Projected NIS reserves under status quo NIS provisions related to the three base-case economic and demographic scenarios (billions of BB\$)



As the above chart shows, the depletion of reserves is projected under the *Intermediate* and *Pessimistic* scenarios, but under the *Optimistic* scenario will continue growing through 2062. Table 3.2 summarises the years in which significant financial events are expected to occur.

Table 3.2. Summary of projection results under current NIF provisions

	Pessimistic	Intermediate	Optimistic
Year expenditure will next exceed contribution income	2017	2020	2023
Year expenditure first exceeds total income	2028	2039	Not before 2062
Year reserves depleted	2044	2060	Not before 2062

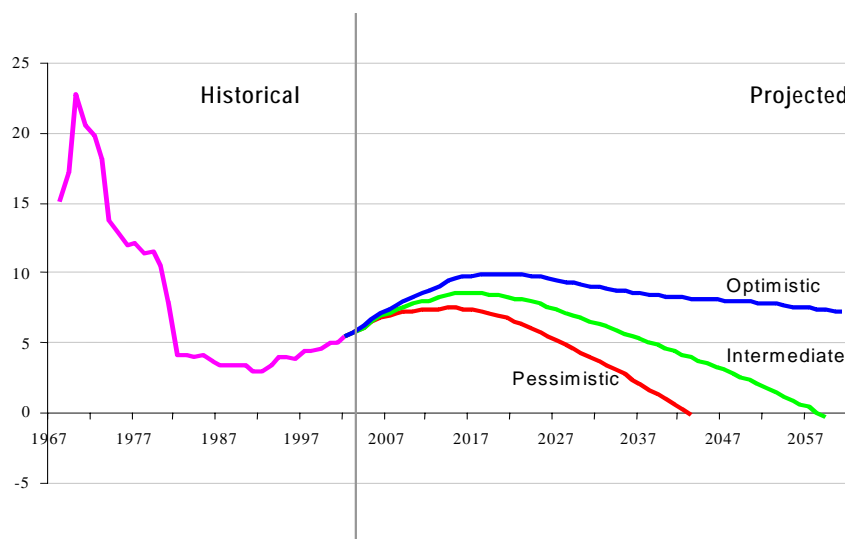
When total NIS expenditure exceeds contribution income portions of investment income will be required to meet current payments, and when NIS incurs its first revenue and expenditures deficit (total expenditure greater than total income) reserves will have reached their maximum level. Thereafter, investments will have to be liquidated to meet benefit payments. If no adjustments to the contribution rate are made annual deficits will grow eventually leading to depletion of reserves. In partially-funded defined-benefit social security schemes the trend for reserves under the *Intermediate* and *Pessimistic* scenarios illustrated in Chart 7 is normal if the contribution rate remains below the true cost of benefits, while the number of contributors per pensioner falls.

With contribution rates set to average 18 per cent beginning in 2006, the NIF will grow both in absolute terms as well as relative to annual expenditure (RER). From BB\$1.55 billion at the end of 2002, 30 per cent of GDP, the NIF is expected to grow to around BB\$10 billion or 50 per cent of GDP over the next 40 years. (*Intermediate* scenario) With NIS assets growing at a faster rate than the local economy, the challenges that already exist to find suitable local investments that are consistent with the Fund's liabilities will be

compounded. Therefore, allocating a greater portion of the Fund to overseas investments may be required to ensure that reasonable rates of return are realised.

The following chart illustrates the trend in the actual RER from 1968 to 2002 and for the three projection scenarios. Under all scenarios, relative funding is expected to decrease after a period of increase. For the *Optimistic* scenario, a funding level of over seven is projected in 2062.

Chart 3.2. Historical and projected reserve-to-expenditure ratios (RER) (*Intermediate* scenario)



One financial objective of the recently adopted pension reforms was to secure a RER of at least five throughout the period to 2030. As shown above, this goal has been achieved under all but the *Pessimistic* scenario, where it falls below five for the first time in 2029.

Numerical details of the financial and demographic projections for the *Intermediate* scenario are provided in Tables 3.3 to 3.5. Similar tables for the *Pessimistic* and *Optimistic* scenarios may be found in Appendix III. For selected years between 2002 and 2062 these tables show:

- projected income and expenditure, year-end reserves and the RER,
- projected benefit expenditure by major benefit type in Barbadian dollars (BB\$ and as a percentage of IE and GDP, and
- projected number of contributors and pensioners by major benefit type.

Table 3.3. Projected revenue/expenditure and reserves, *Intermediate* scenario (millions of BB\$)

Year	Revenue				Expenditure			Annual surplus/(deficit)	Reserves	
	Contribution income	Investment income	Other income	Total	Benefits	Administrative and other expenses	Total		Year-end	No. of times current year's expenditure
2002	294.6	93.4	19.0	407.0	258.7	26.7	285.4	121.7	1,551.0	5.4
2003	318.6	97.7	4.0	420.3	276.0	26.3	302.3	118.0	1,669.0	5.5
2004	349.5	101.5	4.4	455.3	287.4	24.7	312.1	143.2	1,813.0	5.8
2005	385.4	106.1	4.8	496.3	299.9	25.8	325.7	170.6	1,983.0	6.1
2006	426.0	111.7	5.3	543.1	309.9	27.2	337.1	206.0	2,189.0	6.5
2007	447.2	123.3	5.6	576.1	321.2	28.6	349.8	226.3	2,415.0	6.9
2008	466.0	135.7	5.8	607.5	340.4	30.1	370.6	236.9	2,652.0	7.2
2012	545.5	190.7	6.8	743.0	430.5	36.6	467.1	275.9	3,701.0	7.9
2022	776.7	359.8	9.7	1,146.3	772.0	55.7	827.8	318.5	6,879.0	8.3
2032	1,089.9	497.8	13.5	1,592.2	1,351.8	75.8	1,427.6	164.7	9,377.0	6.6
2042	1,515.6	513.9	18.9	2,048.5	2,081.2	93.6	2,174.8	(126.4)	9,530.0	4.4
2052	2,087.4	346.5	26.1	2,460.0	2,915.6	105.3	3,020.9	(560.9)	6,181.0	2.0
2062	2,840.6	(170.3)	35.5	2,705.8	4,075.1	110.5	4,185.5	(1,479.8)	(3,914.0)	(0.9)

Note: Negative reserves indicate the indebtedness of the Fund and negative investment income is the current cost of servicing that debt.

Table 3.4. Projected benefit expenditure – *Intermediate* scenario (millions of BB\$)

Year	Pensions, Grants & Benefits						Benefits as a % of:	
	Old Age Cont.	Invalidity	Survivors	Non-Cont. Old Age	Short-term	Emp. Injury	Insurable Wages	GDP
2002	154	24	9	40	23	8	12.3%	5.3%
2003	166	25	9	38	33	5	12.9%	5.3%
2004	178	26	10	36	33	5	13.1%	5.3%
2005	189	27	11	33	34	5	13.1%	5.3%
2006	197	29	12	31	36	6	13.0%	5.3%
2007	206	30	13	28	37	6	12.9%	5.4%
2008	222	32	15	26	39	6	13.2%	5.5%
2012	300	40	19	18	46	8	14.2%	5.9%
2022	595	61	33	5	66	12	17.9%	7.2%
2032	1,108	81	53	1	93	16	22.5%	8.7%
2042	1,734	114	79	0	132	23	24.7%	9.4%
2052	2,425	165	110	0	184	33	25.1%	9.4%
2062	3,401	229	147	0	252	45	25.8%	9.6%

Note: Figures for Old Age Non-contributory pensions are amounts for which NIS is financially obligated.

Table 3.5. Projected contributors and pensioners at year-end - *Intermediate* scenario

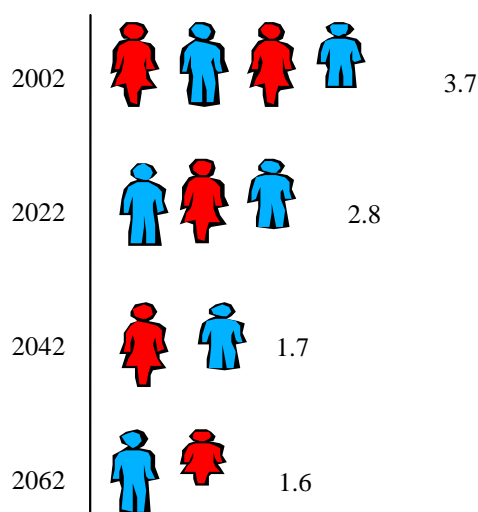
Year	# of Contributors	# of Pensioners					Total # of Pensioners	Ratio of Contributors to Pensioners
		Old Age Cont.	Invalidity	Survivors	Old Age Non- Cont	Death & Disablement		
2002	123,100	17,469	2,484	2,304	10,264	722	33,243	3.7
2003	121,329	18,053	2,522	2,443	9,556	765	33,339	3.6
2004	122,493	18,632	2,604	2,601	8,878	791	33,506	3.7
2005	123,724	19,352	2,685	2,762	8,236	818	33,853	3.7
2006	125,160	19,628	2,773	2,930	7,624	847	33,802	3.7
2007	126,483	19,941	2,867	3,091	7,037	877	33,813	3.7
2008	127,785	20,974	2,965	3,233	6,473	908	34,553	3.7
2012	132,321	25,252	3,309	3,609	4,443	1,013	37,626	3.5
2022	139,130	40,012	3,799	4,375	1,178	1,169	50,533	2.8
2032	135,639	58,413	3,729	5,180	193	1,168	68,683	2.0
2042	131,975	67,378	3,697	5,639	110	1,170	77,994	1.7
2052	129,185	67,807	3,748	5,617	64	1,184	78,420	1.6
2062	125,577	67,962	3,707	5,320	26	1,166	78,181	1.6

Note: The number of old-age non-contributory pensioners shown are those for whom NIS is financially obligated.

The projected number of contributors includes those below normal pension age only.

The projected ageing of the general population is also noticeable in NIS demographic projections. As shown above, the number of contributors is only expected to increase slightly before falling back to current levels, while the number of pensioners is projected to more than double. The change in the contributor-pensioner or support ratio is shown pictorially below.

Chart 3.3. Number of contributors per pensioner



3.2. NIF projected financing requirement under current provisions

The cost of NIS benefits and administrative expenditure may be viewed from several perspectives. Firstly, each year's total expenditure can be expressed as a percentage of that year's IE. This is often referred to as the PAYG cost rate and is the answer to the question "what contribution rate is required to meet exactly that year's expenditure?"

The second rate, called the general average premium (GAP), is the average level contribution rate required over the next 60 years to fully cover total expenditure during that period. This rate may be looked at as the long-term cost of the complete NIS benefits package. In Chart 11 the relationships between the PAYG cost rate and the GAP for the *Intermediate* scenario, and the present contribution rate, can be readily noted.

As Chart 3.4 shows, the average contribution rate is scheduled to increase to 18 per cent in 2006. With a GAP of 20.3 per cent, the contribution rate will still be below average long-term costs. However, contributions alone will be sufficient to meet expenditure through 2020, as illustrated by the contribution rate line being higher than the PAYG cost rate until then.

The increasing trend of the PAYG cost rate is consistent with a maturing scheme and is projected to be almost twice its current level in 2062. Once expenditure exceeds contribution income, investment income, and eventually proceeds from the sale of assets, will be required to meet benefit payments and administrative costs.

The GAP and the PAYG for each scenario are shown in Table 3.6. As expected, the *Optimistic* scenario produces the lowest contribution rates that would be required to meet expenditure while the *Pessimistic* scenario produces the highest rates. For the *Optimistic* scenario where the GAP is only slightly higher than the contribution rate, contribution income by itself will be almost sufficient to fund benefits for the next 60 years.

Chart 3.4. Projected contribution rates - *Intermediate* scenario

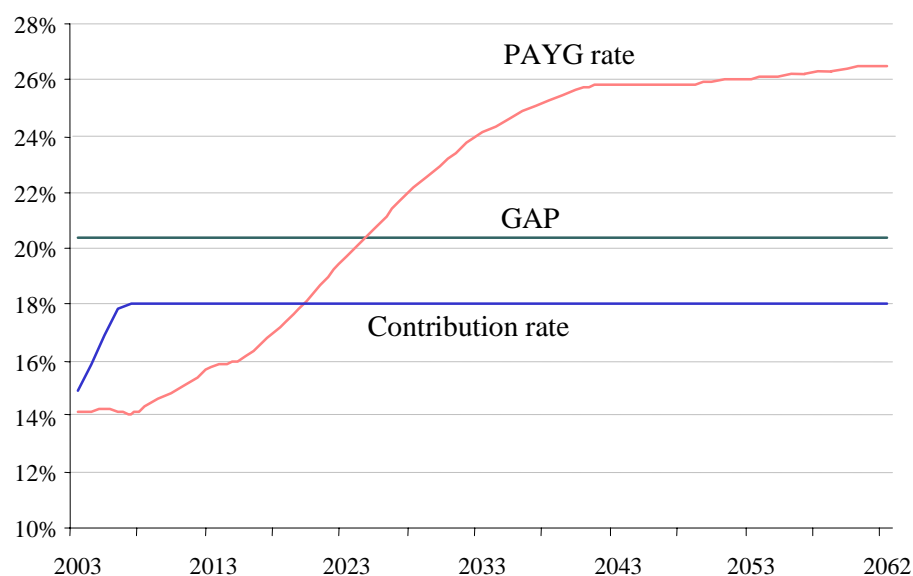


Table 3.6. Projected financing requirements rates (as percentage of insurable earnings)

Scenario	General average premium	Pay-as-you-go cost rate		
		In 2002	In 2032	In 2062
Pessimistic	22.3	13.6	26.7	31.0
Intermediate	20.3	13.6	23.8	26.7
Optimistic	18.7	13.6	21.6	23.4

Another measure of the financial sustainability of a social security system is called “actuarial balance.” For a given period, the actuarial balance can be defined as the difference between:

- the sum of the beginning reserves and the present value of future contributions (money available to meet expenditure), and
- the present value of future expenditure,
- divided by the present value of future IE.

This formula produces a rate that indicates the adequacy or insufficiency of the present contribution rate for a given period. This deficiency can also be expressed in Barbados dollars as shown in Table 3.7 below for the three distinct scenarios under status quo provisions.

Table 3.7. Actuarial balance under current benefit and financing provisions, 2003 to 2062
(BBs are in billions)

	Pessimistic	Intermediate	Optimistic
2002 year-end reserves	1.6	1.6	1.6
Plus PV of future contributions	13.4	13.7	13.8
Minus PV of future expenditure	(16.6)	(15.4)	(14.3)
Equal PV of surplus/(shortfall)	(1.6)	(0.1)	1.1
Actuarial balance (Per cent of insurable earnings)	(2.2%)	(0.3%)	1.4%

The negative 0.3 per cent actuarial balance under the *Intermediate* scenario indicates that together with reserves, the contribution rate is just slightly insufficient to meet expenditure for the next 60 years. For the *Optimistic* scenario, however, the positive actuarial balance suggests that the actual 18 per cent contribution rate could be 1.4 percentage point lower for reserves to remain positive up to 2062. If experience were to follow the *Pessimistic* scenario, a contribution rate that is 2.2 percentage points higher for the entire projection period would be required to sustain the Fund through 2062.

3.3. Financing effect of pension reform adopted in 2003

In January 2003 several changes to contribution and benefit provisions took effect following an extensive pension reform exercise. A summary of these changes is found in Section 1.2.1. These changes have been reflected in the projections thus far discussed. To further assess the long-term financial effect of these changes, projections of the NIF finances under the pre-2003 contribution and benefit provisions have been performed so the effects of the most significant changes can be noted individually. No effect has been noted for the automatic indexation of earnings ceiling and pensions as annual increases are assumed in all projection sets.

The GAP, or average long-term costs of the benefits package, has been used to assess the impact of each change. Under the pre-2003 rules, the GAP is 24.2 per cent of IE compared with 20.3 per cent under the new rules. A reconciliation of the differences between these two projections is shown below.

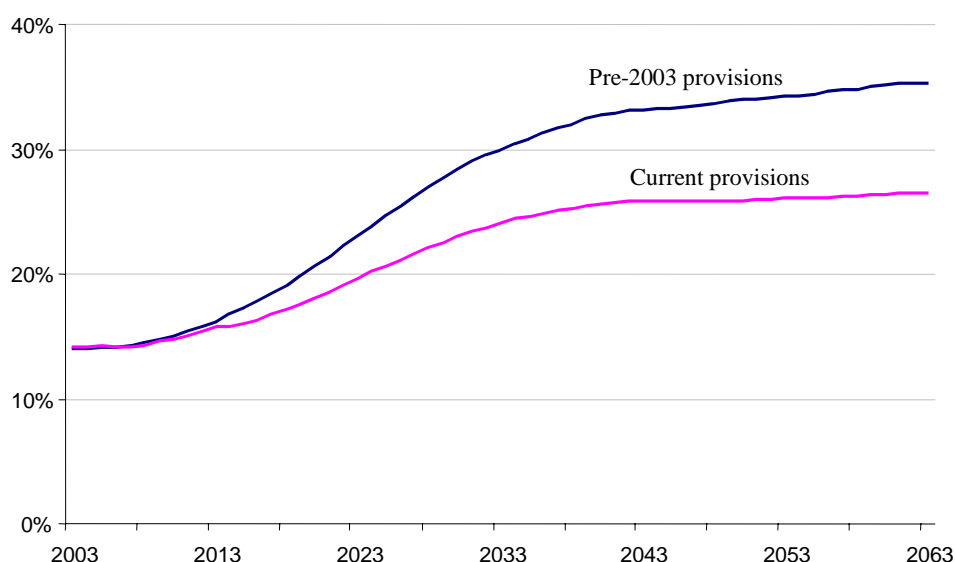
As also shown below, the change with the greatest effect is the increasing normal pension age and flexible early retirement. The small increase in long-term costs due to the higher contribution rates occurs because “other expenses” are assumed to be a percentage of reserves, which will be considerably higher with the increased contribution rates. Overall, therefore, the reforms made in 2002 have decreased long-term costs by 3.9 per cent and increased income by 4 per cent, a net positive impact of almost 8 per cent of IE.

In terms of annual expenditure compared with total IE, the PAYG cost rate is compared between the provisions prevailing during the pre-2003 period and current provisions as shown below. In terms of current costs, pension reform has resulted in expenditure rates in 2062 falling from over 35 per cent to under 27 per cent.

Table 3.8. Impact of recent reforms on average long-term costs

Projection scenario and summary of changes	GAP (percentage of insurable earnings)	Change in GAP (percentage-points)
Pre-2003 rules	24.2%	
Five-year instead of three-year average insurable earnings		(0.3%)
New accrual rate schedule		(1.2%)
Increase normal pension age and flexible early retirement		(3.0%)
Increase contribution rate		0.1%
Non-cumulative effect of changes		0.5%
Current rules – <i>Intermediate</i> scenario	20.3%	

Chart 3.5. Projected PAYG cost-rate trend under pre-2003 and current provisions (*Intermediate* scenario)



3.4. Definition of a NIF financing objective

In deciding on the extent of the reforms that were to be made in 2002, the Board had as a primary funding objective, the desire to have reserves in 2030 that were at least five times annual expenditure in that year. As indicated earlier, the projections under all but the *Pessimistic* scenario, where a ratio of at least five is reached only up to 2029, suggest that this has been achieved.

Prior to the next actuarial review, it is recommended that the Board establish additional funding objectives for the NIF for the short, medium and long terms. By having reasonable benchmarks, these targets will allow an objective evaluation to be made at each actuarial review on the current and future financial condition of the Fund. While there are many different ways of defining reasonable financing or funding benchmarks, a few examples are listed below:

-
- to have contributions alone cover expenditure for at least the next ten years;
 - to have contributions plus investment income cover expenditure for at least 25 years;
 - to have projected reserves of at least five times expenditure thirty years into the future and a reserve of twice expenditure 60 years in the future.

4. Miscellaneous issues relevant to NIS

4.1. Voluntary employee contributions to the NIS

During recent discussions on pension reform, the desire for the NIS to collect, invest and administer voluntary contributions by workers was observed and is now being considered by the Board. While any form of additional savings, especially for retirement, is encouraged and supported by the ILO, this new plan and role for the NIS would take it outside the usual functions of social security institutions and into one where it is competing directly with the private sector.

Prior to implementing a publicly-administered, publicly-invested, voluntary, defined contribution-type savings scheme, NIS should ensure that appropriate public education is provided and that the separation of current social security benefits and the new savings accounts are clearly stated. It is also recommended that monies deposited through the defined contribution tier be kept separate and apart from the NIF.

There will be different and additional administrative functions attached to a voluntary defined contribution approach. These would include withdrawal of funds and annual or more regular statements; with the new computer system that is now in place, these activities should be performed relatively easily.

4.2. Self-employed coverage under the NIS

Of the estimated 16,000 self-employed persons in Barbados⁶ fewer than 25 per cent make NIS contributions even though social security coverage is mandatory. While this participation rate is among the highest in the Caribbean there is substantial room for improvement.

While the attitudes of self-employed persons vary and the reasons for not contributing many, the consequences of not securing higher participation by the self-employed will manifest itself in the future when a larger percentage of the elderly population is left without a reliable source of income in old age. Although, some former self-employed persons may qualify for the government-financed non-contributory old-age pension, this additional cost to taxpayers could be avoided if a contributory pension based on prior NIS contribution was paid instead. Therefore, to avoid increased levels of poverty among the elderly and/or expensive government assistance programs in the future, special initiatives are required to raise the level of coverage among both high- and low-income self-employed persons.

For the self-employed category, NIS should not only view compliance from the perspective of its good performance in collecting contributions but also from that of public awareness. This implies that the focus of inspectors and public relations campaigns should be on the benefits that being covered will bring and the long-term consequences of not providing for old age in a changing society where there will be fewer children to personally support their parents. Additionally, a review of the contribution and benefit structure that presently exists for the self-employed should be made, as the income patterns of self-employment are different from those of regular employment. Since the record keeping and support that an employer provides is non-existent for many self-employed, a

⁶ 2000 Population Census.

structure is required that is more attractive to and consistent with their types of employment.

Examples of possible measures aimed at improving participation among the self-employed are:

- Allowing them to make contributions without any forms and make payments at other-than an NIS office, banks for example.
- Since self-employed persons declare their earnings and the greatest part of the pension is based on earnings in the best five years, persons may pay on low incomes for an extended period and then increase it to the ceiling for the last five years. Consideration may be given to creating insurable earnings (IE) bands for self-employed persons where changes are restricted in the years just before pension age is reached. Using an indexed career-average formula where each year's contributions is awarded equal weight would provide a pension more closely related to contributions, even if declared earnings increase prior to retirement.

4.3. Other benefit and pension reforms under the NIS

The focus of the recent pension reform exercise was on the old-age pension as this benefit is the most costly and the one that, if changed, would have the greatest impact on long-term costs. As this report is being written, a review of other pensions and benefits is being considered. This includes payment of a portion of invalidity benefits if pensioners return to employment as well as a rehabilitation service for persons with disabilities. Constant review of benefits is necessary, as it is important that the benefits that NIS offers remain consistent with prevailing socio-economic conditions.

For survivors' pensions, it is recommended that consideration be given to the payment of both an old-age contributory pension and survivors' pension. When NIS was first established, the concept of survivors' benefit was predominantly geared towards the non-working widow of a contributor. Today, women make up a significant part of the workforce and thus are often entitled to their own old-age pension. Should the insured person die and the surviving spouse be in receipt of, or later qualify for, an old-age pension, the latter will only receive the larger of the old-age pension and the survivors' pension.

As a consequence of present rules, it is possible for household income to fall by more than 50 per cent should one pensioner die. For example, if the husband's weekly pension is BB\$300 and the wife's BB\$200, total household income would fall from BB\$500 to BB\$200 after the husband's death. (BB\$200 is the greater of 50 per cent of BB\$300 and BB\$200). Therefore, there would be a strong argument that in such a case more than just the greater benefit be paid as household income does not fall by as much 50 per cent following the death of one person.⁷

Also, if both spouses are receiving old-age pensions, the pension to the surviving spouse upon death of one party may be different depending on who dies first. Using the above example, if the wife dies first, the husband's pension would have been BB\$300. (BB\$300 is the larger of BB\$300 and 50 per cent of BB\$200). Therefore, if household income is considered as equally shared by both spouses, regardless of whose pension is bigger, the current survivors' pension discriminates against the spouse with lower pension.

⁷ The US poverty line for an individual is only 20 per cent less than that for a couple.

There are also instances where current rules may result in the surviving spouse of a household, where only the husband worked, receiving a larger pension than the surviving spouse of a household where both spouses worked and both households had the same income.

To eliminate such anomalies and possible financial hardship that present survivor pension provisions may create, it is recommended that one of the following options for paying survivors' pensions be adopted:

- payment of both old-age and survivors' up to a maximum combined weekly pension,
- payment of full old-age pension plus a portion (for example, set at one-half) of the survivors' pension, or
- payment of the higher of the two old-age pensions.

The payment of more than one pension would also apply for invalidity and survivors' pensions.

If either of the above options is adopted, persons who have already claimed survivors' pensions and who are now receiving only the greater of two benefits would have their pensions reworked under the new laws. It is not possible to determine how many persons fall into this category or how many additional pensions will be paid. Therefore, an estimate of the financial impact of these changes has been made assuming that there are 50 per cent more survivor pension awards each year for persons 65 and over. Under these assumptions, the increase in GAP is 0.2 percentage-point. Prior to selecting one of the above or any other options, internal calculations could be made to see how current pensioners will be affected and thus the impact on long-term costs.

The payment of a survivors' pension for only one year to a spouse who is under age 50 and who has dependent children has also been raised as an issue that should be reviewed. While a pension for surviving children is paid until age 16, or 21 if in full-time education, financial hardship could result when the spouse's pension ceases after one year. Therefore, the Board may wish to consider payment of the spouse's pension at least up to the date that the pension for the youngest child is suspended. This requirement to maintain the payment of the survivors' pension is in line with the requirements of the ILO Convention on Minimum Standards for Social Security, No. 102.

5. Broad review of the financing of the Unemployment and Severance Payments Funds

Unemployment benefits and severance payments are paid from two separate funds - the Unemployment Fund and the Severance Payments Fund, respectively. Analysis of recent experience and short-term projections of both Funds are discussed together as the experience of both Funds is closely related to changes in employment levels and overall economic performance. The following charts highlight changes in the unemployment experience from 1990 to 2002, as well as the benefit and payment expenditure from the two Funds, expressed in dollars and as a percentage of insurable earnings (IE).

Chart 5.1. Barbados unemployment rate (as percentage of labour force)

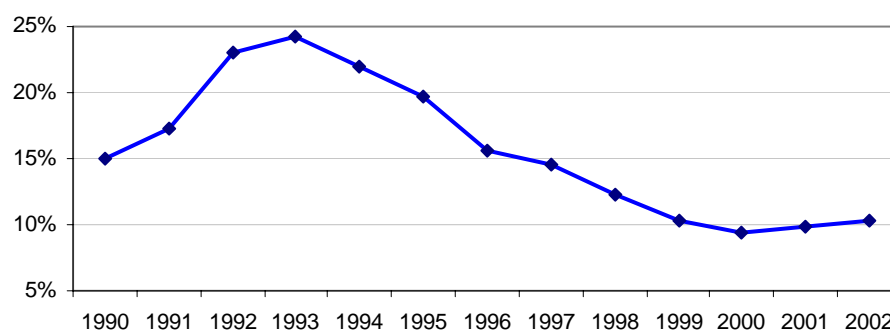


Chart 5.2. Unemployment benefit and severance payments (millions of BB\$)

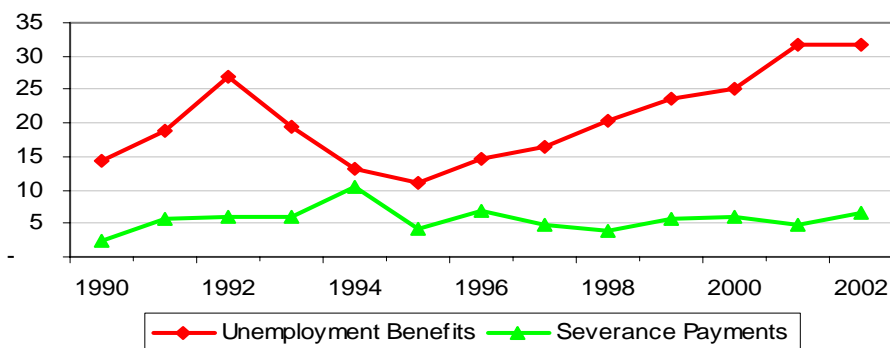
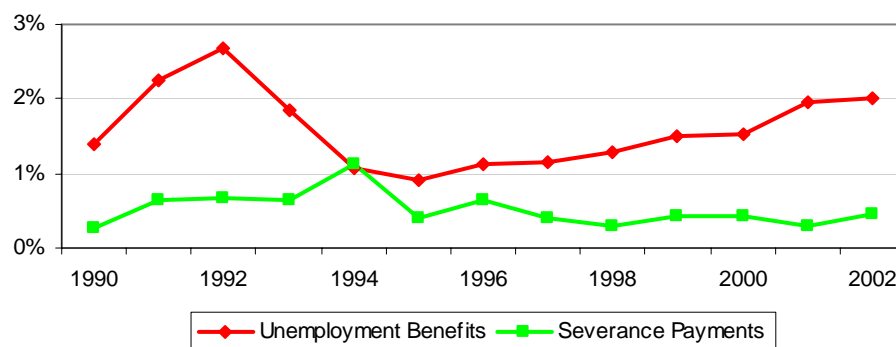


Chart 5.3. Unemployment benefit and severance payments (as percentage of insurable earnings)



After falling gradually between 1994 and 2000 from almost 25 per cent to under 10 per cent, the unemployment rate increased slightly in 2001 and 2002 to 10.3 per cent. Unemployment benefit payments, however, have increased steadily since 1995, both in terms of Barbadian dollars paid and as a percentage of IE. Severance payments, meantime, have fluctuated within a narrow range of BB\$5 and BB\$7 million per annum or around 0.4 per cent of IE.

5.1. Financing of the Unemployment Fund

The contribution rate for unemployment benefits was reduced in 1998 from 3 per cent of IE to 1.5 per cent following many years of contribution and investment income exceeding total expenditure. The following table highlights Fund experience over the past three years. Actual income and expenditure amounts may be found in Appendix V.

Table 5.1 Unemployment fund experience, 2000 to 2002

	2000	2001	2002
Contribution rate (percentage of insurable earnings)	1.50%	1.50%	1.50%
Benefits (percentage of insurable earnings)	1.54%	1.94%	2.00%
Yield on reserves (percentage per annum)	6.7%	6.1%	4.9%
Surplus/(Deficit) (in millions of BB\$)	\$5.4	(\$1.7)	(\$4.0)
Year-end reserves (in millions of BB\$)	\$114.9	\$113.2	\$109.2
Reserve-to-expenditure ratio (RER)	4.4	3.4	3.3

Consistent with the recent economic downturn and increased unemployment, benefits as a percentage of IE increased significantly in 2001 and slightly in 2002. In all three years benefit expenditure exceeded contribution income, and in 2001 and 2002 total expenditure exceeded total income. In each subsequent year, the yield on reserves declined, falling to under 5 per cent in 2002. With reserves of over three times annual expenditure the Unemployment Fund remains very well funded and thus no change to the contribution rate is recommended.

A description of the unemployment benefit provisions can be found in Appendix I

5.2. Financing of the Severance Fund

The Severance Payments Fund provides a 25 per cent refund to employers who make the required severance payments in accordance with the *Severance Payments Act*. In cases where the employer refuses to or is unable to make such payment the Severance Fund makes the payment directly to the employee and the amount paid is recoverable by the National Insurance Board from the employer. Further details of benefit provisions, eligibility conditions and rates of payment can be found in Appendix I.

In October 2001, the contribution rate for severance benefits was reduced from 1 per cent to 0.5 per cent of IE. This rate is payable by the employer only. The following table highlights Fund experience over the past three years. The actual income and expenditure amounts may be found in Appendix V.

Table 5.2. Severance fund experience, 2000 to 2002

	2000	2001	2002
Contribution rate (percentage of insurable earnings)	1.00%	0.88%*	0.50%
Benefit rate (percentage of insurable earnings)	0.44%	0.28%	0.46%
Yield on reserves (percentage per annum)	6.0%	5.8%	4.7%
Surplus/(Deficit) (in millions of BB\$)	\$10.3	\$12.8	\$3.5
Year-end reserves (in millions of BB\$)	\$54.7	\$67.5	\$71.0
Reserve-to-expenditure ratio	7.3	8.1	12.9
* Reduced from 1.0% to 0.5% in October 2001.			

Although the contribution rate was reduced by 50 per cent in 2001, benefit expenditure in 2001 and 2002 was less than contributions and the Fund continued to produce annual surpluses. As for the Unemployment Fund, the rate of return on reserves fell below 5 per cent in 2002. At over 12 times annual expenditure the funding level of the Severance Fund is excessive and thus no change in the contribution rate is recommended.

6. Broad review of the financing of the Sugar Workers' Provident Fund

The Sugar Workers' Provident Fund provides for the payment of pensions to entitled former sugar workers and a funeral grant to their beneficiaries. Pensions are payable after having attained age 65 or following permanent disability before age 65 once the eligibility conditions are met. The National Insurance Board's role is limited to the Scheme's administration, having had this responsibility transferred from the Sugar Workers' Provident Fund Board in January 1976.

The weekly pension amount is BB\$7.50 and the funeral grant is now BB\$500, having been increased from BB\$200 effective January 1, 1999. The weekly pension amount has not been increased since April 1981.

The group of pensioners is a closed one and as at December 2002 was distributed as indicated in the following table.

Table 6.1. Pensioners of the Sugar Workers' Provident Fund at 31 December 2002

Age group	Females	Males	Total
65-69	1	1	2
70-74	6	1	7
75-79	27	6	33
80-84	30	2	32
85-89	50	7	57
90-94	66	24	90
95-99	56	26	82
100-104	15	7	22
Total	251	74	325

The Fund balance at 31 December 2002 was BB\$217,545. Income to the Fund is received by way of payments from the Barbados Agricultural Management Company along with interest on any cash balances. Charges to the fund are the sum of expenditure for pensions, grants and administration.

Projections of total expenditure for the Sugar Workers' Provident Fund are shown below. Administrative expenses are assumed to be 25 per cent of total benefit expenditure.

Table 6.2. Projected expenditure of the Sugar Workers' Provident Fund

2003	2004	2005	2010	2015	2020	2025	2030
151,000	122,000	98,000	34,000	12,000	4,000	1,000	--

Appendix I. Summary of coverage, contribution and benefit provisions

I.1. Funds, benefits, insured persons and contribution rates

The National Insurance Board, through three separate funds, provides for the following benefits:

I.1.1. National Insurance Fund

- Long-term benefits: old-age, invalidity and survivors'.
- Short-term benefits: sickness and maternity, funeral grant.
- Employment injury benefits: injury, disablement, medical expenses, death and funeral grant.

I.1.2. Unemployment Fund

- unemployment benefit.

I.1.3. Severance Payment Fund

- Severance payments.
- Rebates.

Employed and self-employed persons aged 16-64 are covered for the above contingencies as follows:

- Employed persons in the private sector: All contingencies.
- Temporary government employees: All contingencies except severance.
- Permanent government employees: All contingencies, except sickness, unemployment and severance.
- Self-employed persons: All contingencies except employment injury benefits, unemployment and severance.

Employed persons under age 16 or over age 65 are covered for employment injury benefits only.

Earnings used for determining contributions and benefits are limited to BB\$715 per week or BB\$3,100 per month. If earnings are less than BB\$21 or BB\$91 per month, no contributions are payable. Earnings include basic salary and all other remuneration in cash or kind such as bonuses.

As the table below shows, the ceiling on insurable earnings (IE) has increased since 1967 as follows.

Table AI.1. Historical adjustments to the NIS ceiling on insurable earnings

	Weekly (in BB\$)	Monthly (in BB\$)
1967 to 1973	50	
1974 to 1977	100	
1978 to 1981	230	1,000
1982 to 1984	506	2,200
1984 to 1986	598	2,600
1987 to 1991	600	2,600
1991 to present	715	3,100

Effective 2004, the earnings ceiling will be indexed annually in line with changes in average wages.

Contributions are computed as a percentage of IE. Rates of contributions vary according to the type of employment. The contribution rates applicable to the four main categories of contributors for 2003 are shown below.

Table AI.2. NIS contribution rates, as of December 2002 (as percentage of insurable earnings)

	Short- and long-term and employment injury benefits		Unemployment benefits		Severance benefit	
	E'ee	E'er	E'ee	E'er	E'ee	E'er
Employed persons	7.25	8.00	0.75	0.75	-	0.50
Temporary	7.25	8.00	0.75	0.75	-	-
Government	6.70	7.45	-	-	-	-
Permanent government			-	-	-	-
Self-employed		12.50	-	-	-	-

The average contribution rate payable in 2002 was 14.01 per cent. In each of 2004 through 2006 the rates for NIS benefits payable by employers and employees will be increased 0.5 per cent

I.2. Summary of benefits provisions

I.2.1. Long-term benefits

(a) Old-age contributory pension

Contribution requirement: 500 paid or credited weekly contributions of which 150 must be paid.

Age requirement: 65. The pension is not dependent on retirement from the workforce.

Amount of benefit: 40 per cent of average insurable wages over the best five years, plus 1 per cent of total IE for contributions subsequent to the first 500 weekly contributions. These rates apply up to 2012.

Effective 2023, pension accrual rates will be 2 per cent of average IE for each of the first 20 years of contributions and 1.25 per cent of average IE for each year thereafter. Between 2013 and 2022, 50 per cent of the benefit will be based on the old basis and 50 per cent on the new basis.

Maximum pension: 60 per cent of average earnings over the best five years.

Minimum pension: BB\$105.00 per week; last increased in October 2001.

(b) Old-age contributory grant

Contribution requirement: 50 paid or credited weekly contributions.

Eligibility: Other than for the contribution requirement, the applicant must be eligible for old-age contributory pension.

Amount of benefit: six times average weekly IE for each 50 weekly contributions paid or credited. This amount is paid as a lump sum.

(c) Invalidity pension

Contribution requirement: 150 paid weekly contributions.

Eligibility: The applicant has exhausted the maximum period for sickness benefit and is permanently incapable of work, and less than age 65.

Amount of benefit: 40 per cent of average earnings over the best three years, plus 1 per cent of total IE on which contributions were based subsequent to the first 500 weekly contributions.

Duration of pension: Payable until age 65 when converted to an old-age contributory pension.

Minimum pension: BB\$105.00 per week.

(d) Invalidity grant

Contribution requirement: 50 paid or credited weekly contributions.

Eligibility: Other than for the contribution requirement, the applicant must be eligible for invalidity pension.

Amount of benefit: Same as old-age contributory grant.

(e) Survivors' pension

Contribution requirement: The deceased, at time of death, was receiving or was qualified to receive an invalidity or old-age contributory pension.

Eligibility: Widow or widower married for at least three years (includes common-law spouse) or a child who is under age 16, or 21 if in full-time education or a person with disabilities.

Amount of benefit: The proportion of Invalidity pension shown below:

Widow or widower: 50 per cent;

Child: 16 2/3 per cent – up to 3 children at any one time;

Child (orphan or disabled): 33 1/3 per cent;

Maximum benefit: 100 per cent

Duration of benefit:

- Widow or widower age 50 or over at time of death, or disabled: life pension or until the beneficiary is entitled to a larger old-age pension in his/her own right.
- For a widow or widower under age 50 and not disabled: one year.
- For children, age 16 or 21 if in full-time education, for as long as the condition of disability continues, if a person with disabilities.

(f) Survivors' grant

Contribution requirement: 50 contributions paid or credited by the deceased insured person.

Eligibility: Other than for the contribution requirement of the deceased, the applicant must be eligible for survivors' pension.

Amount of benefit: Same as old-age contributory or invalidity grant.

(g) Non-contributory old-age pension

Eligibility: Age 65 or over or, in the case of a blind person or a deaf person, aged 18 or over. Applicant must also be a Barbados citizen or a permanent resident and have lived in Barbados for a period of:

- For a citizen: 12 years since attaining age 40 or an aggregate of 20 years since attaining age 18;
- For permanent resident: 15 years since attaining age 40 or an aggregate of 20 years since attaining age 18.

No pension is payable if a person is in receipt of a pension in respect of public service or a contributory pension under a social security scheme or from any international organisation of which Barbados is a member. However, if the public service or other pension is less

than the current non-contributory pension, then the pension paid is the difference between the two.

Amount of benefit: BB\$86.00 per week. The NIS is only responsible for the first BB\$74.75 per week. Since 1998, all increases above this level and the cost associated with new awards are being met by the consolidated fund of the NIF.

I.2.2. Short-term benefits

(a) Sickness benefit

Contribution requirements:

- Seven weekly paid contributions in the quarter but one before the quarter in which the person became ill and either,
 - 39 weekly paid or credited contributions in the four quarters ending with the quarter but one before the quarter in which the person became ill (self-employed persons must satisfy this criteria), or
 - Person is engaged in employment immediately before becoming ill.

Waiting period: three days. If incapacity lasts for three weeks or more, benefit is payable from the first day. Two periods of illness separated by less than eight weeks are treated as one.

Amount of benefit: 66 2/3 per cent of average weekly IE during the quarter but one before the quarter in which the person became ill. Benefit paid on the basis of six days per week.

Duration of benefit: 26 weeks, plus an additional 26 weeks if at least 150 weekly contributions were paid and 75 contributions paid or credited in the preceding three contribution years.

(b) Maternity benefit

Contribution requirement:

- For an employed person: insured for at least 26 weeks, and having paid at least 16 contributions in the two quarters but one before the quarter the benefit becomes payable.
- For a self-employed person: not less than 39 contributions should have been paid or credited in the four quarters ending with the quarter but one before the quarter benefit becomes payable, and not less than 16 contributions should have been paid in two quarters but one before the quarter the benefit becomes payable.

Amount of benefit: 100 per cent of average-weekly IE over the two quarters but one before benefit becomes payable. Benefit is paid on the basis of six days per week.

Duration of benefit: 12 weeks.

(c) Maternity grant

Eligibility: Payable to a woman who does not satisfy the contribution requirement for maternity benefit but whose spouse has paid the number of contributions that would have enabled the woman to qualify for maternity benefit had they been paid by her.

Amount of grant: BB\$800; last increased from BB\$500 in 2001.

(d) Funeral grant

Eligibility: Insured person had made at least 50 paid contributions, or if fewer, would have been entitled to either of sickness or maternity. A grant is also payable in respect of the death of the spouse of an insured person in respect of whom a grant would have been payable had he/she died.

Amount of grant: BB\$1,400; last increased from BB\$1,000 in 2001.

1.2.3. Employment injury benefits

(a) Injury benefit

Eligibility: Incapable of work as a result of an accident arising out of insured employment, or as a result of a prescribed disease.

Amount of benefit: 90 per cent of average IE in the quarter but one before quarter in which accident or disease occurred. (If past employment is for a shorter period, the average IE of the last 13 weeks, or if less, of someone in similar employment, will be used.)

Duration of benefit: 52 weeks.

Waiting period: Three days. If incapacity lasts for three weeks or more, benefit is payable from the first day. Two periods of incapacity separated by less than eight weeks are treated as one.

(b) Disablement benefit

Eligibility: Disablement resulting from an accident at work or a prescribed disease.

Waiting period: Three days. If an injury benefit is awarded, the period of payment of the disablement benefit is set equivalent to the duration for an injury benefit.

Amount of benefit: The payment of a pension or a grant is based on the percentage loss of faculty suffered.

- If degree of disablement is less than 30 per cent, a grant equal to 365 times the weekly benefit rate times the degree of disablement is paid.
- If degree of disablement is 30 per cent or more, a weekly benefit of the injury benefit amount times the degree of disablement is paid.
- In addition, 50 per cent of disablement pension may be paid if the person requires constant help.

(c) Death benefit

Eligibility: Dependants as defined for survivors' benefit, but other persons who were dependent upon the earnings of the deceased may also qualify.

Amount of benefit: Proportion of disablement pension - same percentage as for survivors' benefits. Other dependants receive 16 2/3 per cent.

(d) Medical expenses

Expenses covered:

- Medical, surgical, dental and hospital treatment, skilled nursing services and supply of medicines.
- Supply and maintenance of artificial limbs, dentures, spectacles and other apparatus
- Travelling expenses to obtain any of the above.

(e) Funeral grant

Condition of payment: Death of insured must relate to employment. Only one funeral grant is payable.

I.2.4. Unemployment benefits

Contribution requirement:

- Insured for at least 52 weeks.
- 20 weekly contributions paid or credited in three consecutive quarters ending with the quarter but one before that in which unemployment began.
- Seven weekly contributions paid or credited in the quarter but one before that in which unemployment began.

Amount of benefit: 60 per cent of average IE during the quarter but one before that in which unemployment began.

Waiting period: Three days. If unemployment lasts for three weeks or more, benefit is payable from the first day. Two periods of unemployment separated by less than eight weeks are treated as one.

Duration of benefit: 26 weeks of continuous unemployment, or (if different periods of unemployment occurred) a maximum of 26 weeks in the last year.

I.2.5. Severance payments

The Severance Payments Fund provides for the payment of compensation to employees who are dismissed by reason of redundancy or natural disaster or who terminate the contract of employment after a period of lay-off or short-time. Under the Fund:

- The severance payment is payable to the employee by the employer,
- If the employer refuses or is unable to make such payment the Severance Fund makes the payment to the employee; (the payment is then recoverable by the National Insurance Board from the employer)
- An employer who pays the employee a severance payment in accordance with the *Severance Payments Act* is entitled to a rebate of 25 per cent of the payment from the Severance Fund.

Employees aged 16 to 65 are covered for Severance payments with the following exceptions:

- persons employed in the Public Service, by any statutory board or in employment that is pensionable under any enactment;
- share fishermen;
- persons employed by their husbands or wives;
- domestic servants who are closely related to their employers;
- partners, independent contractors and freelance agents.

Eligibility: The employee must have completed 104 continuous weeks of employment with the same employer.

Amount of benefit: 25 per cent of benefits in line with the scale shown below are refunded to the employer:

- 2.5 weeks basic pay for each year worked, up to 10 years;
- 3 weeks basic pay for each year worked between 10 and 20 years;
- 3.5 weeks basic pay for each year worked between 20 and 33 years.

Appendix II. Methodology, data and assumptions

This *Eleventh Actuarial Review* makes use of the comprehensive methodology developed by the International Financial and Actuarial Service of the ILO (ILO FACTS) for reviewing the long-term actuarial and financial status of national pension schemes. The *Review* has been undertaken by modifying the generic version of the ILO modelling tools to fit the specific case of Barbados and the National Insurance Scheme (NIS). These modelling tools include a population model, an economic model, a labour force model, a wage model, a long-term benefits model and a short-term benefits model.

The actuarial valuation begins with a projection of Barbados's future demographic and economic environment. Next, projection factors specifically related to the National Insurance Fund (NIF) are determined and used in combination with the demographic/economic framework to estimate future revenue and expenditures and reserves. Assumption selection takes into account both recent experience and future expectations, with emphasis placed on long-term trends rather than giving undue weight to recent experience.

II.1. Modelling the demographic and economic developments

Barbados' population has been projected beginning with results of the 2000 *national census* and applying appropriate mortality, fertility and migration assumptions. For the *Intermediate* scenario the total fertility rate is assumed to decrease from 1.9 in 2000 to 1.85 in 2020, and remain constant thereafter. Table AII.1 shows ultimate age-specific and total fertility rates. For the *Pessimistic* and *Optimistic* scenarios, the ultimate total fertility rates are also assumed as having been reached by 2020.

Table AII.1. Age-specific and total fertility rates

Age group	2002	Ultimate rates		
		Optimistic	Intermediate	Pessimistic
15	0.06	0.06	0.06	0.05
20	0.10	0.11	0.10	0.09
25	0.09	0.09	0.09	0.08
30	0.07	0.07	0.07	0.06
35	0.03	0.03	0.03	0.03
40	0.01	0.01	0.01	0.00
45	-	-	-	-
TFR	1.91	2.00	1.85	1.75

Mortality rates have been determined using the 2000 *Barbados Abridged Life Tables*. Life expectancy at birth in 2000 has been assumed at 72.7 and 78.5 for males and females, respectively. Improvements in life expectancy for the *Intermediate* scenario have been assumed to follow the "medium" rate as established by the United Nations with a "slow" rate assumed for the *Pessimistic* scenario and "fast" for the *Optimistic* scenario. Sample mortality rates and life expectancies at birth and at age 65 for sample years under the "medium" rate of improvements are provided in Table AII.2.

Table AII.2. Mortality rates and life expectancy

Age	Males			Females		
	2002	2032	2062	2002	2032	2062
0	0.0109	0.0073	0.0054	0.0094	0.0064	0.0046
5	0.0003	0.0001	0.0001	0.0002	0.0001	0.0000
15	0.0005	0.0003	0.0002	0.0002	0.0002	0.0001
25	0.0014	0.0008	0.0006	0.0008	0.0007	0.0006
35	0.0021	0.0013	0.0009	0.0012	0.0009	0.0008
45	0.0040	0.0027	0.0020	0.0020	0.0015	0.0012
55	0.0079	0.0058	0.0046	0.0043	0.0033	0.0026
65	0.0156	0.0124	0.0104	0.0086	0.0062	0.0047
75	0.0394	0.0335	0.0297	0.0242	0.0180	0.0140
85	0.1098	0.1002	0.0935	0.0747	0.0632	0.0549
95	0.2446	0.2379	0.2328	0.1950	0.1798	0.1680
Life expectancy at:						
Birth	73.2	77.2	79.4	79.0	82.6	84.8
Age 65	16.7	18.0	18.9	19.8	22.0	23.4

Net migration (in minus out) for each scenario is assumed to decline at varying rates and reaching different ultimate levels over the projection period, including net in migration for both the *Intermediate* and *Optimistic* scenarios. The following table shows the age distribution of net migrants for the first projection year and the ultimate levels (2042 and beyond) for each of the three scenarios

The projection of the labour force, i.e. the number of people available for work, is obtained by applying assumed labour force participation rates to the projected number of persons in the total population. Labour force participation rates have been estimated by averaging recent quarterly labour force survey results from the Statistical Service. Between 2002 and 2032, age-specific labour force participation rates are assumed to increase at advanced ages for both males and females whereby rates for ages 40 and over in 2002 will be those for ages 35 and over in 2032. Table AII.4 below shows the assumed age-specific labour force participation rates in 2002 and 2062. Rates are assumed to change linearly between 2002 and 2032.

The projected real GDP divided by the projected labour productivity per worker gives the number of employed persons required to produce total output. Unemployment is then measured as the difference between the projected labour force and employment.

Estimates of increases in the total wages as well as the average earnings earned are required. Annual average real increases in earnings are assumed equal to the increase in labour productivity as it is expected that wage levels will adjust to efficiency levels over time. Such increases are assumed to be 0.75 per cent, 1 per cent and 1.5 per cent for the *Pessimistic*, *Intermediate* and *Optimistic* scenarios, respectively. The inflation assumption, 2.5 per cent for all scenarios, affects nominal average wage increases.

Table All.3. Net immigration

Age	Initial year		Ultimate rates - 2042					
			Optimistic		Intermediate		Pessimistic	
	Male	Female	Male	Female	Male	Female	Male	Female
0-9	(18)	(16)	11	10	6	5	(6)	(5)
10-19	(16)	(21)	10	13	5	7	(5)	(7)
20-29	(106)	(109)	66	68	33	34	(33)	(34)
30-39	(55)	(46)	35	29	17	14	(17)	(14)
40-49	(10)	(8)	6	5	3	3	(3)	(3)
50-59	1	0	(1)	0	0	0	0	0
60-69	2	0	(2)	0	(1)	0	1	0
70+	2	0	0	0	0	0	1	0
All ages	(200)	(200)	125	125	63	63	(63)	(63)

Table All.4. Age-specific and total labour force participation rates (as a percentage)

Age	Males		Females		Year	Males	Females
	2002	2062	2002	2062			
17	36	36	28	28	2002	80	71
22	84	84	79	79			
27	92	92	87	87	2012	81	71
32	93	93	89	89	2022	81	71
37	93	93	88	88	2032	82	72
42	93	93	88	88			
47	93	93	85	88	2042	83	73
52	91	93	76	85	2052	83	73
57	83	91	61	76	2062	83	72
62	60	83	35	61			

II.2. Projection of NIS income and expenditure

This actuarial review addresses all Barbados NIF revenue and expenditure items. For short-term and employment injury benefits, income and expenditure are projected as a percentage of insurable earnings (IE). The projection of pensions is performed following a year-by-year cohort methodology. For each year up to 2062, the number of contributors and pensioners, and the Barbadian dollar value of contributions, benefits and administrative expenditure, is estimated.

Once the projections of the insured (covered) population, as described in the previous section, are complete, contribution income is then determined from the projected total IE, the contribution rate, contribution density and the collection rate. Contribution density refers to the average number of weeks of contributions persons make during a year.

Benefit amounts are obtained through contingency factors based primarily on plan experience and applied to the population entitled to benefits. Investment income is based on the assumed yield on the beginning-of-year reserve and net revenue and expenditures in the year. NIF administrative expenses are modelled as a decreasing percentage of IE.

Finally, the end-of-year reserve is the beginning-of-year reserve plus the net result of revenue and expenditures.

II.3. NIS population data and assumptions

The data required for the valuation of the NIS is extensive. As of 31 December 2002, required data includes the insured population by active and inactive status, the distribution of IE among contributors, the distribution of paid and credited contributions and pensions-in-payment, all segregated by age and sex.

Scheme-specific assumptions such as the incidence of invalidity, the distribution of retirement by age, density and collection of contributions, are determined with reference to the application of the scheme's provisions and historical experience.

Projecting investment income requires information of the existing assets at the valuation date and past performance of each class. Future expectations of changes in asset mix and expected rates of return on each asset type together allow for long-term rate of return expectations.

Details of NIS specific input data and the main assumptions used in this report are provided in Tables AII.5 through AII.9.

Table AII.5. 2002 active-insured population, earnings and past credits

Age	No. of active insured persons		Average monthly insurable earnings		Average no. of years of past credits	
	Male	Female	Male	Female	Male	Female
16-20	3,347	3,262	1,088	959	0.9	0.8
21-25	6,634	7,265	1,521	1,374	3.6	3.4
26-30	7,735	8,604	1,795	1,605	7.0	6.8
31-35	7,811	8,486	1,934	1,684	10.7	10.4
36-40	7,995	9,151	2,023	1,702	14.5	14.2
41-45	7,734	8,803	2,110	1,746	18.3	18.1
46-50	6,793	7,511	2,172	1,809	22.3	22.0
51-55	5,284	5,273	2,180	1,803	26.3	26.0
56-60	3,523	3,181	2,109	1,689	27.8	27.8
61-65	1,882	1,456	1,989	1,447	28.4	28.5
All ages	58,738	62,992	1,918	1,631	14.7	14.2

Table All.6. Pensions-in-payment - December 2002

Age	Old-Age Benefit		Invalidity Benefit		Survivors Benefits		Old Age Non-Cont. Pension	
	Male	Female	Male	Female	Male	Female	Male	Female
0 - 4					21	10		
5 - 9					102	89		
10 - 14					154	168		
15 - 19					243	254	1	3
20 - 24					8	1	4	10
25 - 29			8	1	1	4	14	13
30 - 34			16	16	4	8	5	10
35 - 39			48	53	4	8	25	26
40 - 44			101	115	6	13	17	24
45 - 49			139	212	7	13	8	7
50 - 54			213	268	10	58	5	13
55 - 59			286	331	59	136	4	9
60 - 64			284	392	158	173	3	2
65 - 69	2,886	2,754			104	121	405	1,343
70 - 74	2,403	2,112			78	96	685	1,909
75 - 79	1,741	1,519			47	46	529	1,788
80 - 84	1,156	997			14	20	439	1,621
85 - 89	668	632			5	16	301	1,244
90 - 94	250	262					153	641
95 - 99	42	47					58	226
100 +	-	-					36	81
85+								
# of Pensioners	9,146	8,323	1,095	1,388	1,025	1,234	2,692	8,970
Avg Weekly Pension	\$ 197	146	\$ 206	\$ 171	\$ 66	\$ 76	\$ 85	\$ 86

The following table shows assumed density factors, or the average portion of the year for which contributions are made for non-civil servants.

Table All.7. Density of contributions (per cent)

Age	Males	Females
17	51	45
22	69	68
27	78	78
32	83	82
37	85	85
42	87	87
47	88	89
52	89	89
57	88	88

The following table shows the expected incidence rates of insured persons qualifying for invalidity benefit.

Table All.8. Rates of entry into invalidity at specific ages (percentage of insured population)

Age	Males	Females
17	-	-
22	0.105	-
27	0.315	0.210
32	0.455	0.350
37	0.980	0.665
42	0.910	1.330
47	2.065	2.100
52	2.730	3.780
57	4.760	6.475
62	5.740	7.595

The table below shows the assumed probability of survivor' benefit claims and the average ages of new claimants, groups by the age of the deceased.

Table All.9. Probability of a deceased having eligible survivors and their average ages

Age	Males		Females	
	Probability of Eligible Spouse	Avg # of Eligible Children	Probability of Eligible Spouse	Avg # of Eligible Children
17	0%	-	0%	-
22	8%	0.0	0%	0.0
27	5%	0.1	0%	0.1
32	25%	0.2	8%	0.3
37	23%	0.3	15%	0.6
42	26%	0.6	13%	0.5
47	31%	0.5	10%	0.5
52	29%	0.3	8%	0.3
57	32%	0.2	10%	0.1
62	31%	0.2	10%	0.0
67	26%	0.1	7%	-
72	10%	0.1	4%	-
77	9%	0.1	3%	-
82	8%	0.0	2%	-
87	6%	0.0	1%	-

Appendix III. Projection results – *Pessimistic* and *Optimistic* scenarios

Table AIII.1. Projected Barbados population, *Pessimistic* scenario

Year	Total	Age 0-15	Age 16-64	Age 65 and over	Ratio of persons 16-64 to 65 and over
2000	268,792	61,948	174,323	32,521	5.4
2002	271,051	61,549	176,743	32,759	5.4
2003	272,121	61,321	177,883	32,917	5.4
2004	273,159	61,075	179,027	33,057	5.4
2005	274,164	60,777	180,221	33,165	5.4
2006	275,131	60,407	181,473	33,251	5.5
2007	276,070	59,977	182,777	33,316	5.5
2012	280,317	57,682	187,260	35,375	5.3
2022	285,896	53,311	184,690	47,895	3.9
2032	286,428	49,752	173,279	63,397	2.7
2042	279,470	46,623	163,896	68,951	2.4
2052	266,205	43,276	155,675	67,254	2.3
2062	251,422	40,346	145,538	65,538	2.2

Table AIII.2. Projected revenue/expenditures and reserve, *Pessimistic* scenario (millions of BB\$)

Year	Revenue				Expenditure			Surplus/ (Deficit)	Reserves	
	Contribution Income	Investment Income	Other Income	Total	Benefits	Admin. & Other Expenses	Total		End of Year	# of times current year's expenditure
2002	294.6	93.4	19.0	407.0	258.7	26.7	285.4	121.6	1,551	5.4
2003	318.5	97.7	4.0	420.2	276.0	26.3	302.3	117.9	1,669	5.5
2004	348.5	101.4	4.4	454.3	287.3	24.8	312.1	142.2	1,812	5.8
2005	382.5	106.0	4.8	493.3	300.6	25.8	326.4	166.9	1,978	6.1
2006	420.8	111.2	5.3	537.3	311.4	27.1	338.5	198.8	2,177	6.4
2007	439.6	116.8	5.5	561.9	323.5	28.5	352.0	209.9	2,387	6.8
2008	455.8	121.6	5.7	583.1	343.5	30.0	373.5	209.6	2,597	7.0
2012	522.9	163.9	6.5	693.3	435.8	35.9	471.7	221.6	3,470	7.4
2022	709.0	267.7	8.9	985.6	775.1	51.7	826.8	158.8	5,564	6.7
2032	935.8	276.7	11.7	1,224.2	1,322.9	64.0	1,386.9	(162.7)	5,585	4.0
2042	1,253.3	79.1	15.7	1,348.1	1,961.9	68.5	2,030.4	(682.3)	1,274	0.6
2052	1,643.5	(424.8)	20.5	1,239.2	2,631.4	82.2	2,713.6	(1,474.4)	(9,454)	(3.5)
2062	2,122.0	(1,472.4)	26.5	676.1	3,549.2	106.1	3,655.3	(2,979.2)	(31,669)	(8.7)

Negative reserves indicate the indebtedness of the Fund and negative investment income is the current cost of servicing that debt.

Table AIII.3. Projected benefit and assistance expenditure – *Pessimistic* scenario (millions of BB\$)

Year	Pensions, Grants & Benefits						Benefits as a % of:	
	Old Age Cont.	Invalidity	Survivors	Non-Cont. Old Age	Short-term	Emp. Injury	Insurable Wages	GDP
2002	154	24	9	40	23	8	12.3%	5.3%
2003	166	25	9	38	33	5	12.9%	5.4%
2004	178	26	10	36	33	5	13.1%	5.4%
2005	190	27	11	33	34	5	13.3%	5.4%
2006	198	29	12	31	35	6	13.2%	5.4%
2007	208	31	14	28	37	6	13.2%	5.5%
2008	225	33	15	26	38	6	13.6%	5.7%
2012	305	41	20	18	44	8	15.0%	6.2%
2022	602	60	35	5	60	12	19.7%	8.0%
2032	1,093	77	56	1	81	15	25.4%	9.9%
2042	1,648	101	82	0	109	21	28.2%	10.7%
2052	2,206	140	112	0	145	28	28.8%	10.8%
2062	2,988	189	145	0	189	38	30.1%	11.2%

Note: Figures for Old Age Non-contributory pensions are amounts for which NIS is financially obligated.

Table AIII.4. Contributors and pensioners at year-end - *Pessimistic* scenario

Year	# of Contributors	# of Pensioners					Total # of Pensioners	Ratio of Contributors to Pensioners
		Old Age Cont.	Invalidity	Survivors	Old Age Non- Cont	Death & Disablement		
2002	123,100	17,469	2,484	2,304	10,264	722	33,243	3.7
2003	121,330	18,052	2,522	2,444	9,556	765	33,339	3.6
2004	122,179	18,626	2,603	2,603	8,878	791	33,501	3.6
2005	123,090	19,338	2,684	2,768	8,236	818	33,844	3.6
2006	124,202	19,604	2,771	2,942	7,624	847	33,788	3.7
2007	125,195	19,903	2,865	3,108	7,037	877	33,790	3.7
2008	126,163	20,919	2,961	3,258	6,473	907	34,518	3.7
2012	129,322	25,087	3,297	3,672	4,443	1,011	37,510	3.4
2022	133,145	39,340	3,750	4,531	1,178	1,159	49,958	2.7
2032	130,617	56,747	3,638	5,365	193	1,147	67,090	1.9
2042	123,669	64,224	3,544	5,844	110	1,132	74,854	1.7
2052	117,370	62,996	3,511	5,791	64	1,122	73,484	1.6
2062	109,763	62,032	3,421	5,451	26	1,089	72,019	1.5

Note: The number of Old Age Non-contributory pensioners shown are those for whom NIS is financially obligated.
The projected number of contributors includes those below Normal Pension Age only.

Table AIII.5. Projected Barbados population, *Optimistic* scenario

Year	Total	Age			Ratio of persons 16-64 to 65 and over
		0-15	16-65	65 and over	
2000	268,792	61,948	174,323	32,521	5.4
2002	271,893	61,659	177,472	32,762	5.4
2003	273,473	61,556	178,982	32,935	5.4
2004	275,075	61,474	180,502	33,099	5.5
2005	276,689	61,376	182,075	33,238	5.5
2006	278,316	61,242	183,711	33,363	5.5
2007	279,958	61,083	185,401	33,474	5.5
2012	288,357	60,614	191,878	35,865	5.3
2022	304,939	61,235	194,169	49,535	3.9
2032	318,974	61,330	190,380	67,264	2.8
2042	327,456	61,397	189,876	76,183	2.5
2052	330,400	61,652	190,561	78,187	2.4
2062	331,859	61,812	191,125	78,922	2.4

Table AIII.6. Projected revenue/expenditures and reserve, *Optimistic* scenario (millions of BB\$)

Year	Revenue				Expenditures			Surplus/ (Deficit)	Reserves	
	Contribution Income	Investment Income	Other Income	Total	Benefits	Admin. & Other Expenses	Total		End of Year	# of times current year's expenditure
2002	294.6	93.4	19.0	407.0	258.7	26.7	285.4	121.6	1,551	5.4
2003	318.6	97.7	4.0	420.3	276.0	26.3	302.3	118.0	1,669	5.5
2004	349.5	101.5	4.4	455.4	287.4	24.7	312.1	143.3	1,813	5.8
2005	387.2	110.8	4.8	502.8	299.1	25.8	324.9	177.9	1,991	6.1
2006	430.2	122.5	5.4	558.1	308.2	27.1	335.3	222.8	2,213	6.6
2007	453.8	136.2	5.7	595.7	318.7	28.6	347.3	248.4	2,462	7.1
2008	475.2	151.2	5.9	632.3	337.2	30.3	367.5	264.8	2,727	7.4
2012	567.1	220.8	7.1	795.0	425.5	37.3	462.8	332.2	3,955	8.5
2022	849.8	467.7	10.6	1,328.1	777.2	59.8	837.0	491.1	8,273	9.9
2032	1,239.7	771.3	15.5	2,026.5	1,401.5	87.3	1,488.8	537.7	13,504	9.1
2042	1,821.6	1,103.5	22.8	2,947.9	2,212.0	120.2	2,332.2	615.7	19,242	8.3
2052	2,633.5	1,521.0	32.9	4,187.4	3,219.2	160.2	3,379.4	808.0	26,503	7.8
2062	3,771.9	2,040.7	47.1	5,859.7	4,686.0	208.5	4,894.5	965.2	35,530	7.3

Table AIII.7. Projected benefit and assistance expenditure – *Optimistic* scenario (millions of BB\$)

Year	# of Contributors	# of Pensioners					Total # of Pensioners	Ratio of Contributors to Pensioners
		Old Age Cont.	Invalidity	Survivors	Old Age Non- Cont	Death & Disablement		
2002	123,100	17,469	2,484	2,304	10,264	722	33,243	3.7
2003	121,324	18,054	2,522	2,442	9,556	765	33,339	3.6
2004	122,478	18,636	2,604	2,599	8,878	791	33,508	3.7
2005	123,699	19,361	2,686	2,758	8,236	818	33,859	3.7
2006	125,123	19,644	2,774	2,923	7,624	847	33,812	3.7
2007	126,431	19,966	2,869	3,079	7,037	877	33,828	3.7
2008	127,717	21,010	2,967	3,216	6,473	908	34,574	3.7
2012	132,165	25,354	3,315	3,566	4,443	1,014	37,692	3.5
2022	139,453	40,550	3,823	4,248	1,178	1,172	50,971	2.7
2032	143,479	59,984	3,786	4,948	193	1,179	70,090	2.0
2042	143,277	70,287	3,794	5,378	110	1,191	80,760	1.8
2052	143,764	72,412	3,851	5,390	64	1,208	82,925	1.7
2062	143,960	73,768	3,946	5,140	26	1,228	84,108	1.7

Note: The number of Old Age Non-contributory pensioners shown are those for whom NIS is financially obligated.

The projected number of contributors includes those below Normal Pension Age only.

Table AIII.8. Projected contributors and pensioners at year-end - *Optimistic* scenario

Year	# of Contributors	# of Pensioners					Total # of Pensioners	Ratio of Contributors to Pensioners
		Old Age Cont.	Invalidity	Survivors	Old Age Non- Cont	Death & Disablement		
2002	123,100	17,469	2,484	2,304	10,264	722	33,243	3.7
2003	121,324	18,054	2,522	2,442	9,556	765	33,339	3.6
2004	122,478	18,636	2,604	2,599	8,878	791	33,508	3.7
2005	123,699	19,361	2,686	2,758	8,236	818	33,859	3.7
2006	125,123	19,644	2,774	2,923	7,624	847	33,812	3.7
2007	126,431	19,966	2,869	3,079	7,037	877	33,828	3.7
2008	127,717	21,010	2,967	3,216	6,473	908	34,574	3.7
2012	132,165	25,354	3,315	3,566	4,443	1,014	37,692	3.5
2022	139,453	40,550	3,823	4,248	1,178	1,172	50,971	2.7
2032	143,479	59,984	3,786	4,948	193	1,179	70,090	2.0
2042	143,277	70,287	3,794	5,378	110	1,191	80,760	1.8
2052	143,764	72,412	3,851	5,390	64	1,208	82,925	1.7
2062	143,960	73,768	3,946	5,140	26	1,228	84,108	1.7

Note: The number of Old Age Non-contributory pensioners shown are those for whom NIS is financially obligated.

Appendix IV. Benefit experience analysis

NIS administers three major types of social security benefits - pensions, short-term and employment injury benefits. The following tables summarises the cost of each benefit type during the years 2000 to 2002. Since some employment injury benefits are paid as pensions and other are short-term in nature, they have been separated into these two classes for the purpose of presentation.

Table AIV.1. Pensions expenditure as percent of insurable earnings, 2000 - 2002

Pension	2000	2001	2002
Old-age contributory	6.02%	6.49%	7.30%
Invalidity	0.94%	1.01%	1.14%
Survivors'	0.36%	0.37%	0.41%
Old-age non-contributory	2.26%	2.17%	1.92%
Disability	0.24%	0.27%	0.25%
Death	0.01%	0.01%	0.01%
Total	9.83%	10.32%	11.03%
Total pensions (millions of BB\$)	208.5	226.3	231.9

Table AIV.2. Pensions-in-payment, awarded and terminated, 1999 - 2002

	No. of pensions				Average weekly pension (BB\$)	
	Paid in Dec 1999	Awards, 2000 - 2002	Terminated 2000 - 2002	Paid in Dec 2002		
					Dec. 1999	Dec. 2002
Pensions						
Old-age contributory	16,044	3,777	1,643	18,178	150	173
Invalidity	2,294	1,078	568	2,804	162	187
Survivors'	2,101	n/a	n/a	2,653	62	71
Old-age non-contributory	12,990	1,200	2,138	12,052	80	85
Disablement	390	n/a	n/a	669	n/a	121
Death	55	n/a	n/a	53	n/a	78

Table AIV.3. Short-term benefit experience, 2000 - 2002

Benefit type	2000		2001		2002	
	No. of claims awarded	Percentage of insurable earnings	No. of claims	Percentage of insurable earnings	No. of claims	Percentage of insurable earnings
Sickness benefit	57,003	0.93%	56,405	0.86%	38,773	0.67%
Maternity benefit	2,972	0.32%	3,439	0.34%	2,300	0.32%
Maternity grant	387	0.01%	695	0.01%	348	0.01%
Funeral grant	1,127	0.06%	1,035	0.06%	1,295	0.08%
Injury benefit	6,057	0.21%	8,038	0.20%	4,914	0.16%
Medical expenses		0.03%	3,080	0.03%	1,931	0.02%
Travelling expenses		0.01%		0.01%		0.01%
Total		1.57%		1.51%		1.27%

Note: A large number of claims that were received but not processed in 2002, thus the significant decrease in both number of claims and amount spent.

**Appendix V. Income and Expenditure of the
National Insurance, Unemployment
and Severance Funds, 2000 – 2002**
(in millions of BB\$)

	2000	2001	2002
Table AV.1 National Insurance Fund			
Income			
Contribution income	296.73	306.98	294.60
Investment income	88.59	92.09	93.42
Other income	6.57	3.00	18.99
Total income	391.90	402.07	407.00
Expenditure			
Benefits			
Sickness	19.80	18.90	14.18
Maternity	6.74	7.52	6.82
Maternity grant	0.22	0.23	0.28
Funeral	1.28	1.24	1.62
Old-age contributory	127.53	142.29	153.54
Old-age non-contributory	19.96	22.10	23.88
Invalidity	7.66	8.01	8.61
Non-contributory pension	47.92	47.67	40.40
Travelling expenses	0.31	0.26	0.16
Medical expenses	0.72	0.65	0.43
Injury	4.46	4.33	3.28
Disablement	5.14	5.94	5.24
Death	0.26	0.24	0.22
Total benefit expenditure	242.02	259.38	258.66
Administrative expenditure	16.64	17.27	19.96
Other expenses	2.87	3.98	6.69
Total expenditure	261.53	280.64	285.31
Excess of income over expenditure	130.37	121.44	121.69
Reserves at year-end	1,299.37	1,429.66	1,551.35

Table AV.2. Unemployment Fund

Income			
Contribution income	24.48	24.59	23.74
Investment income	7.23	6.79	5.29
Total income	31.71	31.37	29.03
Expenditure			
Benefits	25.10	31.85	31.63
Administrative expenses	1.12	1.26	1.44
Miscellaneous expenses	0.05	-	-
Total expenditure	26.27	33.11	33.07
Excess of income over expenditure	5.44	(1.73)	(4.04)
Reserves at year-end	114.94	113.21	109.17

Table AV.3. Severance Fund

Income			
Contribution income	13.81	14.42	7.27
Investment income	2.91	3.46	3.20
Repayments by employers	0.31	0.16	0.31
Total income	17.02	18.04	10.78
Expenditure			
Rebates	3.22	2.38	4.08
Employer payments	2.87	2.27	2.62
Administrative expenses	0.63	0.58	0.62
Total expenditure	6.71	5.23	7.32
Excess of income over expenditure	10.31	12.81	3.46
Reserves at year-end	54.71	67.52	70.98
