Grenada

Report to the Government

Ninth Actuarial Valuation of the National Insurance Fund as of 31 December 2009

Printed in Switzerland

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Executive summary

The National Insurance Scheme (NIS) covered about 42,740 workers in 2009 – about 85 per cent of the employed population. The NIS provided protection for old-age, disability, death, employment injury, maternity and sickness benefits. The short-term benefits branches are in a good financial condition. The main recommendations of this report concern the need to adjust the long-term pension branch in order to make the scheme sustainable over the long term and to improve equity among the various categories of beneficiaries.

The NIS is a relatively young scheme, having started its operations in 1983. Hence, the long-term benefit branch has not reached a state of maturity and the cost of pensions expressed as a percentage of insurable earnings is still increasing. The annual expenditure of all the branches, in 2009, is 7.2 per cent of insurable earnings and will gradually increase to 37.1 per cent in 2069. If the NIS had to be financed by a constant contribution rate over the next 60 years, this rate (the general average premium, or GAP) would be 18.6 per cent. The GAP may be compared to the current contribution rate devoted to all branches, which is 9.0 per cent of insurable earnings.

With the anticipated increase in expenditure, the reserve is expected to begin to decrease in the next decade. It will increase in absolute value until 2028 and will then begin to decrease, and be completely depleted in 2041. The reserve ratio (reserve expressed as a ratio of annual expenditure) is presently 15.8. It decreases during the whole period, reaching 0 in 2041. There is some urgency to adjust the contribution rate in the short term. In 2017, according to this actuarial valuation, total expenditure will exceed contributions, meaning that current contributors will no longer continue to constitute a reserve.

Table ES.1. Financial condition of the National Insurance Scheme: Indicators

	Year of reserve exhaustion	PAYG cost in 2069 (%)	General average premium (%)
Base scenario	2041	37.1	18.6

The 9th actuarial valuation of the NIS makes the following three main recommendations:

1. A gradual increase in the pensionable age from 60 to 65 over a period of 20 years and the implementation of early retirement and late retirement factors.

2. An increase in the contribution rate of 2 per cent in 2015. No increase is recommended before 2015 because of the effect of the global financial and economic crisis. Further increases will have to be considered in the next actuarial valuations, depending on the results of the deep analysis of the pension system (see below) and the economic situation of Grenada. While increases in the contribution rate can be delayed for some years, they are unavoidable in the medium and long term in order to preserve the financial sustainability of the scheme.

3. A deep analysis of the pension system in Grenada. In our opinion, rethinking the pension system involves a consideration and analysis of the following solutions:

    ■   Establishing explicit objectives relatively to poverty reduction in Grenada. This could be achieved by putting in place a universal pension payable to everyone.

    ■   Coordinating the poverty alleviation programme (the universal pension for example) with the pension that is paid from the NIS. By protecting vulnerable

people through a universal pension, it becomes easier to modify the pension formula.

- Letting the supplementary private pension plans play a more important role in Grenada. Currently, few employers have established a supplementary pension plan for their employees. Such pension plans could take the form of defined contribution or defined benefit plans. Introducing supplementary pension plans could be combined with modifications to fiscal policies and the implementation of a regulatory authority.

The sooner actions begin, the less drastic they will have to be. Immediate analysis should be undertaken to find solutions to the upcoming problems. Considering that the scheme is not yet mature, there is still time to find creative and sustainable solutions.

The other main features of this actuarial valuation are:

1. It is suggested to increase the pensions in payment in January 2011 in accordance with the table ES.2.

Table ES.2. Adjustment to pensions in payment, January 2011

	Adjustment to pension (%)
Pensions in payment as of 1 January 2006	12
New retirees in 2006	9
New retirees in 2007	6
New retirees in 2008	0
New retirees in 2009	0

It is also suggested to include in the regulations explicit mechanisms for the adjustment of pensions in payment and other parameters of the scheme.

2. There are currently no formal financing objectives for the NIS. Thus, the following questions cannot be answered: For which period should the contribution rate be adequate? What is the desired level of reserve-to-expenditure ratio or funding? Is a stable contribution rate desirable to maintain equity among generations? What happens if experience is worse than expected? Who shares the risks of the scheme?

We suggest that the NIS hold discussions with stakeholders on the possibility of implementing an explicit written funding policy. Such a policy should be well-thought-out and periodically reviewed.

3. It is suggested to transfer EC$70 million and $40 million [1] respectively from the employment injury and short-term benefits branches to the long-term benefits branch. An analysis of experience shows that the recommended rates for short-term and employment injury benefits are still adequate considering the modifications that come into force in 2010.

4. Concerning the investment policy, the following elements should be considered by the Board:

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[1] When dollars ($) are mentioned in this report, East Caribbean dollars are intended unless otherwise indicated.

- A maximum of 5 per cent of assets should be invested in cash and cash equivalents, in order to maximize the return of the scheme. A reduction in the proportion of assets currently held in cash and cash equivalents is essential, considering the long-term nature of the scheme and the little need of cash in the short term.

- The last actuarial report suggested that the Board should place funds outside Grenada, with a medium-term target of 20 per cent of total assets. This target is adequate, given that one of the goals of an investment portfolio in a social security scheme is to diversify the risk.

- If foreign investments are to be made, currency risk will have to be managed and monitored. The investment policy statement should contain a policy on currency risk, in particular what kind of protection should be implemented.

- Concerning the high proportion of loans in the investment portfolio, the Board should be aware that assets lent directly to private and public business and to personal mortgages can have undesirable effects on the rate of return. The risk of default can be very important in times of economic downturn. The Board should bear in mind that maintaining such a high proportion of investments in direct loans can be more risky than investing in bonds.

- Pension schemes have long-term obligations which allow the investment of a higher proportion of assets in variable income securities such as equities. Part of the money invested in cash and cash equivalents could be moved to equities in order to increase the proportion of assets in this category. Investment in foreign equities should also be made to diversify the risk. A medium-term target of 25 per cent of assets in equities could be an interesting avenue for the Board to explore in order to increase the expected rate of return of the Fund. The increase of risk due to a higher proportion of assets in equities could be partly offset by a reduction of investments in direct loans, to invest more in bonds. Before approving any modifications to the targeted assets allocation, the Board should make sure that the resulting investment policy is still in accordance with its objectives and risk tolerance.

Abbreviations

CARICOM	Caribbean Community
EC	East Caribbean (dollars)
ES	executive summary
FPDA	flexible premium deferred annuity
GAP	general average premium
GDP	gross domestic product
ILO	International Labour Organization/Office
ILO/FACTS	ILO International Financial and Actuarial Service
NIS	National Insurance Scheme (Grenada)
NRA	normal retirement age
PAYG	pay-as-you-go
PV	present value
RER	reserve-to-expenditure ratio
TFR	total fertility rate

Introduction

The National Insurance Scheme began its operations in April 1983. This new defined benefit plan replaced a Provident Fund system that had existed since 1969. Initially, only long-term pensions and short-term benefits were offered; employment injury benefits were introduced later, in 1998. The NIS Board responsible for the administration of the Fund reports to a Cabinet Minister who has responsibility for social security.

Section 22 of the National Insurance Act (the Act) requires that an actuarial review of the Grenada National Insurance Fund be conducted at least every three years. This 9th review of the NIS Fund was performed as at 31 December 2009, three years after the previous review.

The valuation was carried out under the terms of an agreement concluded between the NIS and the ILO. The ILO appointed Mr Guillaume Barrette, F.S.A., F.C.I.A. and Mr Georges Langis, F.S.A., F.C.I.A., both senior actuaries of the Régie des Rentes du Québec, to carry out this actuarial valuation. Mr Barrette and Mr Langis went to Grenada from 6 to 13 June 2010 to gather the necessary data for the valuation in collaboration with the personnel of the NIS, and to hold discussions with all the stakeholders of the Fund (Minister responsible for Social Security, members of the Board, the NIS senior management, and representatives of workers' and employers' organizations).

The International Financial and Actuarial Service of the Social Security Department of the ILO (ILO FACTS) assumed responsibility for the supervision, review and editing of this actuarial review.

The authors are grateful to the national counterparts and staff of the National Insurance Scheme for their support throughout this assignment. Particularly, Mr Alfred P. Logie and Mr Dorset Cromwell, their team and all the management of the NIS, furnished invaluable and timely assistance and thus expedited the preparation of this report.

The terms of reference of the agreement between the ILO and Mr Barrette and Mr Langis include the following:

1. Review the previous actuarial valuation, including information on recent reforms and data (macroeconomic data and scheme-specific data).

2. Draft additional information and data requirements necessary to perform the 9th actuarial valuation.

3. Carry out a mission to Grenada to obtain information on reform options and to collect data to perform the 9th actuarial valuation.

4. Perform the 9th actuarial valuation including the compilation of data and assumptions, a comparative analysis with the previous actuarial valuation, calibration and description of the model used, verification of projection results and drafting of an actuarial report to be sent to the ILO.

5. Prepare a presentation of the actuarial valuation results for the NIS and the Government.

6. Prepare training materials to be used on the second mission.

7. Carry out a second mission to Grenada to present results and perform the training on data collection, modelling and analysis of results.

8. Modify the actuarial report as necessary in order to reflect the comments received and submit the final report to the ILO.

There are eight chapters in the report. The first presents the scheme experience and new developments since the last actuarial valuation. Investment performance and funding issues are also part of Chapter 1. Chapter 2 concentrates on the projection of the general population and economy in Grenada. The third chapter concerns demographic and financial projections on a best-estimate basis and according to the legal provisions of the scheme. Chapter 4 deals with the reconciliation of results between the 8th and 9th valuations. Chapter 5 presents the sensitivity analysis necessary in any actuarial valuation, as well as other issues such as an analysis of the retirement age. Chapter 6 analyses short-term and employment injury benefits, while Chapter 7 is about the investment policy and the rate of return on assets. Chapter 8 is the conclusion of the valuation where recommendations are made.

1. Review of NIS performance and developments since the 8th actuarial valuation of 2006

1.1. Recommendations of the 8th actuarial valuation currently under consideration

A number of recommendations were made in the 8th actuarial review of the NIS with the principal objective of making the scheme sustainable and affordable for future generations of contributors. At the time of preparing this report, several changes emanating from these recommendations were being considered. This section presents and discusses these modifications.

Recommendation #1: Ceiling and pension increases

It was recommended to increase the wage ceiling to a level between EC$3,500 and $4,000 per month[2] and to increase pensions and all fixed dollar benefits such as funeral and maternity grants at regular intervals using a prescribed formula. The NIS Board has recommended increases to the ceiling according to the schedule below (table 1.1). This actuarial valuation will take these increases into account and determine their financial impact.

Table 1.1. Increase in the ceiling of insurable earnings, 2010-2014

Date of ceiling change	Level of ceiling (EC$)
1 November 2010	3 500
1 January 2012	4 250
1 January 2014	5 000

No mechanism for adjusting pensions and fixed dollar benefits at regular intervals using a prescribed formula has been adopted so far. The last increase in the minimum pension was in 2006. This actuarial review will recommend increase adjustments to pensions in payment.

Recommendation #2: Increase pension age to 65

The 8th actuarial review pointed out the necessity of adjusting the scheme to be sure that it will stay affordable and sustainable in the future. One way of achieving these goals was to increase the pensionable age. The current NIS retirement age is somewhat low compared to that found elsewhere, particularly in Caribbean countries (age increased from 60 to 65 in Dominica and St Lucia and from 65 to 67 in Barbados; while in Anguilla, the Bahamas and the British Virgin Islands the normal retirement age is 65). For the time being, no increase in pensionable age has been scheduled for the coming years. In 2009 there have been discussions between stakeholders on this recommendation. The necessity of adjusting the scheme is well understood, but the current economic outlook could make the adoption of such a measure difficult.

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[2] When dollars ($) are mentioned in this report, East Caribbean dollars are intended unless otherwise indicated.

The Board decided to defer any action regarding this recommendation until after the 9th actuarial review of the Fund. This actuarial valuation will go further in that direction by proposing an increase in the retirement age, together with some suggestions on increasing flexibility in the retirement process.

Recommendation #3: Pension accrual rates

The pension accrual rate is 30 per cent for the first ten years and 1 per cent for each additional year. The pension formula thus advantages people who have fewer accumulated years of service. The 8th actuarial review recommended that the pension accrual rates be modified to a formula less generous for those who have not accumulated many years of service (2 per cent for the first ten years and 1.3 per cent thereafter). The Board decided to defer any action on this recommendation until after this 9th actuarial review of the Fund.

In Grenada the coverage rate is very good for the total employed population (close to 90 per cent of the employed population is covered by the scheme) and this despite the fact that the coverage rate of self-employed persons is very low, even if contributions have been mandatory for this group since 2007. What is more worrisome is the high unemployment rate (18 per cent for men and 32 per cent for women)[3]. Such high rates could of course have an impact on the levels of retirement benefits, as people with frequent episodes of unemployment will arrive at age 60 with fewer accumulated years of service.

Discussions with worker representatives revealed that the global replacement rate is relatively low. In fact, there is no first-tiered universal pension and no supplementary government-sponsored pension plan for public employees, while most private employers do not offer a supplementary pension plan to their employees. For example, teachers will have accumulated at retirement 25 years of service on average. This gives a replacement rate of 45 per cent. For most of the working population, the NIS is the only source of revenue after retirement.

Making the recommended modifications to the pension accrual rates would of course have more of an impact on those who have been affected by many unemployment periods during their working life. Before going in that direction, we recommend a more global analysis of the unemployment situation in Grenada. This thinking should cover not only the need for unemployment protection[4], but also the impact on the unemployed of modifications to the pension formula and to the retirement age. For example, increasing the retirement age to 65 will allow people to accumulate more years of service through working for a longer period. Also, the release of the next labour force survey will give a more complete picture of the labour market in Grenada. This will help in the design of solutions adapted to the situation.

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[3] The country poverty assessment: Grenada, Carriacou and Petite Martinique 2007/2008.

[4] Only two countries of the Caribbean Community (CARICOM) offer unemployment protection: Bahamas and Barbados.

Recommendation #4: Survivors' pension

In the 8th actuarial review the Board agreed on the following:

1. Increase the minimum rate for children's survivors' pension (from EC$9.90 to $19.70).

2. Increase the age up to which dependent children can receive the benefit from 18 to 21, if still attending school.

3. Permit the payment of the full invalidity pension together with the survivors' pension.

These regulations will come into force on 1 November 2010.

Recommendation #5: Maternity grant

The 8th actuarial review pointed out the need to relax qualifying conditions for maternity grants so that more women receive benefits. Starting on 1 November 2010, the regulation is repealed and replaced by the following:

1. Maternity allowance shall be payable only if the woman had been insured for not less than thirty contribution weeks and had been engaged in employment as an employee pursuant to section 24 of the Law during at least twenty contribution weeks in the period of thirty contribution weeks immediately preceding the contribution week in which occurs the day which is six weeks before the expected date of confinement, or in which occurs the day from which the benefit is claimed, whichever is later.

2. Maternity grants shall be payable only if the insured woman or the insured husband has at least 50 paid contribution weeks.

Recommendation #6: Enhancing self-employed persons' participation

The coverage rate of self-employed persons, at under 20 per cent, is very low, even if contributions have been mandatory for this group since 2007. The situation of self-employed persons is very different from that of salaried workers because of the nature and income patterns of self-employed work, and for that reason some countries have adopted a different design approach to encourage coverage. Sometimes more flexibility can be adopted. The 8th actuarial review discussed the "band system" as a way of increasing the participation of self-employed persons. Under this system, the self-employed person selects the income band which best reflects his/her usual income and thus contributes the same amount each month regardless of what actual earnings are in that month. As recommended in the previous actuarial valuation report, we encourage a deep analysis of this design before going in that direction.

Recommendation #7: National health insurance

Health coverage is not offered by the NIS, so that many people in Grenada do not have any health coverage at all. There are currently discussions among stakeholders on implementing a national health insurance programme. One approach discussed is to put in place a social health insurance scheme financed by the contributions of workers. When implementing such a system it is very important that decision-makers be guided by people with strong expertise in the health insurance field. Analysis of systems elsewhere is also vital. The design of such a scheme is beyond the scope of this report; however, it is important to integrate the capacities of the NIS into the development process of this new

system. This does not mean that the NIS should necessarily administer the new social insurance programme. Managing long-term pensions and managing health insurance do not require the same expertise or the same computerized system. Nevertheless, because it is likely that those insured under the new scheme will be the same people as those insured by the NIS, the NIS should at least be used as a point of entry for the new health insurance system – for example, it could be the entity that collects the contributions. It is important to avoid duplication. In an integrated system the coverage in one part of the system should be linked to that in another part. Such a system might help attract those people who are less concerned by pension coverage, such as the self-employed.

It is recommended that the Government and the NIS continue discussions and studies on the implementation of a national health insurance programme.

Recommendation #8: Sunday as a ''waiting day''

As recommended in the previous actuarial report, Sunday will be included as a waiting day prior to the payment of sickness benefits and injury benefits so that workers who work on Sundays do not continue to be disadvantaged. These regulations will come into force on 1 November 2010.

Recommendation #9: Wages for calculating weekly benefits

As a way of reducing delays in the payment of short-term benefits, it is recommended that the reference period for wages be modified, by using a period of 13 weeks ending on the last day of the two months preceding the date sickness began. These regulations will come into force on 1 November 2010.

Recommendation #10: Duration of injury benefit payments

The Board agreed to the recommendation to extend the injury benefit period to an additional 26 weeks before the determination of the permanent loss of physical or mental faculty is made. These regulations will come into force on 1 November 2010.

Recommendation #11: Branch allocations and transfer of reserves

For internal accounting purposes only, the Board agreed to revise the allocation of contribution income to the various branches as follow:

1. Employment injury benefits from 1.0 to 0.3 per cent

2. Long-term benefits from 6.7 to 7.4 per cent

3. Short-term benefits remain at 1.3 per cent

Also, there is a transfer of EC$35 million from the short-term benefit branch to the long-term benefit branch and a transfer of $45 million from the employment injury benefit branch to the long-term benefit branch.

1.2. Trends in financial developments since 1983

The following charts illustrate the trends in the main indicators of the financial experience of the NIS since its beginning. Figure 1.1 compares the statutory contribution rates to the pay-as-you-go (PAYG) rates for the period 1983 to 2009.[5] The PAYG rate is the rate that is necessary to pay all expenditures (benefits and administrative expenditures) in a given year. At the beginning of the scheme, this rate was close to zero but began its upward trend to reach 7.2 per cent in 2009. It is usual that, when a scheme is maturing, the PAYG rate increases year after year as more and more people retire. The difference between the statutory contribution rates and the PAYG rates is used to accumulate a reserve. The amount of reserve accumulated at the end of 2009 is $662,014,060. The importance of the reserve is shown in figure 1.2 where its level is given in relation to GDP for the last ten years. In 2000, the amount of reserve represented 27.3 per cent of GDP in Grenada; in 2009, the ratio is 47.8 per cent.

Figure 1.1. Statutory contribution rates and PAYG rates, 1983-2009 (percentages)
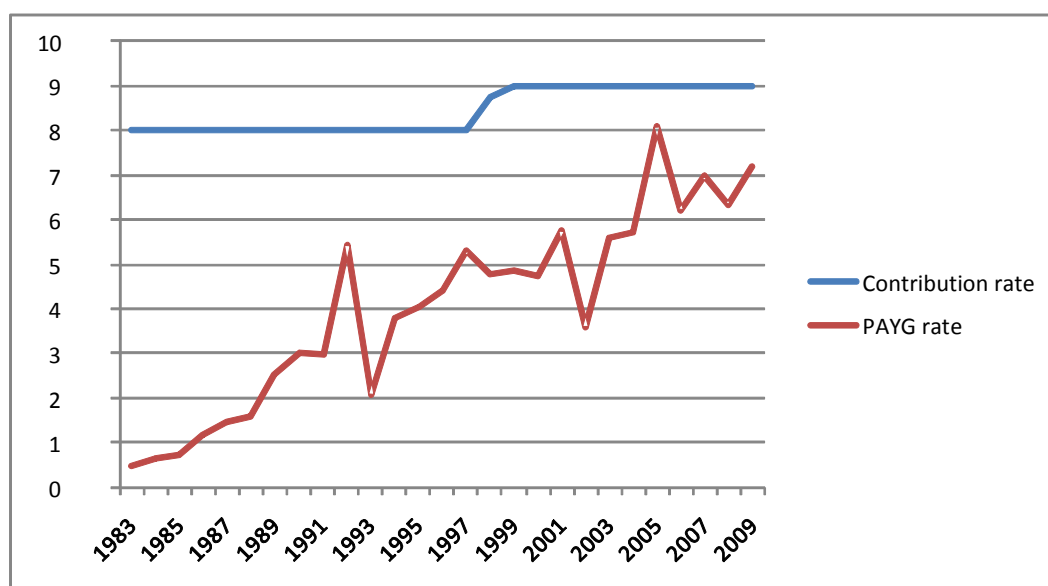
Notes: For the year 2009, the total expenditures used to reproduce the PAYG rate on the figure exclude the item "other expenses" ($9,660,099) which represents assets written off. From an analytical point of view, this kind of expenditure should be included as a negative investment return.

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[5] For simplicity, the PAYG rate for a given year is calculated as the ratio of total expenses to contributions times the contribution rate. In figure 1, the increase in the PAYG rate in 2005 was due to the payment of unemployment benefits following hurricane Ivan. Changes in the PAYG rate for the years 2002 and 2003 and 1992 and 1993 come from payment of outstanding contributions by the Government.

Figure 1.2.   Reserves at year end as a percentage of GDP, 2000-2009
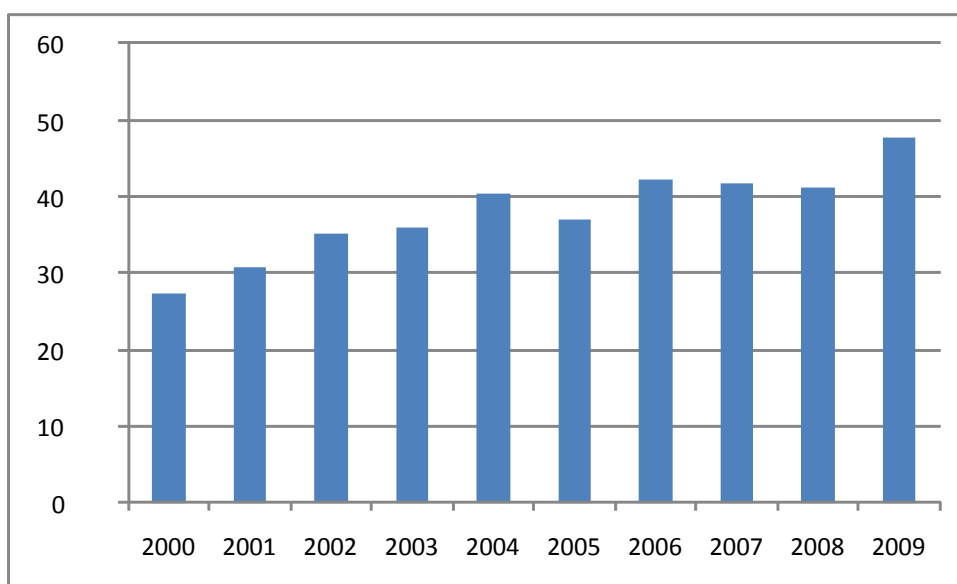
Figure 1.3 presents the reserve-to-expenditure ratio (RER) that reflects the size of the year-end reserve relative to that year's expenditures. It is a useful measure indicating the funding level at a particular point in time, but it is not representative of the long-term pattern of the scheme, especially in the case of a still immature pension system such as the NIS. The RER has seen a general downwards trend since 1983, although it has levelled off in the last few years to reach 16.6 at the end of 2009.

Figure 1.3.   Reserve-to-expenditure ratio (RER), 1983-2009 (percentages)
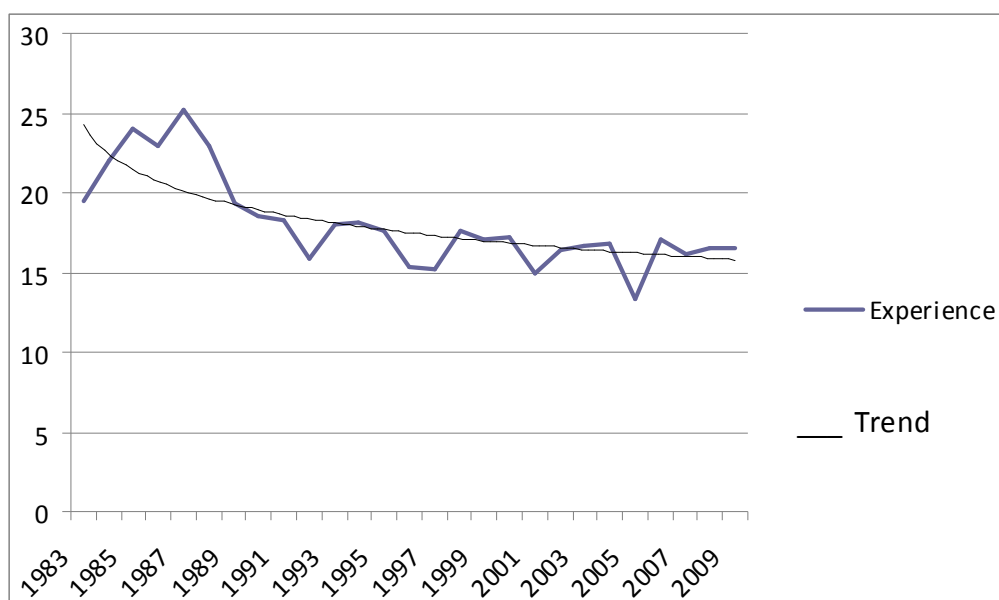
Note: For the year 2009, total expenditures used to reproduce the RER ratio in the figure exclude the item "other expenses" ($9,660,099) which represents assets written off. From an analytical point of view, this kind of expenditure should be included as a negative investment return.

Figure 1.4 shows the proportion of each type of benefits paid to the total amount of benefit expenditures. It clearly illustrates that, as time goes by, long-term benefits become more and more important when compared to other types of benefit. In 2009, long-term benefits

represented 82.4 per cent of all benefits and the proportion should continue to go up in the future, showing that these benefits drive the cost of the NIS.

Figure 1.4.   Proportion of benefits paid, 1983-2009 (percentages)
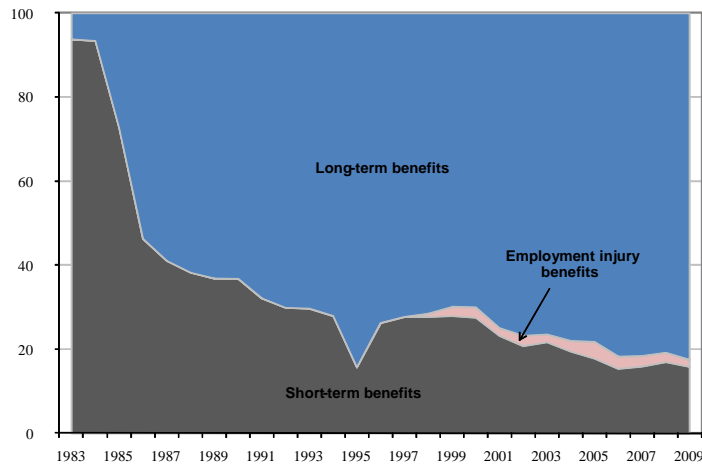
Note: For this figure, unemployment benefits paid in 2005 have been voluntarily omitted.

Figure 1.5 shows the evolution of the number of contributors and pensioners over the last ten years. The average rates of growth in the number of contributors and pensioners are 1.6 and 3.2 per cent respectively. In 2009, the number of contributors dropped considerably (by 12 per cent) because of the global economic crisis. Without this crisis, the average rate of growth of the number of pensioners and contributors over the last ten years would have been the same. The future evolution of the financial performance of the NIS will be driven considerably by the ratio of contributors to pensioners. Figure 1.6 shows the evolution of this ratio since 1991. In that year, there were 31 contributors for each pensioner; this ratio is now around 7.

Figure 1.5.   Evolution of the numbers of pensioners and contributors, 2000-2009
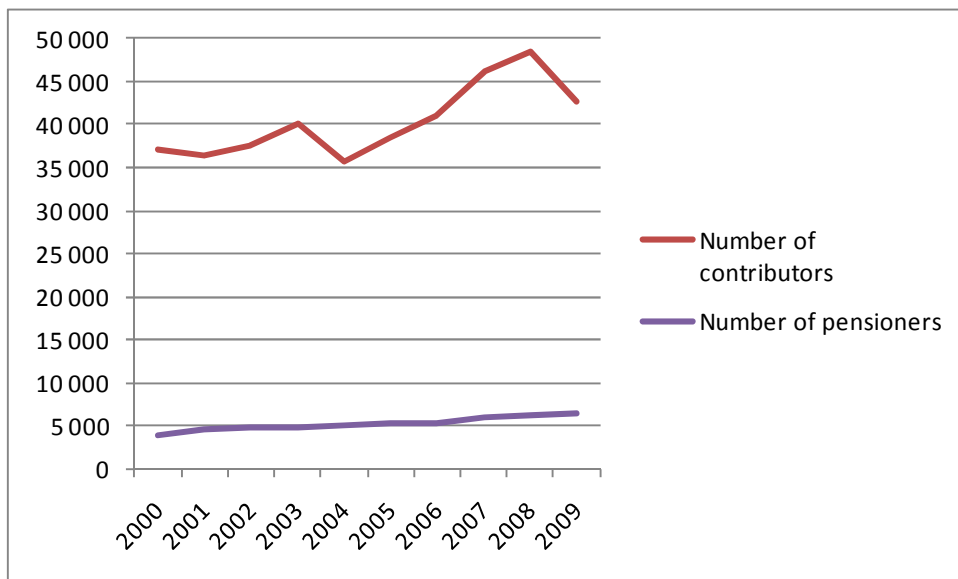
Figure 1.6.   Ratio of the number of contributors to the number of pensioners, 1991-2009
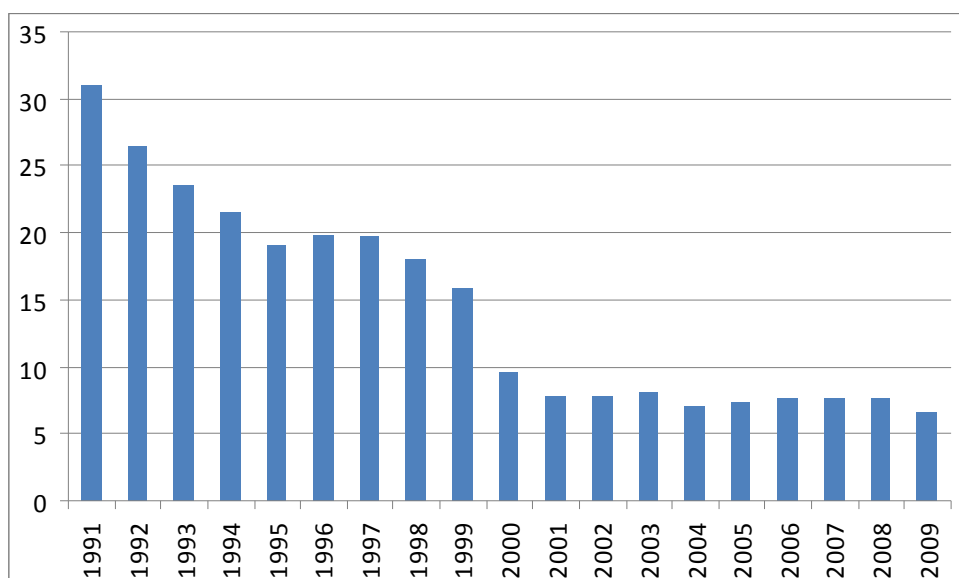
1.3.   Financial experience since the 8th actuarial review of 2006

Table 1.2 shows the statements of account for the period from 2006 to 2009. In each of these years, income exceeded expenditures.

Table 1.2.   Statements of account, 2006-2009 (EC$)

	2006	2007	2008	2009
Total income	**82 119 017**	**74 717 074**	**87 257 527**	**85 417 098**
Contributions received	44 630 449	44 722 639	53 683 634	49 980 541
Investment Income	25 386 799	29 452 538	32 540 926	34 771 350
Other income	333 265	370 724	531 622	665 207
Gain on sale of land	11 768 504	171 173	501 345	-
Total expenditures	**30 747 619**	**34 722 215**	**37 734 221**	**49 594 712**
Benefits paid	24 566 879	28 485 198	31 203 190	33 297 941
General and administrative costs	6 180 740	6 237 017	6 531 031	6 636 672
Other expenses	-	-	-	9 660 099
Surplus	**51 371 398**	**39 994 859**	**49 523 306**	**35 822 386**
Assets at yearend	**524 203 286**	**562 857 019**	**626 357 131**	**662 014 060**

Source: NIS annual reports.

According to the statements of account, contribution income increased by 4 per cent between 2006 and 2009, while for the same period, total expenditures increased by 61 per cent. The low rate of increase in income is mainly due to the global economic crisis where, for the year 2009, the number of people who contributed to the scheme dropped by 12 per cent compared to 2008. On the expenditures side, the increase was in part driven by the item "Other expenses" which represents the write-off of the investment held in British American Insurance Co. Ltd. During this period, benefits increased by 36 per cent and administrative costs by 7 per cent. Increases in benefits were mainly due to the increase in the number of pensioners by 22 per cent.

1.4 Projections in the 8th actuarial review compared with actual figures

Table 1.3. Eighth actuarial valuation, comparison of projections with actual figures, 2007, 2008 and 2009 (percentages)

	2007	2008	2009	Average
Ratio of total expenses to total earnings				
Projected	6.8	6.9	6.9	6.9
Actual	7.0	6.3	7.2	6.8
Ratio of benefit expenses to total earnings				
Projected	5.6	5.7	5.8	5.7
Actual	5.7	5.2	6.0	5.7
Ratio of administrative costs to total earnings				
Projected	1.2	1.2	1.2	1.2
Actual	1.3	1.1	1.2	1.2
Reserve ratio				
Projected	16.3	15.8	15.4	15.8
Actual	16.2	16.6	166	16.4

Sources: NIS annual reports; authors' calculations. Differences are due to rounding.

The comparison in table 1.3 shows that, on average, the real experience is in line with the expected experience. During the three years shown, the ratio of total expenses to total earnings was 6.8 per cent compared to an expectation of 6.9 per cent. The RER over the period observed was higher than that projected in the last actuarial valuation.

Table 1.4 presents a picture of the main factors explaining the differences between the experience of the last three years and the projections in the 2006 actuarial valuation. The average annual increase in the level of contributions was 3.8 per cent, less than the projected increase of 5.9 per cent. Both the growth in the number of contributors and the evolution of the average salary explain the difference. The average annual increase in benefits paid was 10.7 per cent compared to the projected increase of 11.3 per cent. The number of long-term pensioners has increased more than expected, with an annual growth of 6.8 per cent compared to a projected increase of 3.5 per cent. Table 1.4 also shows that inflation was higher than the assumption used in the previous actuarial valuation. A higher nominal annual return on investment compared to the expectation was obtained on a nominal basis. However, after taking into account the effect of inflation, the real return on assets was lower than projected, 2.0[6] compared to 2.2 per cent.

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[6] The loss of $9,660,099 in the write-off of British American Insurance Co. Ltd is considered as an investment loss.

Table 1.4. **Eighth actuarial valuation, comparison of projections with actual figures, 2006 to 2009, selected indicators, average annual variation (percentages)**

	Nominal	Real
Annual average increase in contributions		
Projected	5.9	3.1
Actual	3.8	0.0
Annual average growth in the insured population		
Projected	2.3	n.a
Actual	1.5	n.a
Annual average increase in salary		
Projected	3.5	0.7
Actual	2.3	-1.4
Annual average increase in total benefits paid		
Projected	11.3	8.4
Actual	10.7	6.6
Annual average increase in the number of pensioners		
Projected	3.5	n.a
Actual	6.8	n.a
Annual average inflation rate		
Projected	2.8	n.a
Actual	3.8	n.a
Annual real return on assets		
Projected	5.0	2.2
Actual	5.9	2.0
n.a.= not applicable.		

Internal accounting procedures at the NIS separate finances into three branches (long-term benefits, short-term benefits and employment injury benefits). It is a very good monitoring approach, since these three branches have different characteristics (frequency, severity, duration of payment) and financing mechanisms. Contributions for each branch are allocated according to a stated proportion, investment income is allocated on the ratio of the reserves at the beginning of the year and general and administrative expenses are allocated in proportion to the sum of contributions and benefits.

Table 1.5 shows the PAYG rates for each branch of benefits. For short-term benefits and employment injury benefits, the rates are very stable over the period and are in line with the last actuarial recommendations. Long-term benefits rates are more variable, with an upward tendency. This actuarial analysis will put more emphasis on the long-term benefits branch.

Table 1.5.   **PAYG contribution rates by branch, 2006–2009, percentage of total insurable earnings**

Branch	2006	2007	2008	2009	Recommended rates of the last actuarial valuation
Long-term	5.0	5.6	5.1	5.9	7.4
Short-term	0.9	1.1	1.1	1.1	1.3
Employment injury	0.2	0.2	0.2	0.2	0.3
Total	6.2	7.0	6.3	7.2	9.0

Table 1.6 shows the levels of reserves by branch and the corresponding RER. As in the last actuarial valuation, money from the short-term benefits and employment injury benefits branches could be reallocated to the long-term benefits branch. It is suggested to transfer EC$70 million and $40 million respectively from the employment injury and short-term benefits branches to the long-term benefits branch. An analysis of the actual figures shows that the recommended rates for short-term and employment injury benefits are still adequate considering the modifications that come into force in 2010 (see section 1.1).

Table 1.6.   **Reserves and reserve-to-expenditure ratio (RER) by branch, 2006 and 2009**

Branch	Reserves ($000 000)		Reserve- to-expenditure ratio		Suggested target'
	2006	2009	2006	2009	
Long-term	511.72	536.5	20.6	16.5	See section 1.7
Short-term	6.0	51.1	1.3	8.1	1.0
Employment injury	5.1	73.8	4.2	71.0	2.0
Total	522.8	661.5	17.0	16.6	n. a.

n.a.= not applicable.

Notes: [1] For short-term and employment injury benefits the levels are those suggested in the last actuarial review.

[2] The level of reserves in 2006 includes a transfer of $35 million from short-term benefits to long-term benefits and of $45 million from employment injury benefits to long-term benefits.

1.5.   Analysis of the performance and system design

Key indicators that have been described in the two preceding actuarial valuations are reproduced in this section. Trends are normal and in line with expectations (see table 1.7). Attention should be given to the decreasing trend in the three-year average real return on the reserve.

Table 1.7.   **National Insurance performance indicators, 2002, 2006 and 2009**

	2002	2006	2009	Comments
Statutory contribution rate (%)	9.0	9.0	9.0	No change since EI benefits added in 1998
PAYG rate (%)	3.6	6.2	7.2	Gradual increase as expected, approaching the statutory contribution rate
Reserve-to-expenditure ratio	16.3	17.1	16.6	Quite stable
Benefits as % of GDP	1.7	2.0	2.4	Gradual increase as expected
Reserves as % of GDP	35	42	48	Reserves growing at a faster rate than the economy
3-year average real yield on reserves, net of inflation (%)	5.5	5.0	2.0	Decreasing trends
Administrative expenses as % of insurable wages	1.2	1.2	1.2	Stable
No. of contributors per pensioner	7.8	7.7	6.6	The decrease in 2009 is due to the economic crisis
Average pension as % of average insurable wage	34	43	45	Increasing as scheme becomes more mature

Table 1.8 discloses the results of an analysis of the trends of key design parameters. For the total employed population, the coverage rate is very good, but for self-employed persons it is very low, even if contributions have been mandatory for them since 2007. The current economic crisis will probably not help in attracting self-employed persons in the next few years.

Table 1.8.   Assessment of key design parameters, 2002, 2006 and 2009

Policy	Measured by	2002	2006	2009	Comments
Level of insurance coverage	Ratio of ceiling to average insurable wage	2.6	2.3	2.1	Downward trend Ceiling will increase as of 2010
Minimum floor of income protection	Minimum old-age pension as % of average insurable wage	0.12	0.13	0.14	Low
	Minimum old-age pension as % of poverty line[1]	0.61	0.63	0.40	Low
Replacement rate for new pensioners (%)	(Average weeks of service at age 60 - 500)/52 x 1% + 30%	n.a	38	40	Increasing but low if people have no other sources of revenue
Coverage for all employed persons	% of employed persons contributing	> 90	> 90	> 85[2]	Very good
	% of self-employed persons contributing[3]	n.a.	≈ 5	≈ 15	Low
Investment diversification [4]	% of assets held in government securities	25	19	17	Acceptable
	% of assets held in short-term deposits	30	24	31	Slightly high
	% of assets held locally	89	89	91	High

n.a.= not available.
≈ = approximately.
Notes: 'The poverty line for the year 2008 is $5,842. The information comes from Caribbean Development Bank: *Country poverty assessment: Grenada, Carriacou and Petite Martinique,* Final report, main report (2007/2008). Figures for the year 2002 and 2006 come from the previous actuarial report.
[2] The decrease in 2009 is due to the economic crisis.
[3] Based on a population of 5,000 self-employed persons.
[4] Information for the year 2009 comes from the May 2010 financial statements.

The low minimum floor of income protection and the low replacement rates for new pensioners raise some questions concerning the adequacy of protection at retirement. In 2009, there were about 13,500 people aged 60 or over in Grenada. An old-age pension was paid to 4,933 people. Although some are still active after age 60 (according to the information we have, we can estimate this number at 2,500), a large number (64 per cent) of elderly people are not receiving a lifetime pension. Although this proportion might decrease in future because the scheme is not yet mature (27 years of existence), there is a risk that a large part of the population will receive no old-age benefits. Only those who have worked and meet the eligibility condition (contributions during 500 weeks) can receive an old-age pension.

In 2009, the average old-age pension was $5,800 (3,498 pensioners) and the average Provident Fund benefit was $1,700 (1,435 pensioners). According to the final report on the country poverty assessment for Grenada, Carriacou and Petite Martinique (Caribbean Development Bank, 2007/2008), the adult poverty line was $5,842 in 2008. For old-age pensioners then, the average pension is close to the level of the poverty line, which is itself very low. As the scheme continues to mature, the average pension should increase in comparison with the poverty line. However, factors such as high unemployment rates and low density of contributions (2/3 on average in 2009) are indicators that the average

pension could stay low in the future and well under the maximum pension payable. The NIS pension is the only revenue at retirement for most people in Grenada.

According to the final report on the country poverty assessment of Grenada, Carriacou and Petite Martinique, 16 per cent of the elderly population is poor. There is a way to reduce poverty among older people, by providing a universal pension to all those over a certain age (between 60 and 65). People would receive income at retirement from two sources: a basic amount of pension and a pension based on labour activities (the NIS). This universal pension would also be a way of diversifying the risk to individuals, since the total amount of pension would no longer be tied only to the labour force eligibility conditions, but also to a universal criterion of residence. This kind of universal pension would also reduce the impact of a low retirement pension due to unemployment periods during one's career, which is a problem in Grenada. The implementation of such a universal pension is beyond the scope of this actuarial valuation; however, it is believed that such a pension should be considered in the global analysis of Grenada's social security system. Figure 1.7 shows the cost of providing a universal benefit to all people aged 65 and older. As an example, the amount of this benefit is set at two-thirds of the adult poverty line. The annual amount is assumed to increase by the amount of inflation each year.

Figure 1.7. Universal benefit for people aged 65 and over, two-thirds of the poverty line, cost in relation to GDP (percentages)
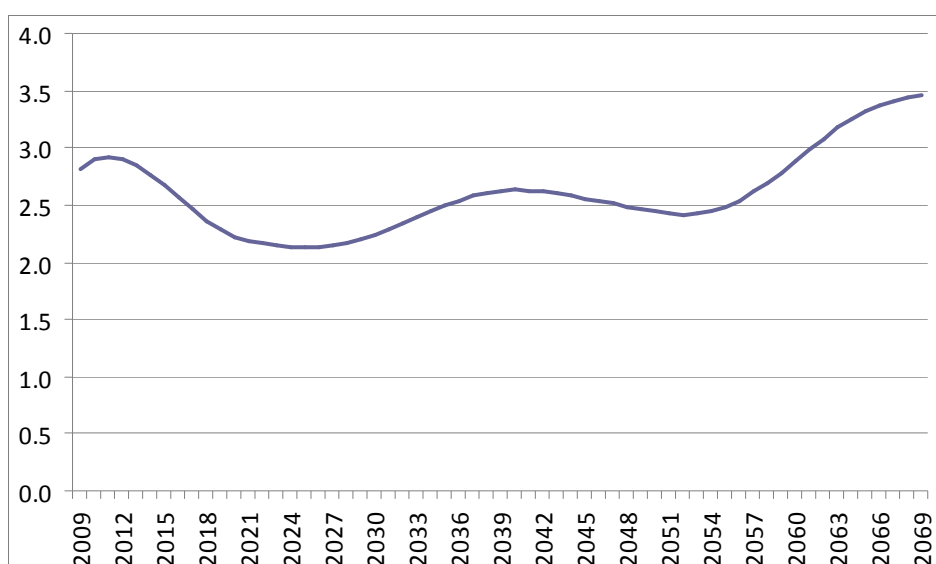
1.6. Investment performance

1.6.1. Description of the assets and investment portfolio

As of 31 December 2009, the total assets of the NIS on the balance sheet represent an amount of $662.0 million (see table 1.9). The assets can be divided into two main components:

1. Investment portfolio, which represent 95.0 per cent of the total assets, and is composed principally of government securities (16.4%), fixed deposits (29.7%), loans (26.6%), bonds (9.4%), equities (9.8%), and real estate (3.0%).

2. Other assets, which represent 5.0 per cent of the total, are composed of cash and bank balances (0.2%), accounts receivable and prepaid expenses (0.9%), interest receivable and property (2.9%), plant and equipment (1.1%) and other assets.

As of 31 December 2009, there is a total liability of $0.5 million, so that total available assets are $661.5 million.

Table 1.9.   National Insurance Fund asset values at the end of 2006 and 2009

	December 2009		December 2006	
	$millions	%	$millions	%
A) Financial investments	628.7	95.0	504.6	96.3
Government securities	108.8	16.4	94.0	17.9
Fixed deposits & FPDAs	196.7	29.7	120.2	22.9
Originated loans	176.2	26.6	186.5	35.6
Bonds	61.9	9.4	63.7	12.2
Equities	65.0	9.8	33.5	6.4
Real estate	20.0	3.0	6.6	1.3
B) Cash and bank balances	1.4	0.2	1.7	0.3
C) Accounts receivable and prepaid expenses	5.7	0.9	0.6	0.1
D) Interest receivable	18.9	2.9	9.5	1.8
E) Property, plant and equipment	7.3	1.1	7.8	1.5
F) Total assets (A + B + C + D + E)	662.0	100.0	524.2	100.0
G) Liabilities	0.5		1.4	
H) Net assets available (F-G)	661.5		522.8	

Source: NIS, Annual reports.

Over the last ten years, the average return on the total assets has been 7.0 per cent (see figure 1.8). Excluding the effects of inflation, the real average return on assets was 4.0 per cent. This performance is higher than the assumptions used in the last two actuarial valuations and will be taken into account in the analysis of the investment return assumption.

Figure 1.8.   Returns on total assets, 2000-2009 (percentages)
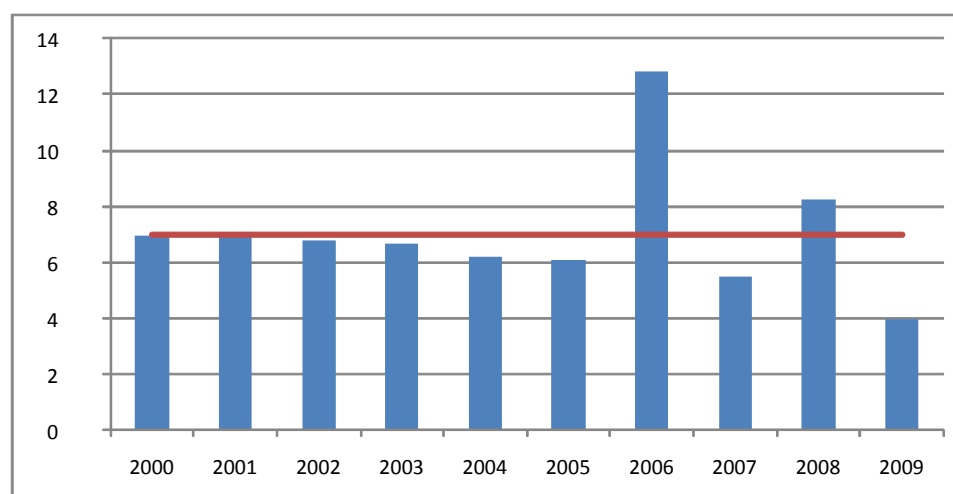
Sources: Annual reports; authors' calculations.

Note: The year 2006 includes an unrealized gain on equity and a gain on sale of development land. For the year 2009, the loss of $9,660,099 in the British American Insurance Co. Ltd is considered as an investment loss.

The following section focuses on further elements concerning the structure of the investment policy and the rate of return on assets.

1.7. Financial system

The social security code stipulates that contribution rates must be fixed, so that the total income makes it possible to cover the technical expenses as well as part of the administrative costs. Furthermore, a specified reserve amount should be constituted as a way of diversifying the risk, of cushioning the impact of economic downturn and of increasing equity among generations of contributors. However, there are different factors that will affect the achievement of this goal:

1. The natural increase in the level of expenditures over a long period. This is especially true for a non-mature scheme such as the NIS in which increasing numbers of pensions will be paid.

2. The desire for a stable contribution rate (making it more likely that employees and employers will remain confident in the scheme) and for a rate that will not become a burden on the people who contribute to it.

3. The duration of the equilibrium period (the period where the contribution rate and the investment income are enough to pay the expenditure of the scheme) and the amount (level) of reserve that will be attained throughout this period.

4. There are currently no formal financing objectives for the NIS. Thus, the following questions cannot be answered: For which period should the contribution rate be adequate? What is the desired level of reserve-to-expenditure ratio or funding? Is a stable contribution rate desirable to maintain equity among generations? What happens if experience is worse than expected? Who shares the risks of the scheme?

Some countries have begun to be aware of these issues and to include in their financial strategy some explicit financing objectives. Some are also trying to put in place automatic adjustment provisions to take into account demographic or economic changes.

One way of dealing with financing problems is to put in place a funding policy. In the pension planning there is growing interest in such policies, as many major pension plans already have one in place. A funding policy is a useful tool to:

1) formalize the long-term funding objectives of the scheme;

2) better understand the risks and advantages of financing options;

3) ensure that plan assets are sufficient to deliver the promised benefits; and

4) enhance corporate governance by increasing transparency.

Funding rules must address the interests of stakeholders:

1) plan participants and former participants, as beneficiaries of the system and often as contributors to its financing;

2) employers, as one of the parties bearing responsibility for financing the pension system; and

3) the general public and the government.

The funding policy would specify:

1) contribution rates

2) risks faced by the scheme and how these risks can be managed

3) risk tolerance

4) allocation of risks between participants and employers

5) funding objectives (such as contribution stability or improving the RER)

6) frequency of actuarial valuation and the method of actuarial projection

7) funding method

8) goals related to intergenerational equity

9) all other funding issues

We suggest that the NIS hold discussions with stakeholders on the possibility of implementing an explicit written funding policy. Such a policy should be well-thought-out and periodically reviewed. For this actuarial valuation, we present results in the same way as in the previous actuarial valuation.

Appendix III describes the basic concepts behind the funding of social insurance.

2. Projections of the general population and of the economy

2.1. Population projection

Future NIS income and expenditures 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. To improve the projections of the future NIS finances, projections of Grenada's total population and economic activity are required.

Population projection is the basis for an estimation 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 income will be. Since these factors are interrelated, population and economic projections are performed together to ensure that consistent assumptions have been used. For this review, 60-year projections of the population, the economy and the NIS finances have been performed.

Given the significant uncertainty inherent in forecasting such a long period, sensitivity analysis will be done on the projection of population to capture the effect on the future financial position of the scheme. Further details may be found in Appendix II.

2.1.1. Demographic assumptions

The 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 Grenada and is the most difficult assumption to make in this kind of projection.

The last official population census occurred in 2001. At that moment there were 102,598 persons in Grenada. For the year 2009, the population estimation of the Central Statistical Office is used. According to this source of information, there are 108,887 persons in Grenada in 2009, an increase of 6,289 persons since the last census.

The total fertility rate (TFR) represents the average number of children each woman would have between age 15 and 49. If there is no migration, a TFR of 2.1 is required for each generation to replace itself. In 2009, Grenada's TFR is estimated at 2.2, a continuing decrease since 1991 and 2001 where its level was 3.4 and 2.6 respectively. It is expected for the projection that the TFR will reach 1.85 in 2035 and stay constant thereafter. This is the same assumption as the one used by the United Nations for their projection.

Life expectancy at birth in 2009 has been estimated at 70.6 for males and 76.3 for females and is in line with the information published in the Vital Statistics Reports (2000–2006). For these projections, improvements in mortality are assumed to occur in accordance with UN estimates. With these assumptions, life expectancy at birth in 2069 is estimated to be 79.2 for males and 83.5 for females. A more important figure for a scheme like the NIS is life expectancy at the moment old-age pensions begin. Life expectancy at age 60 is projected to increase over the projection period from 19.9 to 24.8 years and from 22.9 to 26.1 years for males and females, respectively.

Since no new information has been released since the last actuarial valuation concerning migration, the same assumption as that used in that valuation is used in this valuation. The

net migration rate is –0.6 per cent at the beginning of the projection period, decreasing to –0.2 per cent ultimately (2026).

2.1.2. Results of the population projection

Figures 2.1 and 2.2 and table 2.1 show the expected evolution of the population of Grenada over the next 60 years. The changes in the relative size of each age group — 0-14 years old, 15-59, and 60 and over — are a direct result of reductions in birth rates, improvements in longevity and the migration of mainly working-age persons.

Figure 2.1.   Projected population distribution, 2009-2069
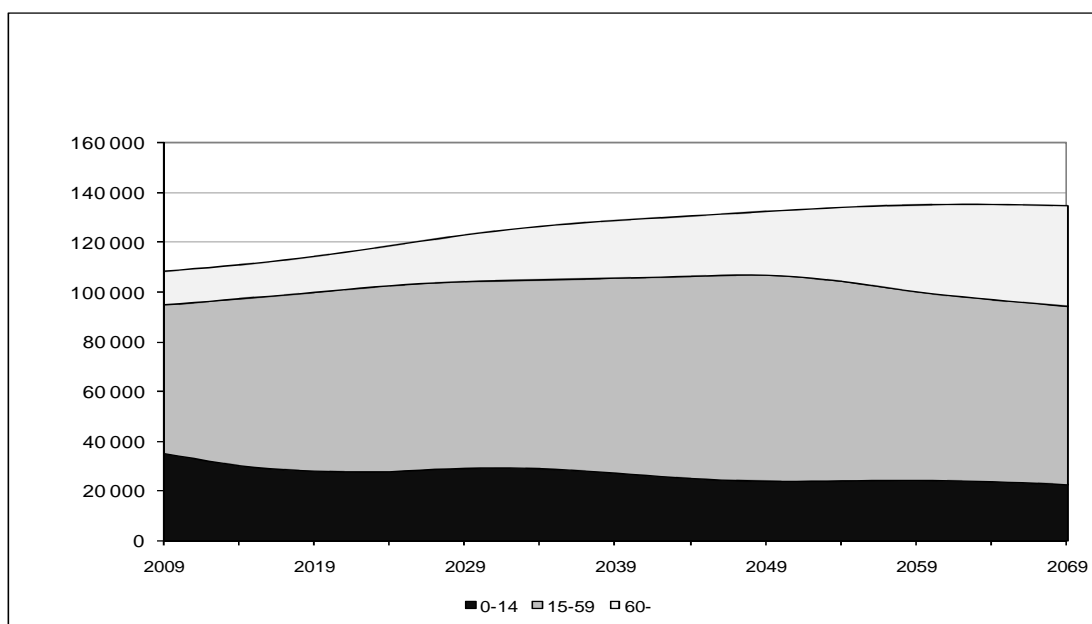
Figure 2.2.   Population pyramids, 2009-2069
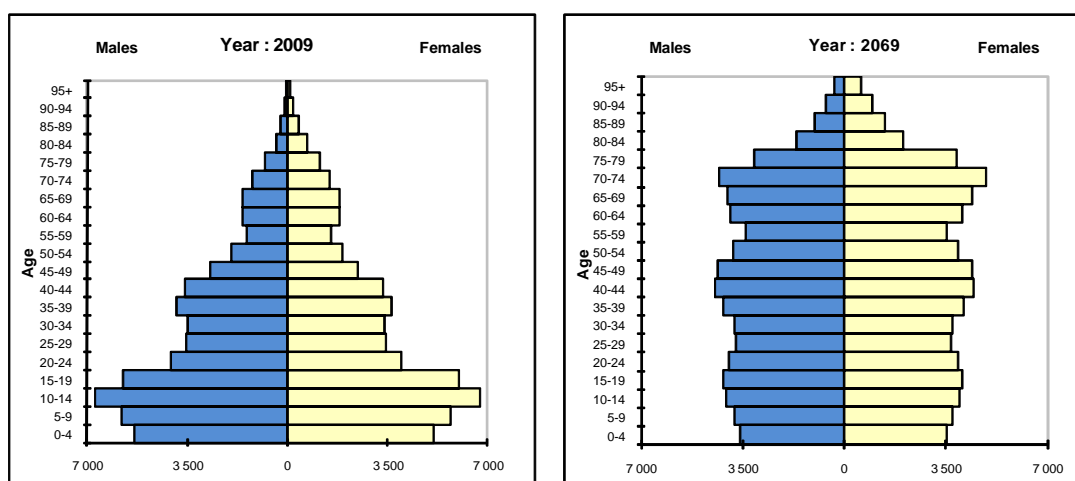
Table 2.1. Population and dependency ratio, 2009-2069

Year	Total	0-14	15-59	60+	Ratio 15-59 / 60+
	Age				
2009	108 887	35 393	60 056	13 438	4.5
2010	109 323	34 384	61 431	13 508	4.5
2011	109 867	33 401	62 937	13 529	4.7
2012	110 276	32 253	64 493	13 530	4.8
2013	110904	31 376	65 981	13 547	4.9
2014	111445	30 521	67 324	13 601	5.0
2019	114 784	28 335	72 069	14 380	5.0
2024	119 015	28 036	75 030	15 949	4.7
2029	123 352	29 403	75 303	18 646	4.0
2034	126772	29 294	76 103	21 375	3.6
2039	129 135	27 475	78 613	23 046	3.4
2044	130 970	25 327	81 506	24 138	3.4
2049	132 757	24 272	82 992	25 494	3.3
'1054	134 366	24 356	80 441	29 568	2.7
2059	135 374	24 569	76 006	34 798	2.2
2064	135 562	24 024	73 457	38 080	1.9
2069	135 015	22 799	71 970	40 246	1.8

Highlights of the population projection are:

1.   Average annual growth of the population over the projection period is 0.4 per cent.

2.   The total population will increase to reach 135,590 in 2063 and will then begin to decrease gradually.

3.   The number of people aged 15-65 (the working-age population) will begin to decrease in 2054.

4.   At the end of the projection period, the number of births and number of deaths are almost equal.

5.   In 2009, there are 4.5 persons aged 15-59 for each person aged 60 and over. Sixty years later, this ratio drops to 1.8.

6.   The average age of the population is 29 years old in 2009 and will increase to 42 in 2060.

7.   The dependency ratio increases at the beginning of the projection period due to a high number of young people entering the labour market on reaching age 15.

2.2. Economic assumptions

The Grenadian economy contracted by 7.7 per cent in 2009, mainly owing to the global crisis. The tourism and construction sectors have been considerably damaged by the crisis, as has direct investment from foreigners. For the NIS, the impact has been an important decrease of 11.7 per cent in the number of contributors. For the future, the performance of

the economy will continue to have a major impact on the experience of the NIS. The economic projections for this report assume in the long term a stable and positive economic growth and labour productivity in all years. In the short and medium term, however, it is expected that the economy will recover slowly from the crisis. We make the assumption that it will take ten years before all the jobs lost due to the crisis will be completely recovered.

It is important to bear in mind that the last labour force survey in Grenada took place in 1999. This means that for the time being no updated picture of the labour market exists. The labour projection is consequently not based on robust data. However, we believe that this should not have a material effect on the results of the actuarial valuation, since trends are more important than absolute numbers. Our projection is reasonable in the context of an ageing society such as Grenada. The ratio of the labour force compared to the number of people of working age (15-69) will increase from 72 to 75 per cent during the first 15 years of projection and stay at that level for about 30 years. However, in the long run, because of the ageing process, this ratio will begin to decrease. The increasing rarity of the workforce will push down the unemployment rate during the whole projection period. Table 2.2 shows the result of the projection.

Table 2.2.   Projection of the labour force and the employed population, 2009-2069

Population	2009	2019	2029	2039	2049	2059	2069
Male	108 887	114 784	123 352	129 135	132 757	135 374	135 015
Female	54 151	56 975	61 230	64 045	65 650	66 715	66 332
Working-age population (15-69)	66 817	78 111	85304	89 625	93 302	94 593	88 426
Male	33 511	39 108	42 629	44 552	46 238	46 688	43 811
Female	33 306	39 003	42 676	45 074	47 064	47 905	44 615
Labour force	48 039	58 077	64 309	66 769	70 461	68 140	63 376
Male	24 806	29 717	32 729	33 848	35 647	34 517	32 126
Female	23 233	28 360	31 580	32 921	34 814	33 623	31 250
Employed (total)	36 645	48 085	54 088	57 190	62 545	61 929	58 990
Male	19 674	25 581	28 486	29 792	32 299	31 884	30 262
Female	16 971	22 503	25 602	27 398	30 247	30 045	28 727
Unemployed	11 394	9 992	10 221	9 579	7 916	6 211	4 386
Male	5 132	4 136	4 244	4 056	3 349	2 632	1 864
Female	6 262	5 857	5 977	5 523	4 567	3 578	2 522
Labour participation rate (15-69)	71.9	74.4	75.4	74.5	75.5	72.0	71.7
Unemployment rate (%)	23.7	17.2	15.9	14.3	11.2	9.1	6.9

Figure 2.3 indicates the growth rates of the principal macroeconomic indicators used in the projection. The main assumption used to calculate these growth rates is the unemployment rate. It is assumed that all the jobs lost during the financial crisis will be recovered in ten years. In other words, the unemployment rate will gradually return, over a period of ten years, to its level before the crisis. This creates a higher growth rate of the employed population during the first ten years, converging close to the labour force growth rate after that. The real GDP growth rate is affected by the productivity increase (ultimate assumption of 1 per cent) and the growth of the employed population. Inflation has been assumed at 3.2 per cent per annum during the first year, dropping to 2.75 per cent in 2013 and thereafter. Further details may be found in Appendix II.

Figure 2.3.   Growth rates of GDP, employment, productivity and labour force, 2009-2069 (percentages)
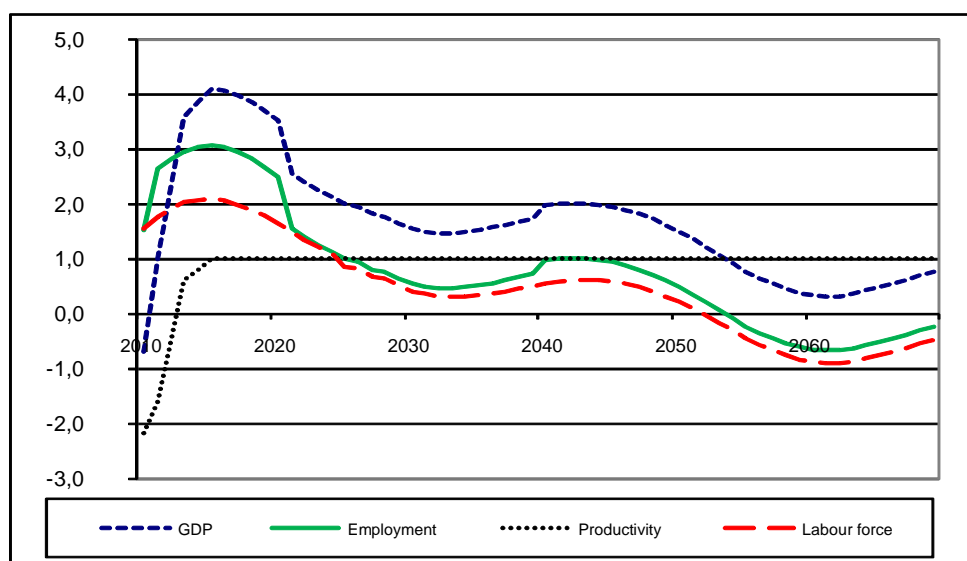
3. Demographic and financial projections

This valuation deals with the ability of the social security scheme to meet its future obligations at the time they fall due. This is done under an open-group approach. It is assumed that workers will continue to be insured with the NIS indefinitely, thus paying contributions and accruing benefit entitlements, and later receiving benefits in accordance with the current practice of the NIS. Future contributions and benefits are calculated according to the demographic and economic assumptions presented in Chapter 2 and on the basis of the database and scheme-specific assumptions presented in Appendix II.

This review deals with expenditures and income. Long-term benefits will attain a mature state only after the youngest people of the first generation of contributors have become pensioners, have died and all survivors' pensions paid on their behalf have ceased. This requires that the situation of the scheme be analysed over a period that is long enough. For the current valuation, the projection period is 60 years, from 2009 to 2069.

The general methodology of the valuation is described in Appendix IV. For the present actuarial valuation, a basic scenario was produced based on best-estimate assumptions. Also, additional scenarios were produced to better understand major factors that have an impact on the financial soundness of the NIS and to assess uncertainties concerning possible modifications to the scheme that could be part of a future potential reform of pensions.

The main purpose of the valuation is to find out whether the financing of the NIS is on course over the long term, and not to exactly forecast numerical values. Due to the long-term nature of assumptions, absolute figures include a high degree of uncertainty. Therefore, results have to be interpreted carefully and future actuarial reviews will have to be undertaken on a regular basis to revise actuarial assumptions in light of the actual experience of the scheme.

3.1. Results of the projection for the basic scenario

3.1.1. Demographic projections

Demographic projections are shown in table 3.1. The projection of the demographic ratios for old-age, invalidity and survivors' benefits is also shown in figure 3.1 to better demonstrate trends in the evolution of this indicator. The demographic ratio is the ratio of pensioners to active participants. The total number of contributors follows a rate of growth derived from the projection of the general population, labour force and employed population, as described in the preceding chapter. The number of pensioners grows rapidly during the projection period. This is due to the fact that the scheme, which started in 1983, is not yet mature. As a result, the ratio of pensioners to contributors (demographic ratio) grows from 14.4 to 75.6 per cent by 2069. The same conclusion can be drawn from figure 3.1, showing that the scheme will become more mature over the next 60 years. Toward the end of the projection period, the old-age benefits demographic ratio becomes more stable as the scheme enters into a more mature stage. The ratio of pensioners to contributors is normally a good indicator of the increasing cost of the scheme. This directly affects the PAYG cost of the scheme, as presented in the next section.

Table 3.1.   Demographic projections, 2009-2069

| Year | No. of contributors | No. of pensioners | | | | | Total no. of pensioners | Ratio of pensioners to contributors (%) |
		Age	Invalidity	Survivors'	Provident Fund	Death & disablement		
2009	42 740	3 410	426	952	1 365	17	6170	14.4
2010	43 521	3 702	456	1 079	1 337	20	6 593	15.1
2011	44 891	3 946	470	1 248	1 260	22	6 946	15.5
2012	46 474	4 213	488	1 415	1 184	23	7 324	15.8
2013	48 230	4 515	510	1 577	1 109	25	7 736	16.0
2014	50 116	4 822	534	1 730	1 034	26	8147	16.3
2015	52 081	5 152	560	1 875	961	28	8 576	16.5
2019	59 717	7 126	676	2 391	686	35	10 914	18.3
2029	64 683	12 354	1 015	3 743	208	53	17 372	26.9
2039	66 383	18 031	1 485	5 067	30	75	24 688	37.2
2049	75 564	28 092	2018	6 081	4	97	36 293	48.0
2059	71 478	38 606	2 220	7 181	3	110	48120	67.3
2069	67 999	40 982	2 148	8 152	3	113	51399	75.6

Figure 3.1.   Demographic ratios by benefit type, 2010-2065 (percentages)
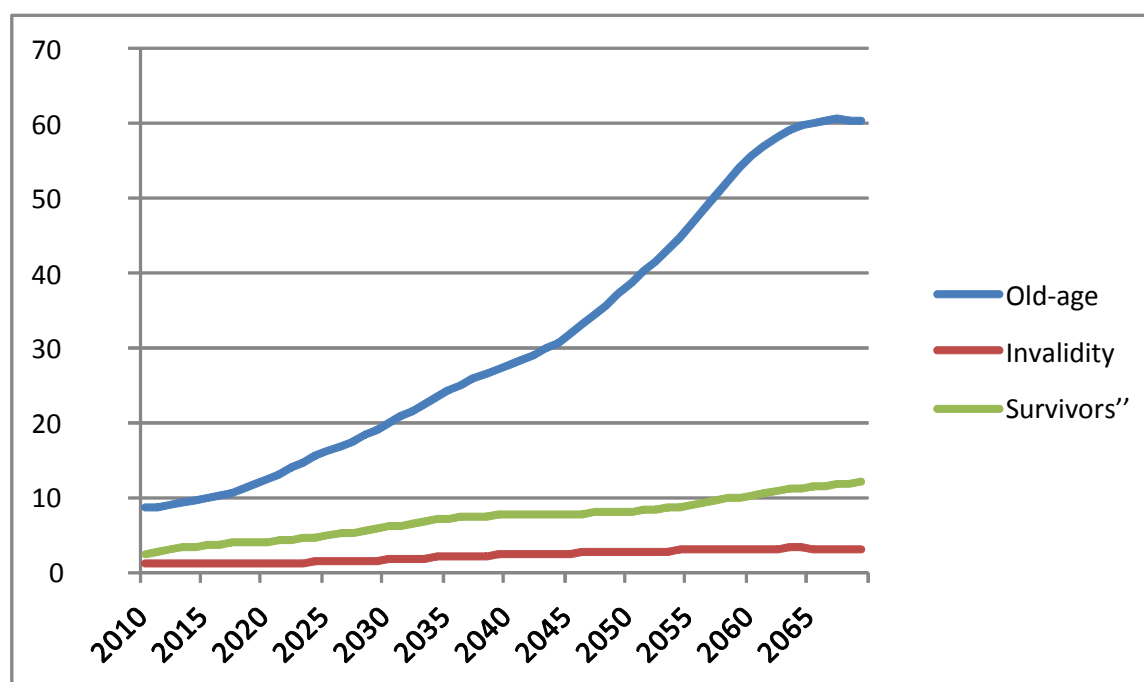
3.1.2. Financial projections

Table 3.2 shows the breakdown of benefits paid throughout the projection period.

It can be seen that the total expenditures as a percentage of insurable earnings, which is called the PAYG rate, rises from 7.2 per cent in 2009 to 37.1 per cent in 2069. This is also

shown in figure 3.3. The PAYG rate represents the contribution rate that would be required to pay all the expenditures of the scheme (benefits, administrative and other expenses), year after year, in the absence of a reserve. This high increase of the PAYG rate is mainly due to the increase in the demographic ratio, as explained in the previous section. In fact, there are increasing numbers of pensioners receiving benefits, while the number of contributors does not grow as fast.

Figure 3.2 shows the evolution of the replacement ratio by benefit type. This ratio is defined as the average pension of pensioners over the average salary of active members. The trend is upward, due to the maturing process of the scheme. The following elements are observed:

1. The old-age replacement ratio increases for the first 13 years of the projection period. Current new old-age pensioners have about 27 years of working life and in 13 years will be part of the first generation who will have been able to participate in the scheme for their complete working life of 40 years (from 20 years to 60 years of age). After that, the replacement rate oscillates around 50 per cent. The density factors, which vary by age, are mainly responsible for this slight oscillation.

2. The upward trend in the invalidity replacement rate at the beginning of the projection period is due to the fact that, since the insured population is ageing, new invalids will be older than those of previous years.

3. The old-age replacement ratio decreases toward the end of the projection period. This is a sign that the scheme is becoming mature. Since pensions are indexed to inflation, and salaries increase with inflation and productivity, a decrease in the replacement ratio is observed. The same phenomenon is observed with the invalidity replacement ratio.

4. The survivors' replacement ratio moves upward throughout the projection period. As time goes by, there are increasing numbers of widows compared to the number of orphans, giving the illusion of an increasing average pension. It is important to bear in mind that, on average, orphans' pensions are lower than the ones paid to widows and they are paid for a shorter period.

Table 3.2.   Financial projections: Breakdown of benefits, 2009-2069

Year	Pensions, grants, benefits and administrative expenses							Expenditures as a % of
	Age	Invalidity	Survivors	Provident Fund	Short- term	Empl. injury	Admin. expenses	Insurable wages
2009	21.0	1.9	2.1	2.4	5.3	0.6	6.6	7.2
2010	24.2	2.1	2.4	2.6	5.7	0.6	7.1	7.6
2011	27.2	2.3	3.0	2.5	6.3	0.7	7.7	7.7
2012	30.7	2.6	3.7	2.5	7.0	0.9	8.5	7.9
2013	34.7	2.9	4.4	2.4	7.6	1.1	9.1	8.2
2014	38.9	3.2	5.1	2.3	8.4	1.2	9.9	8.4
2015	43.6	3.6	6.0	2.2	9.2	1.4	10.7	8.6
2019	70.9	5.5	9.8	1.7	12.9	2.5	14.3	9.9
2029	179.0	13.1	25.7	0.7	21.8	4.6	23.3	13.8
2039	372.0	28.5	55.3	0.1	33.5	7.7	34.8	18.3
2049	876.2	59.0	105.4	0.0	54.2	13.1	55.7	25.1
2059	1 784.0	94.5	187.1	0.0	77.3	19.7	77.1	34.8
2069	2651.3	126.4	310.9	0.0	110.8	28.6	108.0	37.1

Figure 3.2.   Replacement ratios by benefit type, 2010-2065 (percentages)
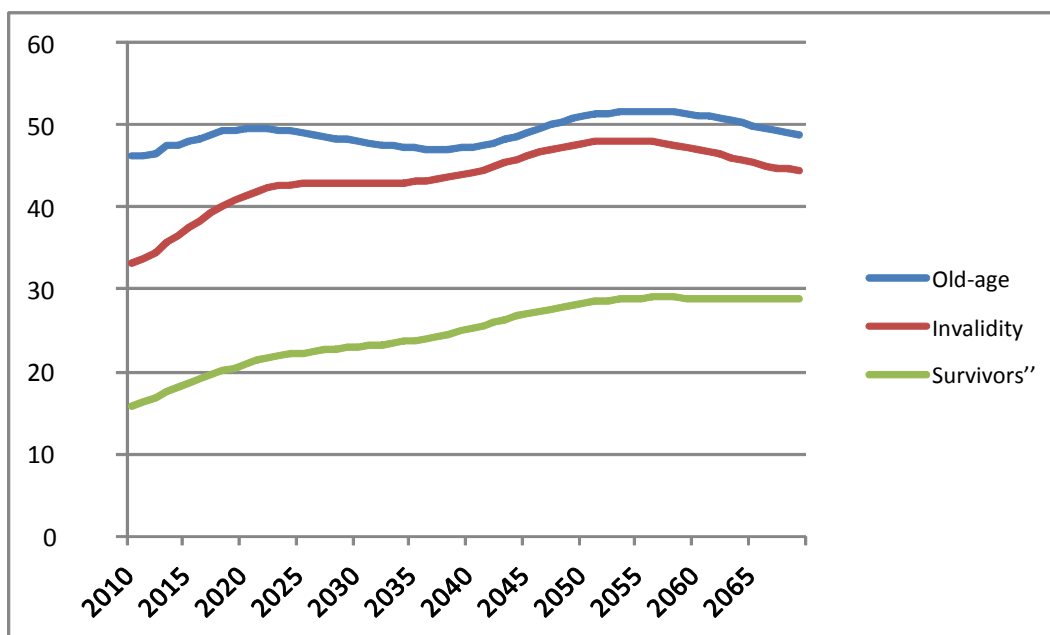
Figure 3.3.   Projected PAYG rates, 2009-2069 (percentages)
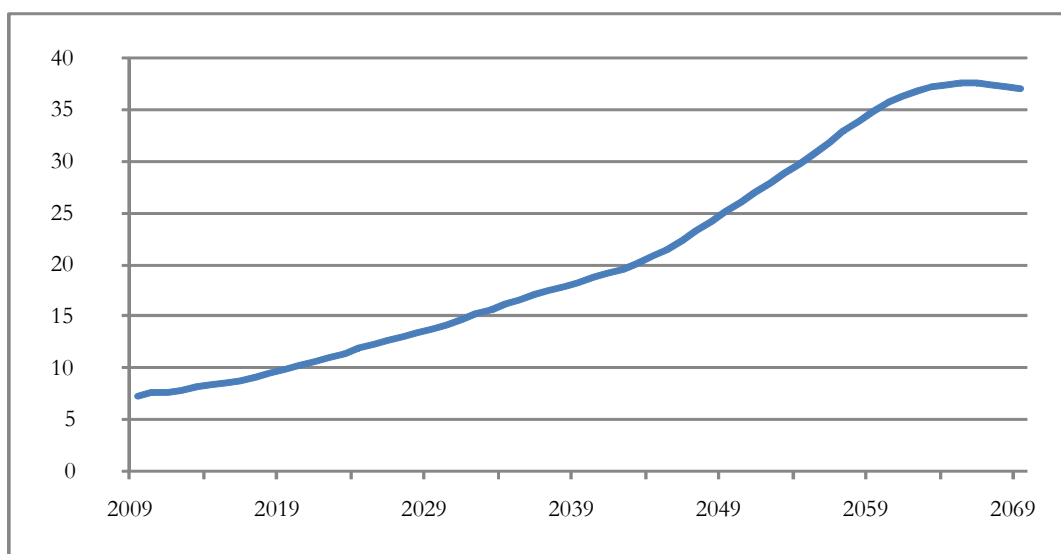
Table 3.3 shows the results of the financial projections in terms of cash-flow and reserve. The two following figures 3.4 and 3.5 show the evolution of the reserve over the projection period. The main observations are:

1.   Annual contributions are sufficient to pay for all annual expenditures until 2016. The reserve grows rapidly.

2.   Starting in 2017, investment income must be used to pay for annual expenditures. The reserve still grows, but at a slower pace. In fact, this is the year where the PAYG rate exceeds the current contribution rate.

3. Starting in 2029, total income (contributions, investment income and other income) are no longer sufficient to pay for annual expenditures. The reserve starts to decrease.

4. During the year 2041, the reserve drops to zero.

5. Starting in 2042, the required annual contribution rate to pay for all expenditures becomes the PAYG rate. As an illustration, this rate is 19.6 per cent in 2042.

6. The reserve ratio, which is the ratio of the end-of-year reserve over the annual expenditures for the year, moves from 16.6 to 0 between 2009 and 2041. This ratio can be interpreted as the number of years during which annual expenditures can be paid by the reserve if there were no contributions, no investment income and no other income.

Table 3.3.   Financial projections: Cash inflows, cash outflows and reserves, 2009-2069

Year	Cash inflows				Cash outflows				Reserves	
	Contribution income	Investment income	Other income	Total	Benefits	Admin. expenses	Total	Surplus/ (Deficit)	End of year	No. of times current year's expenditure
2009	50.0	34.8	0.7	85.4	33.3	6.6	39.9	45.5	661.5	16.6
2010	53.0	33.3	0.3	86.7	37.5	7.1	44.6	42.1	703.6	15.8
2011	58.0	36.1	0.4	94.5	42.0	7.7	49.8	44.7	748.3	15.11
2012	63.6	39.1	0.4	103.1	47.2	8.5	55.7	47.4	795.7	14.3
2013	68.3	42.3	0.4	111.1	52.9	9.1	62.0	49.1	844.8	13.6
2014	74.4	45.8	0.5	120.6	59.1	9.9	69.0	51.6	896.4	t3.0
2015	80.2	49.4	0.5	130.2	65.9	10.7	76.6	53.5	949.9	t2.4
2019	107.2	65.6	0.7	173.6	103.4	14.3	117.7	55.8	1173.3	10.0
2029	174.6	86.4	1.1	262.2	244.9	23.3	268.2	(6.1)	1479.5	5.5
2039	261.2	26.2	1.7	289.0	497.1	34.8	531.9	(242.9)	325.6	0.6
2049	417.6	(299.9)	2.7	120.4	1 108.0	55.7	1163.7	(1 043.3)	(5 675.9)	(4.9)
2059	578.4	(1 427.0)	3.8	(844.8)	2162.6	77.1	2239.7	(3 084.5)	(26 051.2)	(11.6)
2069	810.3	(4 198.8)	5.3	(3 383.3)	3228.0	108.0	3336.1	(6 719.3)	(75 458.2)	(22.6)

Figure 3.4.   Projection of the reserve, 2009-2039
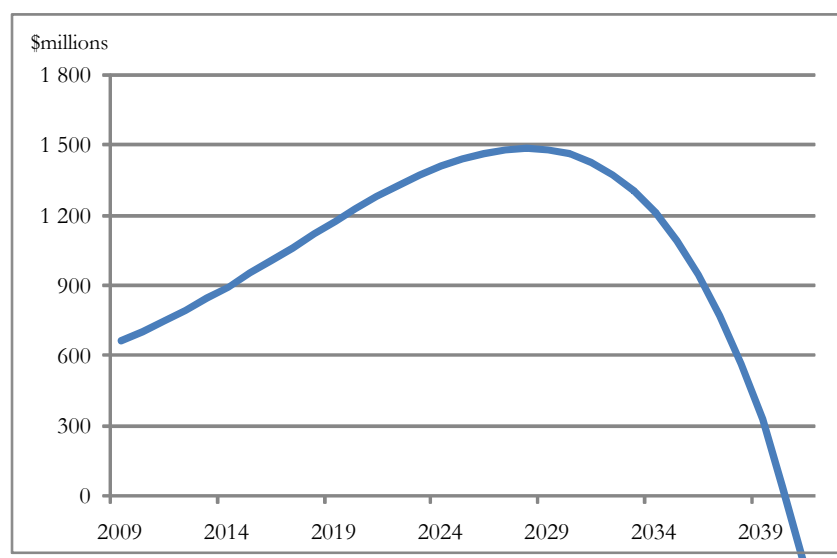
Figure 3.5.   Projection of the reserve-to-expenditure ratio, 2009-2039
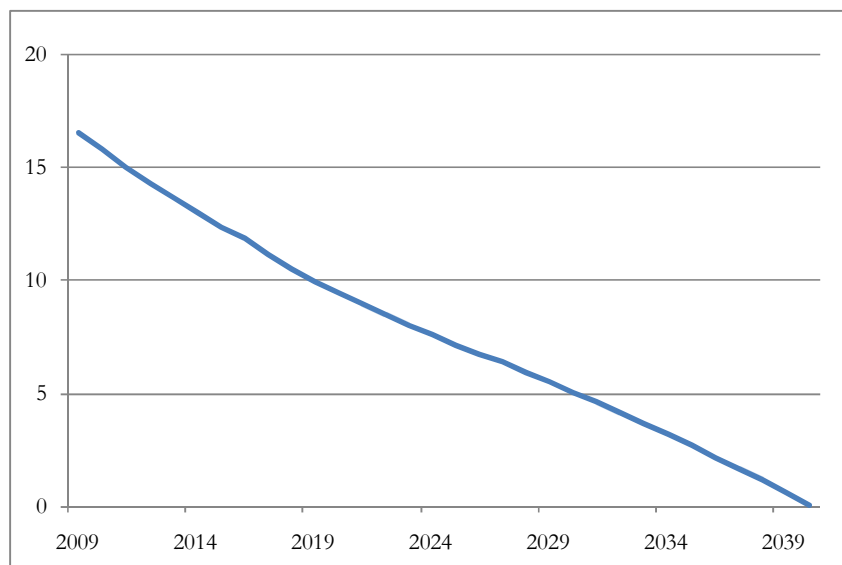
Another very important result of the financial projection is the general average premium (GAP). The GAP can be calculated in two ways:

1.   The annual contribution, as a percentage of insurable earnings, necessary to pay for all expenditures over the entire projection period without considering the reserve. In the current valuation, this GAP is 18.6 per cent. Figure 3.6 shows the evolution of the reserve-to-expenditures ratio if a contribution rate of 18.6 per cent is used throughout the projection period.

2.   The annual contribution, as a percentage of insurable earnings, necessary to pay for all expenditures over the entire projection period, but assuming that the initial reserve will be exhausted at the end of the projection period. In the current valuation, this GAP is 16.5 per cent. The problem with this definition is that by financing the scheme at a contribution rate of 16.5 per cent, there would be no reserve left in 2069, meaning that the contribution rate would have to increase instantly to around 37 per cent (the PAYG rate) in 2069. Such an increase would not be viable for the scheme.

Figure 3.6.   Projection of the reserve-to-expenditure ratio, 2009-2069, contribution rate of 18.6 per cent
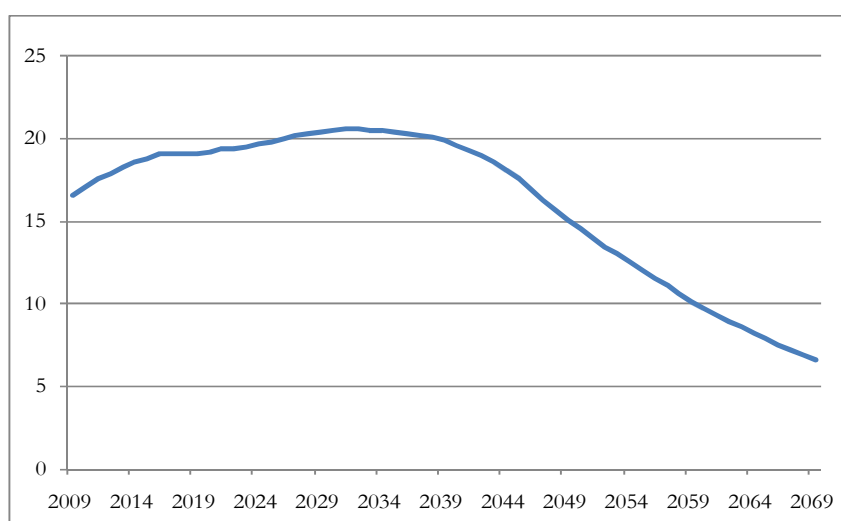
Table 3.4 shows the actuarial balance of the scheme, based on the second definition above. Taking into account the initial reserve and the present value (PV) of future contributions and benefits, there is a cumulative shortfall, in present value, of 2,428 million EC$. By increasing the contribution rate by 7.5 per cent (which means a total contribution rate of 16.5 per cent) there would be no shortfall, as the present value of future contributions and the initial reserve would be sufficient to pay for the present value of future benefits. Finally, table 3.4 also shows the actuarial balance as a percentage of the nominal GDP in 2010, which is 171 per cent.

Table 3.4. **Financial projections: Actuarial balance, 2009-2069** ($millions)

	2009 year-end reserves	661
Plus	PV of future contributions	2 903
Minus	PV of future expenditures	5 992
Equal	PV of surplus/ (shortfall)	(2 428)
	Actuarial balance (% of PV of insurable earnings)	-7.5%
	Actuarial balance (% of 2010 GDP)	171%

4.   Reconciliation with previous actuarial valuation

The long-term projected cost of the NIS in this valuation is in line with that projected in the last report, but is slightly higher (18.6 compared to 18.1 per cent). There are elements related to the methodology and assumptions that, when taken alone, produce different results from those projected in the previous valuation. This chapter explains these differences, based on a comparison of the expected GAP in the 2006 valuation versus the actual GAP in the 2009 valuation. The effect of the GAP over 60 years is used, rather than other indicators of cost, to capture the long-term impact and the magnitude of the changes between the two valuations.

If the expected results of the 2006 valuation had been perfectly realized in 2007, 2008 and 2009, and if the same assumptions and methodologies as in the previous valuation had been used in the 2009 valuation, the 60-years GAP as of the end of the year 2009 would have been 19.3 per cent. In comparison, the 60-years GAP as of the end of the year 2009, calculated using all the new data, assumptions and methodologies of the 2009 valuation, is 18.6 per cent.[7] This decrease of 0.7 per cent is due to many factors that offset each other, some having a minor effect but others with a major impact on the results. The most important factors are explained below (see table 4.1):

1.   The real investment return assumption starts at 1.80 per cent, rising to 3.25 per cent over ten years, and then remains stable at 3.25 per cent for the rest of the projection period. In the previous valuation, this assumption was 2.25 per cent. This contributes to reduce the expected 2006 GAP by 1.3 per cent.

2.   The mortality tables for males and females have been modified in the current valuation. Compared to 2006 a higher improvement in mortality is assumed, increasing the expected 2006 GAP by 0.4 per cent.

3.   The initial and projected covered population of the 2009 valuation is different than expected in the 2006 valuation. The net impact of this element is a decrease of 1.4 per cent of the expected 2006 GAP. This is mainly due to the following elements increasing the growth of the covered population over the projection period:

   ■   based on new data available, a younger initial general population in the country compared to what was expected in 2009;

   ■   the assumption that over the next ten years unemployment, which is very high at present, will decrease to its pre-financial-crisis level; and

   ■   slightly higher fertility rates in the 2009 valuation.

4.   The real salary increase assumption is about the same in both valuations. However, initial average salaries in 2009 are higher than those expected in 2009 from the 2006 valuation. The impact on the expected 2006 GAP is –1.4 per cent.

5.   The methodology of some calculations has been changed in the 2009 valuation. In particular, the treatment of the density, of the number of pensioners, of funeral benefits and of the Provident Fund has been improved. This, together with some other

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[7] Note that the GAP used for the reconciliation between the two valuations is the contribution rate required to pay all expenditures over the projection period without considering the reserve. The same conclusions would have been drawn using the GAP that considers the initial reserve.

minor improvements of the model, creates an increase of 2.1 per cent of the expected 2006 GAP.

6. Family assumptions have been improved in the 2009 valuation based on new data submitted by NIS staff. This change increases the expected 2006 GAP by 0.9 per cent.

7. Based on new data available, the density factors were recalculated in the 2009 valuation. This decreases the expected 2006 GAP by 0.4 per cent.

8. The inflation assumption is the same as in the previous valuation. The only difference is that benefits in payment were expected to be increased at nominal 2.5 per cent in the 2006 valuation, while benefits in payments were assumed to be increased in line with the inflation rate in the current valuation. This difference in the indexation creates an increase in the expected 2006 GAP of 0.4 per cent.

9. The increases in the ceiling of insurable earnings due to take place in 2010, 2012 and 2014 decrease the expected 2006 GAP by 0.2 per cent.

10. Differences in actual pensions in payment as of the end of 2009, compared to those expected from the 2006 valuation, increase the expected 2006 GAP by 0.1 per cent.

11. The disability rates, updated to take into account the experience of the last three years, and the effect of the increase of the funeral grant in 2007, contribute to increase the expected 2006 GAP by 0.1 per cent.

Table 4.1.   **Reconciliation of the GAP as between the 2006 and 2009 actuarial valuations**
(percentage differences)

Expected 2006 GAP	**19.3**
Real investment return assumption	-1.3
Mortality assumption	0.4
Initial and projected covered population	-1.4
Initial salaries and real salary increase assumption	-1.4
Methodology	2.1
Family assumptions	0.9
Density factors	-0.4
Benefit increases	0.4
Ceiling increases in 2010, 2012 and 2014	-0.2
2009 pensions in payment	0.1
Disability assumption and increase in funeral grant in 2007	0.1
2009 GAP	**18.6**

5. Sensitivity analysis and other issues

Chapter 4 has shown that, under the base scenario, a contribution rate of 18.6 per cent is necessary to pay all the expenditures of the scheme for the next 60 years, without taking into account the initial reserve. This chapter will discuss some other scenarios built to better understand the risks and what is at stake for the NIS. The following scenarios are discussed here:

1. Return on assets

2. Population growth

3. Mortality

4. Average salary increase

5. Modification in the pension formula

6. Increase in the retirement age

7. Adjustment to pensions in payment

5.1. Return on assets

The assumption concerning the return on assets in the base scenario is 5.0 per cent at the beginning of the projection period, increasing to the ultimate level of 6.0 per cent after ten years. Table 5.1 shows the impact of having a return 0.5 per cent lower and 0.5 per cent higher than that in the base scenario. A change in the return on assets has no impact on the PAYG rate because when calculating this rate, the amount of reserve is not taken into account.

Table 5.1.   Sensitivity analysis: Return on assets (percentages)

Scenarios	GAP	PAYG 2069	Year reserve = 0
Base	18.6	37.1	2041
+0.5	17.9	37.1	2042
-0.5	19.3	37.1	2038

Having a higher or lower return on assets of 0.5 per cent will not greatly affect the timing of the depletion of the reserve. The minimum return on assets necessary to avoid a negative level of reserve at the end of 60 years is 10.1 per cent, which is considerably higher than our best-estimate assumption. This scenario shows that even if the NIS Fund performs very well in terms of investment returns, those returns will not be sufficient to eliminate the financial problems of the scheme.

5.2. Population growth

The PAYG rate is very sensitive to the assumption related to population growth. A sensitivity analysis was carried out by assuming a higher population growth throughout the projection period. In this scenario, the population growth is driven by two factors:

1. The migration rate is 0 during the whole projection period.

2. The fertility rate decreases from 2.2 to 2.1 during the first 20 years. A fertility rate of 2.1 is required for each generation to replace itself.

In our base scenario, the population grows at an annual rate of 0.4 per cent over the projection period. In our additional scenario, this growth is 0.8 per cent. This high population growth scenario shows the importance of the ageing problem in Grenada. It is important to understand the impact of population growth in a pension scheme like the NIS. Higher population growth means that there are more people available to pay for benefits. This has the effect of delaying the ultimate cost of a pension plan by lowering the PAYG rate over the projection period, as shown in table 5.2. According to this scenario, the PAYG rate at the end of the projection period is 32.6 per cent, a difference of 4.6 per cent when compared to the base scenario. While results under this scenario are positive, this is not enough to eliminate the future financial problems of the NIS.

Table 5.2. Sensitivity analysis: Population growth (percentages)

Scenarios	GAP	PAYG 2069	Year reserve = 0
Base	18.6	37.1	2041
Higher growth	17.5	32.6	2042

5.3. Mortality rates

The next two scenarios (table 5.3) show the impact on the projection of mortality rates that are 10 per cent higher or lower than our best-estimate assumption. At age 60, a reduction in the mortality rate of 10 per cent increases life expectancy by seven months. The reverse is true for an increase of 10 per cent in the mortality rate.

Table 5.3. Sensitivity analysis: Mortality rates (percentages)

Scenarios	GAP	PAYG 2069	Year reserve = 0
Base	18.6	37.1	2041
Higher mortality rates	18.3	36.2	2041
Lower mortality rates	18.9	38.0	2040

5.4. Average salary increase

Very often pensions are indexed annually in pension plans according to the increase in inflation, while salaries increase faster than inflation plus a productivity component. The fact that the annual increase in salaries is higher than the pension adjustment has the effect of lowering the PAYG cost in the future, because the basis for the calculation of contributions increases more rapidly than the average amount of benefits. For the present actuarial valuation, we assume that pensions in payment will increase in line with inflation even if there is no such provision in the regulations. This assumption is necessary, to reflect the fact that one time or another there will be a need to increase pensions to retain their monetary value and to give people confidence in the scheme. Therefore, in an actuarial valuation the relation between the salary increase and the benefit increase is important. In our base scenario it is expected that, in the long run, the increase in the average salary will be 1 per cent higher than the inflation rate. A sensitivity analysis has been produced to show the financial impact of an increase in real salaries that is 0.5 per cent higher or lower than the one in the base scenario (see table 5.4).

Table 5.4.   Sensitivity analysis: Salary increase (percentages)

Scenarios	GAP	PAYG 2069	Year reserve = 0
Base	18.6	37.1	2041
+0.5	18.3	34.3	2041
-0.5	18.9	40.2	2040

5.5.   Modification in the pension formula

The pension accrual rate is currently 30 per cent for the first ten years and 1 per cent for each additional year. The pension formula advantages people who have less accumulated years of service. In the 8th actuarial review, it was recommended that the pension accrual rates be modified to a formula that less generous for those who have not accumulated many years of service (2 per cent for the first ten years and 1.3 per cent thereafter). A sensitivity analysis has been performed to show the impact of this proposition (table 5.5). However, it is not recommended for the moment to go in that direction because a more thorough analysis of the objectives of the system should be undertaken. For example, a global analysis should be made of poverty reduction, the level of replacement of revenue, the availability of other saving mechanisms for retirement, funding objectives, the implementation of a universal pension and the impact of unemployment periods on pensions. Nevertheless, it is worthwhile to show the impact of this recommendation. For this simulation, we make the assumption that the pension formula is changed at the beginning of the projection period.

Table 5.5.   Sensitivity analysis: Pension formula (percentages)

Scenarios	GAP	PAYG 2069	Year reserve = 0
Actual	18.6	37.1	2041
Proposed	16.9	33.9	2045

The impact of the proposed pension formula is important. The GAP decreases by 1.7 per cent, the PAYG rate in 2069 by 3.2 per cent and the year the reserve will be zero is delayed by four years. This scenario shows that modifying the pension formula could be used as a mechanism to decrease the financial pressure on the scheme. We believe, however, that this kind of modification should be accompanied by a global analysis of the system.

5.6.   Increase in the retirement age from 60 to 65

The last actuarial review pointed out the necessity of adjusting the scheme to be sure it will stay affordable and sustainable in the future. Increasing the pensionable age from 60 to 65 is a valuable way of achieving this goal. The current retirement age at the NIS is somewhat low compared to elsewhere, particularly in Caribbean countries where, for instance, it has increased from 60 to 65 in Dominica and Saint Lucia and from 65 to 67 in Barbados. For several other Caribbean countries, namely Anguilla, the Bahamas and the British Virgin Islands, the normal retirement age is 65.

As in the previous actuarial valuation report, the impact was analysed of an increase of the pensionable age from 60 to 65. Because of the impact of the financial crisis, the date the modification could take effect has been delayed. As shown in table 5.6, it could take 20 years to reach the ultimate new pensionable age instead of 12 years as recommended in the previous actuarial report.

Table 5.6.   Schedule in the increase in the normal retirement age

Years	Normal retirement age (NRA)
2010, 2011, 2012, 2013,2014, 2015	60
2016, 2017, 2018, 2019	61
2020, 2021, 2022, 2023	62
2024, 2025, 2026	63
2027, 2028, 2029	64
2030 +	65

The provisions related to the present normal retirement age (NRA) are the following:

1. The first possible age to retire is 60.

2. If the retirement age occurs before the NRA, the pension is reduced by a factor of 0.5 per cent for each month before the month in which the individual reaches the NRA.

3. It is possible to accumulate years of service for five years after the NRA. When the NRA is 60, the last possible age to ask for a pension is 65. When the NRA is 63, the last possible age is 68. Five years after the NRA, there is no further accumulation of service.

4. When retirement takes place after the NRA, the pension is increased by a factor of 0.5 per cent for each month after the month in which the individual reaches the NRA:

The new provisions concerning the retirement age will impact considerably the results of the projection as shown in the next table. The GAP decreases by 3.1 per cent and the year where the reserve is zero is delayed to 2048.

Table 5.7.   Sensitivity analysis: Increase in the retirement age from 60 to 65, 20 years transition period (percentages)

Scenarios	GAP	PAYG 2069	Year reserve = 0
Actual	18.6	37.1	2041
Proposed	15.5	31.0	2048

The following examples illustrate what will happen:

Early retirement

We are in 2025. John reaches age 62 in December 2025 and plans to retire in February 2026. What will his pension be? The NIS calculates his pension normally according to the pension formula for the NRA. The amount is $15,000. But because John is retiring earlier than the NRA his pension will be reduced. John will reach the NRA in December 2026; he is retiring 10 months before NRA (12–2). His pension will be reduced by 5 per cent (0.5% x 10). The new amount of pension is $14,250 (95% x $15,000).

Normal retirement

There is no adjustment to pension for those who take their retirement at the NRA.

NRA / Age at retirement	60	61	62	63	64	65	66	67	68	69	70
60	100	106	112	118	124	130	130	130	130	130	130
61	94	100	106	112	118	124	130	130	130	130	130
62	88	94	100	106	112	118	124	130	136	142	148
63	82	88	94	100	106	112	118	124	130	130	130
64	76	82	88	94	100	106	112	118	124	130	130
65	70	76	82	88	94	100	106	112	118	124	130

Late retirement

We are in 2029. Belinda reaches age 68 in March 2029 and has decided to retire in that month. What will her pension be? The NIS calculates her pension normally according to the pension formula for the NRA. The amount is $16,000. But because Belinda is retiring later than the NRA, her pension will be increased. Belinda will retire at age 68, for years (48 months) after the NRA. Her pension will be increased by 24 per cent (0.5% x 48). The new amount of pension is $19,840 (124% x $16,000).

We are in 2035 and Bill has decided to work until age 72. Because the last pensionable age is 70, the NIS will calculate his pension using the pension formula that was applicable in the month he was 70 years old. Bill's pension should increase by 30 per cent to take into account that Bill has retired five years after the NRA.

Table 5.8. shows the adjustment factors for each age of retirement considering the evolution in the NRA.

Table 5.8.   Summary of adjustments to pension, retirement in the month of birth (percentages)

NRA / Age at retirement	60	61	62	63	64	65	66	67	68	69	70
60	100	106	112	118	124	130	130	130	130	130	130
61	94	100	106	112	118	124	130	130	130	130	130
62	88	94	100	106	112	118	124	130	136	142	148
63	82	88	94	100	106	112	118	124	130	130	130
64	76	82	88	94	100	106	112	118	124	130	130
65	70	76	82	88	94	100	106	112	118	124	130

A participant can partly offset the effect of the reduction in pension due to the increase in the retirement age by working more years. For example: on average, people enter the scheme at age 23 and retire at age 60, giving a contribution period of 37 years (60–23). On an assumption that the density is 75 per cent, this gives an average length of service of 28 years (37 x 75%) and a replacement rate of 48 per cent at age 60 (30% + 1% x 18). If a person decides to retire at age 63, he or she will get an additional 2.25 years of service (3 x 75%) and an additional replacement rate of 2.25 per cent. Using the assumption related to the real increase in salary (1 per cent), the reduction applied to the pension will be less than the 12 per cent (100%–88%) shown in table 5.8 for someone who retires at age 63; it will in fact be 5 per cent (100% –95%) because of a longer period of contribution and a higher average salary. Table 5.9 reproduces table 5.8, but takes into account the

additional years of service (using a density of 75 per cent) and a higher salary (1 per cent real increase).

Table 5.9. **Effect of working more years combined with the adjustment to pension, compared to a situation with only the pension adjustment but no additional years of work** (percentages)

NRA / Age at retirement	60	61	62	63	64	65	66	67	68	69	70
60	100	109	118	127	137	147	151	155	158	162	166
61	94	103	112	121	131	141	151	155	158	162	166
62	88	96	105	114	124	134	144	155	166	177	189
63	82	90	99	108	117	127	137	148	158	162	166
64	76	84	93	101	111	120	130	140	151	162	166
65	70	78	86	95	104	113	123	133	144	155	166

Table 5.10 compares the proposition in the present actuarial report with that recommended in the previous actuarial report, where the increase in the NRA is spread over a period of 12 years. There are small differences in all the indicators. This shows that delaying the increase in the NRA to allow more time for people to be prepared will not greatly affect the financial situation of the NIS. A more rapid schedule than that proposed in this actuarial valuation could also be an option.

Table 5.10. **Sensitivity analysis: increase in the retirement age from 60 to 65, comparison between propositions in the 8th and 9th actuarial valuations** (percentages)

Scenarios	GAP	PAYG 2069	Year reserve = 0
8th actuarial valuation	15.1	30.5	2050
9th actuarial valuation	15.5	31.0	2048

5.7. Adjustment to pensions in payment

The NIS regulations are silent as to when and how to adjust pensions in payment and other parameters of the scheme (ceilings, minimum pensions). The last adjustment to pensions in payment occurred on 1 January 2006. This kind of adjustment is necessary not only to preserve the value of money, but to make sure that contributors and pensioners retain confidence in the scheme. It is suggested to increase pensions in payment in January 2011. Such an adjustment should usually be based on cumulative price inflation since the last increase. However, since the average increase in salary between 2006 and 2009 was lower than inflation and because of the current economic outlook, it is not suggested to increase pensions in payment according to inflation. It is important to preserve a balance in the scheme between pensioners and contributors and to take into account the capacity of the economy (contributors) to pay for the benefits offered by the scheme. Table 5.11 presents the suggested increase in pensions and compares it to the cumulative inflation rate.

Table 5.11. Adjustment to pensions in payment (percentages)

	Adjustment to pension	Cumulative inflation rate
Pensions in payment as of 1 January 2006	12	16.6
New retirees in 2006	9	11.8
New retirees in 2007	6	7.7
New retirees in 2008	0	-0.3
New retirees in 2009	0	

Table 5.12 shows that such adjustments will not affect the long-term financial position of the scheme. In the short term, the PAYG rate will increase by 0.3 per cent and this increase will phase out with time.

Table 5.12. Sensitivity analysis: Adjustment to pensions in payment (percentages)

Scenarios	GAP	PAYG 2069	PAYG 2011	Year reserve = 0
Actual	18.6	37.1	7.7	2041
Proposed	18.6	37.1	8.0	2040

It is also suggested to include in the regulations explicit mechanisms for the adjustment of pensions in payment and other parameters of the scheme.

5.8. Minimum pension

In the base scenario, the minimum pension is set at $46.40 per week for age, disablement and widow/widower pension. For orphans, the minimum pension is $19.70 per week. Minimum pensions are assumed to increase with inflation over time. A sensitivity test is provided here, showing the effect of a minimum pension set in accordance with the poverty line. According to the final report on the country poverty assessment (Grenada, Carriacou and Petite Martinique), the adult annual poverty line is $5,842 in 2008. The minimum age, disablement and widow/widowers pension would thus be $112.35 per week and the minimum orphans' pension would be $47.70 weekly. As in the base scenario, it is assumed that the minimum pension will increase with inflation in the future. Table 5.13 shows the impact of this test.

Table 5.13. Sensitivity analysis: Minimum pension equals the poverty line (percentages)

Scenarios	GAP	PAYG 2069	Year reserve = 0
Base	18.6	37.1	2041
Higher minimum pension	19.3	37.6	2038

Such a modification to the provisions of the NIS would cause the financial situation of the scheme to deteriorate. As the scheme becomes more mature in future, pensions increase with fewer people receiving the minimum pension. Also, the minimum pension increases with inflation, while salaries increase at a faster pace, which reduces the impact of the minimum pension in the future. This kind of modification would still help to increase the replacement ratio of many participants in the NIS, particularly those with frequent periods

of unemployment. The cost of such a modification would be 0.7 per cent over 60 years. [8] As stated in Chapter 8 of this report, a global analysis of the pension system in Grenada should be made before implementing this kind of modification to the scheme. For example, if a universal pension is introduced in the country as a first pillar, people with frequent periods of unemployment might not need an increased minimum pension paid from the NIS. A universal pension has also the advantage of covering everyone, even those who normally will not qualify for a pension (for example, those who are receiving grant benefits).

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[8] In this scenario, indexing the minimum pension to salaries instead of to inflation increases the GAP from 19.3 to 20.4 per cent.

6. Short-term and employment injury benefits

Short-term benefits refer to sickness benefits, maternity benefits and funeral benefits while employment injury benefits mainly include disablement and death benefits. These benefits are not analysed in this actuarial valuation since their cost is insignificant and stable over time, as shown in table 1.5. However, even if emphasis must be put on long-term benefits, it is still important to understand how short-term and employment injury benefits affect the financial situation of the scheme. Here are some points of interest concerning these benefits:

1. Short-term benefits have a PAYG rate, ignoring administrative expenses, of 0.9 per cent in 2009. This rate is projected to increase to near 1.25 per cent in 2069 based on the recommended rate of the last actuarial valuation.

2. Short-term benefits have an impact on the GAP of 1.2 per cent. This means that a contribution of 1.2 per cent of insurable earnings per year would completely finance these benefits. Thus, their long-term impact on the cost of the scheme is not significant.

3. Employment injury benefits have a PAYG rate, ignoring administrative expenses, of 0.1 per cent in 2009. This rate is projected to increase to a little more than 0.3 per cent in 2069 based on the recommended rate of the last actuarial valuation. Short-term employment injury benefits are projected in the same way as short-term benefits (as a percentage of insurable earnings each year), while disablement and death benefits are projected as a constant percentage of invalidity and survivors' pensions respectively. The method used is in line with that in the last actuarial valuation.

4. Employment injury benefits have an impact on the GAP of 0.3 per cent. This means that a contribution of 0.3 per cent of insurable earnings per year would completely finance these benefits. Thus, their long-term impact on the cost of the scheme is very low.

5. Employment injury benefits could have a more important effect on the scheme due to the fact that disablement and death benefits are paid as pensions. However, only very few pensions are in payment as of the end of 2009, despite the fact that these benefits were introduced in 1998.

6. Funeral benefits have a very low impact on the cost of the scheme, at around 0.1 per cent of insurable earnings.

7. Maternity benefits have a PAYG rate of 0.3 per cent, which is again not significant compared to the impact of long-term benefits.

Finally, since the total impact of short-term and employment injury benefits is only around 1 per cent on the PAYG rate (ignoring administrative expenditures) and 1.5 per cent on the GAP, and since experience shows that the cost of these benefits is stable over time, it can be stated that these branches of the NIS are not where the future challenges lie. Nevertheless, an analysis of costs should be performed at each actuarial valuation in order to ensure that experience is still in line with assumptions and to react quickly if new trends emerge.

7. Structure of the investment policy and rate of return on assets

The investment policy of the NIS was approved by the Board on 28 July 2010. Strategic objectives for investments were established, focusing on:

1. **Safety:** Investments should ensure the preservation of capital in the overall portfolio.

2. **Yield:** A minimum acceptable rate of return must be achieved. In the development of this policy, a minimum rate of return of 6 per cent per annum on the overall portfolio was considered.

3. **Liquidity:** The investment portfolio must ensure an adequate level of liquidity to meet all short- to medium-term cash requirements. However, considering expected cash flows, liquidity is not a priority in the short term.

4. **Socio-economic utility:** Investment should support social and economic utility as far as possible, since this will contribute to improve the conditions and quality of life of citizens, as well as influence some level of economic activity in the country.

The investment policy statement describes the structure, responsibilities and duties of the investment committee, the responsibilities of the Board and the role of the investment department. It also includes guidelines on investments and limits on single investments. The investment policy statement should be reviewed at least every three years.

The current asset mix and targets are presented in table 7.1.

Table 7.1. Asset mix and investment benchmarks, current and target (percentages)

Investment category	Allocation on 31 May 2010	Targeted allocation	Minimum rate of return
Cash & cash equivalent	29.8	5-10	5
Cash	26.7	3-5	
Treasury Bills	3.1	2-5	
Fixed income securities			
Bonds	28.3	35-40	6
Domestic - Government	14.4	10-15	
Domestic - Other	5.6	0-5	
Regional	8.3	5-15	
International	0	1-5	
Loan	27.7	25-35	7
Statutory	11.7	5-10	
Domestic loans	6.3	7-10	
Mortgage financing	9.7	10-15	
Equities	10.2	10-15	7.5
Domestic	10	5-10	
Regional	0.1	1-3	
International	0	1-2	
Real estate	4.1	5-10	10

The major shift from the current asset allocation to the target allocation is the decreasing proportion in cash and cash equivalents from 29.8 to 5–10 per cent. These investments should be reallocated to other investment categories. This move is essential considering the long-term nature of the scheme and the little need for cash in the short term. A maximum of 5 per cent of assets should be invested in cash and cash equivalents in order to maximize the return of the scheme.

The last actuarial valuation pointed out that there should be no further lending to institutions that are currently in default of any NIS obligations, and that the proportion of the Fund held in government securities should be kept below 20 per cent. This was due to the debt restructuring by the Government of Grenada and the arrears position of loans granted to some statutory bodies. The new investment policy seems to move in that direction: the percentage allocated to loans to statutory bodies is targeted to reduce from 11.7 to 5–10 per cent.

The investment policy statement recommends that a maximum of 7 per cent of assets be held in foreign investments. In May 2010, 8.8 per cent of the investment portfolio was invested in external assets and there were no assets invested in international bonds and equities. The last actuarial report suggested that the Board should place funds outside of Grenada, with a medium-term target of 20 per cent of total assets. This target is adequate given that one of the goals of an investment portfolio in a social security scheme is to diversify the risk. Over-exposure to the local economy could have a negative impact on investment performance, especially during a long economic downturn. If foreign investments are to be made, currency risk will have to be managed and monitored. The investment policy statement should contain a policy on currency risk, in particular what kind of protection against currency risk should be implemented. Since the East Caribbean dollar is pegged to the US dollar at a rate of EC$2.70 to US$1.00, foreign investments in the United States would not create any currency risk as both currencies move together.

Concerning the high proportion of loans in the investment portfolio, the Board should be aware that assets lent directly to private and public enterprise and to personal mortgages can have undesirable effects on the rate of return. First, during economic downturns these investments could have a negative impact on the performance of the Fund because of the risk of default. Second, such investments are less liquid than bonds. For the moment, liquidity is not a concern as the scheme generates positive net cash flows, but the Board should bear in mind that maintaining such a high proportion of investments in direct loans can be more risky than investing in bonds.

Pension schemes have long-term obligations which allow the investment of a higher proportion of assets in variable income securities such as equities and real estate. Currently, the NIS targets 15–25 per cent of assets in these investments. While the current target for real estate (5–10 per cent) is appropriate, more than 10–15 per cent of assets could be invested in equities. This would allow for a higher expected return on assets, so that investment income could be higher in the future. Obviously, a higher expected return also brings a higher risk of short-term fluctuations, but the long-term nature of the scheme allows for such fluctuations. Part of the money currently invested in cash and cash equivalents could therefore be moved to equities in order to increase the proportion of assets in this category (this move can also affect target allocation to fixed income securities). Investment in foreign equities should also be made, in order to diversify the risk. A medium-term target of 25 per cent of assets in equities could be an interesting avenue for the Board, in order to increase the expected rate of return of the Fund. The increase in risk due to the higher proportion of assets in equities could be partly offset by a reduction of investments in direct loans in order to invest more in bonds, as suggested earlier. Before approving any modifications to the targeted asset allocation, the Board should make sure that the resulting investment policy is still in accordance with its objectives and risk tolerance.

For the present actuarial valuation, the assumption related to the expected rate of return on assets is 5 per cent at the beginning of the projection period, increasing by 0.1 per cent each year to reach its ultimate level of 6 per cent after ten years. Six per cent is the target of the investment return in the investment policy statement. The lower assumed return on assets during the first ten years is due mainly to the current economic situation and the debt restructuring strategy of the Government of Grenada that took effect in 2005. For $92 million of bonds, the interest rate of 6 per cent was replaced by a schedule that increases from 1 to 9 per cent. Currently, the interest rate is 2.5 per cent on those bonds. The total face amount is scheduled to be reimbursed in 2025.

8. Conclusion

This actuarial valuation of Grenada's National Insurance Scheme was carried out as at 31 December 2009. The methodology used for the pension branch is based on a model developed by the ILO for reviewing the long-term actuarial and financial status of national pension schemes. The model has been adjusted to fit the particular situation of the NIS. The data related to the NIS (contributors, beneficiaries, financial statements) used in this actuarial valuation are complete and of good quality. The data concerning the general population (for example the migration rate) and the labour force (unemployment rates and participation rates) bring some uncertainties into the projections. However, globally the data used are complete enough to obtain a picture of the financial soundness of the NIS.

An actuarial valuation requires many assumptions. The assumptions in this valuation are adequate individually and coherent as a whole. They are established on a best-estimate basis and have been selected to reflect long-term trends rather than giving undue weight to recent experience. It is not the objective of pension projections to forecast the exact development of the scheme's income and expenditures, but to verify its financial viability.

This is the third actuarial valuation where the conclusions are similar: financial pressure on the scheme in the coming years will be so high that immediate action is needed to make this scheme viable and equitable for the next generations. According to the base scenario and if no adjustments in the contribution rate or the benefits are made:

1. Total expenses will be higher than contributions in 2017, meaning that investment income will be necessary to pay benefits at that time.

2. The reserve will be exhausted in 2041 and the required contribution rate will then be 19.2 per cent.

3. The required contribution rate to pay all the expenses during the next 60 years is 18.6 per cent.

4. If the reserve is used during the next 60 years to pay for expenses along with contributions and investment income (a strategy by which the reserve will be 0 in 2069), the contribution rate that is required is 16.5 per cent.

This actuarial valuation clearly demonstrates that modifications to the scheme are necessary and that delaying the normal retirement age from 60 to 65 is the first step to achieve long-term sustainability. However, even if the normal retirement age is postponed to 65 during a period of 20 years, other adjustments are still needed to make the scheme viable. This is shown in figure 8.1 where the present contribution rate is compared to the PAYG rate that results from the recommendation to increase the retirement age to 65. In 2018, the PAYG rate will be higher than the current contribution rate of 9 per cent and the reserve will be exhausted in 2048.

> Recommendation #1: An increase in the pensionable age from 60 to 65

Figure 8.1. 2009 contribution rate compared to PAYG rates under the strategy of increasing the normal retirement age to 65 (percentages)
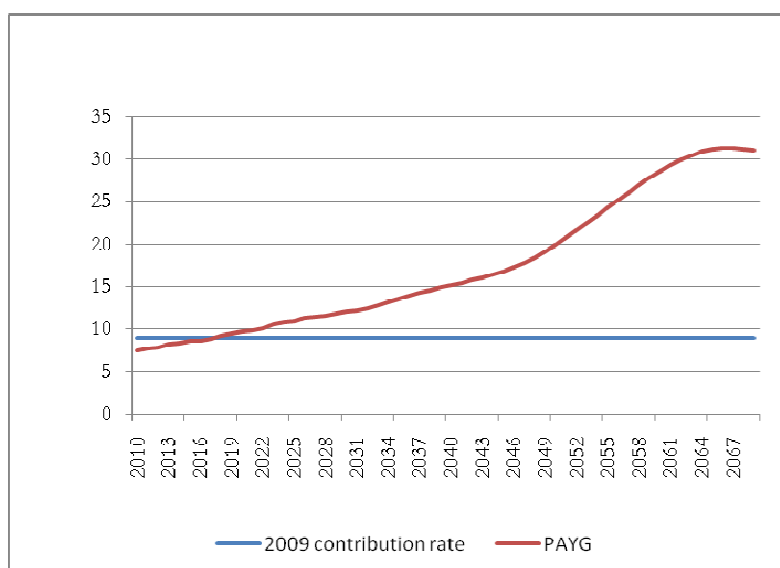
In Grenada there is currently a mandatory retirement age of 60, for example, in the regulations governing civil servants. It is important that the increase in the retirement age be accompanied by legislative changes so that the obligation to retire at age 60 is eliminated. Such a modification is important to avoid situations where someone can no longer work but has no access to the full retirement income.

The increase in the retirement age will affect some categories of employees more than others. For example, some workers have physically demanding jobs and are no longer able to work. It should be possible, through an analysis of the complete picture of the retirement system, to find solutions better adapted to targeting and protecting these groups of insured employees (see recommendation no. 3).

The following other solutions should also be considered with a view to making the scheme sustainable over the long term.

Increase in the contribution rate

Figure 8.2 and table 8.1 show the effect of increasing the contribution rate by 2 per cent every five years starting in 2015. In this scenario, the contribution rate will reach 17 per cent in 2030 and will be constant thereafter. The reserve ratio will be 5.8 at the end of the projection period of 60 years. After this period a contribution rate of 17 per cent will not be sufficient to continue to pay benefits indefinitely. Other measures might well be necessary to ensure the long-term sustainability of the scheme. Also, while it is mathematically feasible to increase the contribution rate from 9 to 17 per cent between 2015 and 2030, questions arise concerning the levels of contribution that people will agree to pay in the future. Is 17 per cent too high? Is it equitable for coming generations of contributors?

Figure 8.2. **PAYG rates with normal retirement age increased to 65 compared to a contribution rate increased by 2 per cent every five years, starting in 2015** (percentages)
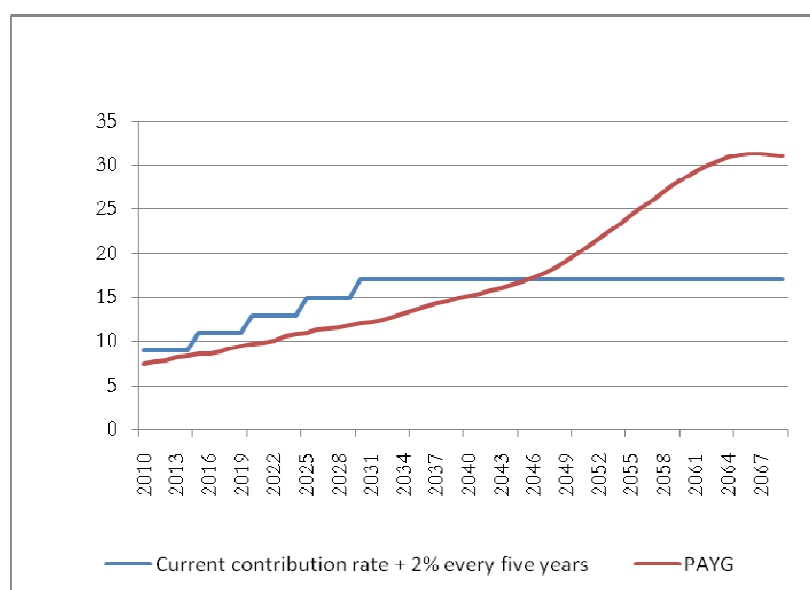
Table 8.1. **Financial projections: Cash inflows, cash outflows and reserve, 2009–2069, with an increase in the NRA over 20 years and the contribution rate reaching 17 per cent in 2030**

Year	Cash inflows				Cash outflows				Reserves	
	Contribution income	Investment income	Other income	Total	Benefits	Admin. expenses	Total	Surplus/ (Deficit)	End of year	No. of times current years expenditure
2009	50.0	34.8	0.7	85.4	33.3	6.6	39.9	45.5	661	16.6
2010	53.2	33.3	0.3	86.9	37.5	7.1	44.6	42.2	704	15.8
2011	58.1	36.1	0.4	94.6	42.1	7.7	49.8	44.8	748	15.0
2012	63.3	39.1	0.4	102.9	47.3	8.4	55.7	47.1	796	14.3
2013	68.0	42.3	0.4	110.8	53.0	9.1	62.1	48.7	844	t3.6
2014	74.0	45.7	0.5	120.3	59.2	9.9	69.1	51.2	895	t3.0
2015	97.7	49.8	0.6	148.2	66.1	10.7	76.8	71.4	967	12.6
2019	131.3	72.3	0.9	204.4	99.5	14.3	113.9	90.6	1306	11.5
2029	291.8	170.0	1.9	463.7	207.7	23.3	231.1	232.6	3 035	13. t
2039	493.2	374.4	3.2	870.8	397.8	34.8	432.6	438.2	6 646	15.4
2049	787.9	685.0	5.1	1478.0	830.3	55.6	885.9	592.1	12 055	13.6
2059	1 087.1	963.7	7.1	2057.8	1 699.5	76.7	1776.2	281.6	16 679	9.4
2069	1 522.4	952.9	9.9	2485.2	2669.1	107.5	2776.5	(291.3)	16 204	5.8

One element that stands out in each scenario that has been produced for this actuarial valuation: the moment when the PAYG rate will exceed the current contribution rate is not far off. This is shown in table 8.2.

Table 8.2.   Year the PAYG rate will exceed the contribution rate of 9 per cent

Scenarios	Year
Base scenario	2017
Increase of NRA from 60 to 65 (over 20 years)	2018
Increase of NRA from 60 to 65 (over 12 years)	2020
Modification to the pension formula (last actuarial valuation's recommendation)	2019
High population growth	2018

Because all scenarios are converging relatively to the same point in time, it is suggested that the contribution rate should be increased by 2 per cent in 2015. Such an increase is inappropriate in the current context due to the financial crisis, but should be considered in the medium- term. The new contribution rate of 11 per cent will make it possible to continue to accumulate a reserve that will be useful and necessary for the next generations. The necessity of further increases in the contribution rate should be evaluated in upcoming actuarial valuations.

Recommendation #2: An increase in the contribution rate of 2 per cent in 2015

Rethinking the pension system

If a higher contribution rate is not an adequate solution to solving the sustainability problem, and given that investment income cannot alone reverse the current trend, modifications to the benefits will have to be considered. It is possible to find solutions today that will maximize the performance of the social security system and minimize the financial pressure on the coming generations. As discussed in Chapter 5, a modification to the current pension accrual rate could be considered. At 30 per cent for the first ten years and 1 per cent thereafter, the current accrual rate is biased toward those who have an uneven career affected by frequent episodes of unemployment. In the current context, this pension formula is valuable; any reduction in benefits would lower an average replacement ratio that is already low. Thus, modifications should take into account the performance of the scheme relative to important indicators such as poverty reduction and income replacement ratio. In our opinion, rethinking the pension system involves considering and analysing the following solutions:

1.   Establishing explicit objectives relatively to poverty reduction in Grenada. This could be achieved by putting in place a universal pension payable to everyone. Chapter 1.5 provides an example of a universal pension with its cost in relation to GDP.

2.   Coordinating the poverty alleviation programme (through the universal pension for example) with the pension that is paid from the NIS. By protecting vulnerable people through a universal pension, it becomes easier to modify the pension formula.

3.   Allowing supplementary private pension plans to play a more important role. Currently, few employers have established a supplementary pension plan for their employees. Such pension plans could take the form of defined contribution or defined benefit plans. Introducing such plans could be combined with modifications to fiscal policies and the implementation of a regulatory authority. A deep analysis should be made and should include a variety of possibilities, among them the implementation of a non-mandatory defined contribution plan where the administration and investment are carried out by a public or parastatal institution such as the NIS. Proceeding in this

way could considerably reduce administrative fees, encourage additional savings for retirement and consequently be more beneficial to the contributors.

The sooner these actions are taken, the less drastic they will have to be. An immediate analysis should be carried out in order to find solutions to the upcoming problems. Considering the fact that the scheme is not yet mature, there is still time to find creative and sustainable solutions.

Recommendation #3: A deep analysis of the pension system in Grenada

Appendix I

Summary of contribution and benefit provisions

The following is a general description of the coverage, contributions and benefit provisions of the Grenada National Insurance Scheme at 1 January 2010. The actuarial valuation also takes into account modifications to the scheme that will come into effect in future as described in section 1.

1. Contingencies covered

The Grenada National Insurance Scheme provides for the following benefits:

- **Short-term Benefits:** Sickness Benefit, Maternity Allowance, Maternity Grant, and Funeral Grant.

- **Long-term Benefits:** Age, Invalidity and Survivors' Pensions and Grants.

- **Employment Injury Benefits:** Injury Benefit, Disablement Benefit, Constant Care Allowance, Medical Expenses, Death Benefit and Funeral Grant.

2. Insured persons

The Scheme covers employed, self-employed and voluntarily insured persons from ages 16 to 59 as follows:

- employed persons in the private and public sector are covered for all contingencies;

- self-employed persons are covered for all contingencies;

- voluntarily insured persons are covered for long-term benefits and funeral grant only.

Contributions by self-employed persons are mandatory. Employed persons aged 60 and over and under 16 (holiday workers) are covered for Employment Injury Benefits only.

3. Insurable earnings and contributions

In addition to salary, insurable earnings include overtime pay, cost-of-living allowance, commissions, gratuities and service charge payments.

Earnings that are covered for the purpose of determining contributions and benefits are limited to $693 per week or $3,000 per month. The monthly ceiling on insurable earnings has increased as follows:

1983-1995	$1,250
1995-1998	$2,500
1998-present	$3,000

Contributions are computed as a percentage of insurable earnings. The contribution rate is 9 per cent, 4 per cent paid by the employee and 5 per cent by the employer, with 9 per cent for the self-employed. A contribution rate of 1 per cent is payable by the employer on behalf of workers who are aged 60 or over and those under 16 on holiday jobs. Before Employment Injury Benefits were introduced in 1998, the contribution rate was 8 per cent. Voluntary contributors pay at 6.75 per cent of insurable earnings.

Self-employed persons can choose their level of insurable earnings, subject to the same ceiling as that stated above.

4.   Benefit provisions

Long-term benefits

(a)   Age pension

Contribution requirement: 150 weekly contributions paid and 500 weekly contributions paid or credited.

Age requirement: 60. The pension is not dependent on retirement from the workforce.

Amount of benefit: 30 per cent of average insurable earnings over the best five years, plus 1 per cent for every set of 50 weeks credited over 500.

- Maximum: 60 per cent of average insurable earnings

- Minimum: $46.40 per week

(b)   Age grant

Contribution requirement: 50 weekly paid or credited contributions.

Eligibility: The person must be ineligible for Age Pension.

Age requirement: 60.

Amount of benefit: Five times average weekly insurable earnings for each set of 50 weekly contributions paid or credited. This amount is paid as a lump sum.

(c)   Invalidity pension

Contribution requirement: 150 weekly contributions paid.

Eligibility: The insured is:

- (i) less than 60

- (ii) invalid, other than as a result of an employment injury, and

- (iii) not in receipt of sickness benefit.

Amount of benefit: Calculated in the same manner as Age Pension, with the same minimum and maximum pension.

Duration of pension: Payable for as long as invalidity continues.

(d)   Invalidity grant

Contribution requirement: 50 weekly contributions paid or credited.

Eligibility: Other than for not meeting the contribution requirements, the person must be eligible for Invalidity Pension.

Amount of benefit: Calculated in the same manner as Age Grant.

(e)   Survivors' pension

Contribution requirement: The deceased, at time of death, had paid at least 150 weekly contributions.

Eligibility:

■   Widows or widowers must have been married to or living with the deceased for at least three years.

■   Children up to age 16, or 18 (21 starting on 1 November 2010) if in full-time education, or invalid of any age, who were maintained by or living with the deceased at the time of death.

■   Parents who were wholly or mainly maintained by the deceased and the spouse and children have not exhausted the maximum amount payable.

Amount of benefit: Shown below is the proportion of the pension received by the deceased, or the Invalidity Pension the deceased would have been entitled to:

■   widow or widower: 75 per cent

■   child: 25 per cent (divided equally among all children)

■   full orphan or invalid orphan: 50 per cent

■   parent: 25 per cent

■   minimum widow/widower benefit: same as for Age and Invalidity Pension;

■   minimum child benefit: $9.90 per week ($19.70 per week starting on 1 November 2010)

■   minimum benefit for orphan/invalid: $19.70 per week

■   maximum family benefit: 100 per cent of Age Pension. However, due to minimum pensions, the total family benefit can be more than 100 per cent.

Duration of benefit:

Widow and widowers:

(i)   For life, if at the date of death the widow or widower was either at least 50 or less than 50 but invalid, and married or living with the deceased for at least three years.

(ii)   For one year only, if at the date of the spouse's death the widow or widower was less than 50 and not an invalid, or he/she was at least 50 but married or living with the deceased for less than three years.

(iii) The pension ceases on remarriage.

Widow(er)s who may also be entitled to an Age Pension will receive 100 per cent of the Age Pension plus 50 per cent of the Survivors' Pension.

For dependent children, the pension will be paid up to age 16, or 18 (21 starting on 1 November 2010) if in full-time education, or invalid of any age or until recovery from invalidity.

(f) *Survivors' grant*

Contribution requirement: 50 weekly contributions paid or credited.

Amount of benefit: The same proportions apply as those used for the Survivors' Pension, but are applied to the Age Grant at death.

Short-term benefits

(a) *Sickness benefit*

Contribution requirement: 13 paid contribution weeks with at least 8 weeks of contributions in the last 13. The insured must be under age 60 and must have been engaged in insurable employment immediately at the onset of the illness.

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

Amount of benefit: 65 per cent of average weekly insurable earnings during the last 13 weeks prior to the illness, with the insurable earnings determined by using wages only in weeks worked.

Duration of benefit: Maximum of 26 weeks. May extend another 26 weeks if at least 150 paid contributions and at least 75 paid or credited contributions in the last three years.

(b) *Maternity allowance*

Contribution requirement: 30 paid contribution weeks with at least 20 weeks in the 30-week period immediately preceding either (i) the week that is six weeks before the expected week of confinement, or (ii) the week from which the Allowance is claimed.

Amount of benefit: 65 per cent of average weekly insurable earnings during the last 30 weeks (at least $522 in total).

Duration of benefit: 12 weeks, starting no earlier than six weeks before the expected date of confinement.

(c) *Maternity grant*

Contribution requirement: Same as for Maternity Allowance. If the mother fails to qualify for Maternity Allowance, but her legally married husband's contributions satisfy these conditions, the Maternity Grant is payable.

Amount of grant: $522. The Maternity Grant has increased on an ad-hoc basis as follows:

1994-1998	$400
1998-2006	$450
2007-present	$522

(d) *Funeral grant*

Eligibility: An insured person who has paid at least 50 contributions, or was in receipt of or had title to a benefit, or who was insured for at least eight weeks during the last 13 weeks. A grant is also payable in respect of the death of the spouse or a dependent child. Note that

when death results from employment injury, no prior contributions are required and only one grant may be paid.

Amount of grant: $2,320 for the insured, $1,740 for an uninsured spouse, and $870 for a dependent child. The funeral grant for the insured has been increased on an ad-hoc basis as follows:

1979-1983	$ 300
1984-1988	$ 500
1988-1995	$1,000
1995-1997	$1,600
1998-2006	$2,000
2007-present	$2,320

Employment injury benefit

(a)   Injury benefit

Eligibility: Incapable of work as a result of a work-related accident or a prescribed disease. There are no qualifying contribution requirements for any Employment Injury benefits.

Amount of benefit: 70 per cent of average insurable earnings in the last 13 weeks before the accident occurred (or less if the person was in employment for a shorter period).

Duration of benefit: Maximum of 26 weeks.

Waiting period: Three days. If incapacity lasts for more than three days, benefit is payable from the first day.

(b)   Disablement benefit

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

Waiting period: The period of payment of Injury Benefit.

Amount of benefit: Percentage of average insurable earnings by reference to percentage loss of faculty suffered. If the degree of disablement is 30 per cent or more, a Pension is paid and is calculated as follow: the Injury Benefit amount times the degree of disablement.

If the degree of disablement is less than 30 per cent, a Grant equal to 365 times the weekly Injury Benefit times the degree of disablement is paid. If the period of disablement is expected to be less than seven years, the amount of the Grant is the number of weeks of disablement expected times the weekly Injury Benefit times the degree of disablement.

Constant Care Allowance

If the degree of disablement is 100 per cent and a full-time attendant is required, a Constant Care Allowance of an additional 50 per cent of the Disablement Benefit is paid.

(c)   Death benefit

Eligibility: Dependants are defined as for Survivors' Benefit.

Amount of benefit: Proportion of Disablement Pension, the same percentage as for Survivors' Pension. In the case of remarriage, a lump sum of one year's pension is paid.

(d)   Medical expenses

Expenses covered: Medical, surgical, dental, hospital and nursing services, medicines, prosthetic devices and transportation costs incurred as a result of an employment injury or prescribed disease.

CARICOM agreement on social security

Grenada is a signatory to the CARICOM Agreement on Social Security. As a result, some former contributors with fewer contributions than required for Age, Invalidity and Survivors' pensions may qualify for these pensions under the Agreement based on the total number of contributions they have made in participating countries.

Appendix II

List of tables and figures in Appendix II

Tables

Figures

Methodology, data and assumptions

This actuarial review makes use of the comprehensive methodology developed at the International Financial and Actuarial Service of the ILO (ILO FACTS) for reviewing the long-term actuarial and financial status of a national pension scheme. The review has been undertaken by modifying the generic version of the ILO modelling tools to fit the specific case of Grenada and its 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 Grenada's future demographic and economic environment. Next, projection factors specifically related to social security are determined and used in combination with the demographic and economic framework to estimate future cash flows and the scheme reserve. 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.

1. Modelling demographic and economic developments

Grenada's general population has been projected from information obtained from the Central Statistical Office and by applying appropriate mortality, fertility and migration assumptions. The following tables describe those assumptions.

Table AII.1. Age-specific and total fertility rates (TFR)

Age group	2009	2035
15-19	0.0490	0.0167
20-24	0.1234	0.0844
25-29	0.1040	0.1403
30-34	0.0860	0.0874
35-39	0.0554	0.0353
40-44	0.0203	0.0059
45-49	0.0020	0.0000
TFR	2.20	1.85

The total fertility rate is assumed to decrease from 2.2 to 1.85 in 2035, and remain constant thereafter. Table AII.1 shows ultimate age-specific and total fertility rates.

Mortality rates have been set to reproduce the life expectancy patterns obtained in Grenada's Vital statistics report 2000–2006. Since no mortality tables were available, information from other countries and organizations (the United Nations) has been analysed and used to estimate and shape the mortality rates table. Life expectancy at birth in 2009 has been assumed at 70.6 and 76.3 for males and females, respectively. Improvements in life expectancy have been assumed to follow the "medium" rate as established by the United Nations. This mortality pattern is also used to project survivors' benefits payable on a participant's death.

The life expectancies at birth, at age 20 and at age 60, and sample mortality rates for sample years are provided in tables AII.2 and AII.3 respectively.

Table AII.2. Life expectancy, 2009, 2039 and 2069, by age and sex

Year	Males			Females		
	At 20	At 40	At 60	At 20	At 40	At 60
2009	52.8	35.0	19.8	58.4	39.7	22.9
2039	57.2	38.7	22.5	61.0	41.8	24.2
2069	60.3	41.6	24.8	64.2	44.6	26.1

Table AII.3. Sample mortality rates, 2009, 2039 and 2069

Age	Males			Females		
	2009	2039	2069	2009	2039	2069
15	0.00160	0.00083	0.00054	0.00086	0.00029	0.00011
20	0.00159	0.00087	0.00059	0.00078	0.00035	0.00014
25	0.00172	0.00104	0.00079	0.00085	0.00045	0.00020
30	0.00234	0.00153	0.00125	0.00126	0.00074	0.00034
35	0.00352	0.00238	0.00200	0.00202	0.00125	0.00061
40	0.00513	0.00352	0.00292	0.00298	0.00191	0.00099
45	0.00703	0.00485	0.00390	0.00403	0.00271	0.00154
50	0.00916	0.00632	0.00492	0.00515	0.00374	0.00226
55	0.01167	0.00812	0.00619	0.00653	0.00504	0.00307
60	0.01510	0.01067	0.00810	0.00870	0.00688	0.00430
65	0.02054	0.01473	0.01118	0.01262	0.01015	0.00678
70	0.02980	0.02165	0.01644	0.01981	0.01632	0.01175
75	0.04549	0.03362	0.02564	0.03249	0.02754	0.02141
80	0.07125	0.05388	0.04147	0.05371	0.04705	0.03944
85	0.11160	0.08527	0.06595	0.08726	0.07750	0.06692
90	0.17240	0.13172	0.10187	0.13790	0.12248	0.10576
95	0.26103	0.19944	0.15425	0.21168	0.18801	0.16234
100	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Net migration (in minus out) for each scenario is assumed to decline over the projection period at varying rates and reaching different ultimate levels. The same assumptions as those in previous actuarial valuation have been made concerning net migration. The following table shows the age distribution of net migrants for the first projection year (2009) and the ultimate levels (2048 and beyond).

Table AII.4. Net migration, number of persons, 2009 and 2048

	Male		**Female**	
	2009	**2048**	**2009**	**2048**
0-9	-23	-8	-23	-8
10-19	-18	-6	-18	-6
20-29	-120	-40	-120	-40
30-39	-79	-26	-79	-26
40-49	-26	-9	-26	-9
50-59	-7	-2	-7	-2
60-69	-2	-1	-2	-1
70 +	0	0	0	0
Total	-276	-92	-276	-92

The projection of the labour force, that is, the number of people available for work, is obtained by applying assumed labour force participation rates by sex and age to the projected number of persons. Between 2009 and 2069, age-specific labour force participation rates are assumed to stay constant for both males and females. Table AII.5 shows the assumed age-specific labour force participation rates used for the projection.

Table AII.5. Age-specific labour force participation rates (percentages)

Age	**Male**	**Female**
15	28.5	27.4
20	59.7	57.4
25	86.8	83.4
30	92.3	88.8
35	93.4	89.8
40	93.8	90.1
45	92.8	89.2
50	90.6	87.1
55	83.9	80.6
60	65.0	62.5
65	27.7	26.6

The number of employed persons times the projected labour productivity per worker gives the projected real GDP. Assumptions for average salary growth and labour productivity per worker are established in an exogenous way and are set equal in the long term, as it is expected that wages will adjust to efficiency levels over time. The increases in the real average salary are assumed to be gradual over the first six years of the projection period, from 0 to 1 per cent. The inflation assumption affects nominal average wage increases. Table AII.6 shows the inflation rate in Grenada from 2000 to 2009. For the first four years of projection, inflation is presumed to be 3.20, 3.05, 2.90 and 2.75 per cent, remaining constant thereafter at 2.75 per cent, as shown in table AII.7.

Table AII.6. Inflation rate, 2000-2009

Year	Inflation rate (%)
2000	0.6
2001	2.2
2002	1.7
2003	3.3
2004	2.3
2005	3.5
2006	4.3
2007	3.9
2008	8.0
2009	-0.3

Source: Statistical Division, Ministry of Finance.

The NIS investment portfolio is invested not only in government bonds, but also in corporate bonds, fixed deposit and housing loans. During the last ten years, the average real return on assets invested was 4.0 per cent. The ultimate real return on assets is established at 3.25 per cent. The following table presents a summary of the principal economic assumptions.

Table AII.7. Inflation rates, earnings growth and interest rates from 2010 (percentages)

Period	Inflation rates	Average rate of growth on earnings		Annual return on assets	
		Nominal	Real	Real	Nominal
2010	3.20	0.00	3.20	1.80	5.00
2011	3.05	0.20	3.25	2.05	5.10
2012	2.90	0.40	3.30	2.30	5.20
2013	2.75	0.60	3.35	2.55	5.30
2014	2.75	0.80	3.55	2.65	5.40
2015	2.75	1.00	3.75	2.75	5.50
2016	2.75	1.00	3.75	2.85	5.60
Ultimate	2.75	1.00	3.75	3.25	6.00

2. Projection of NIS income and expenditure

This actuarial review addresses all Grenada National Insurance Scheme revenue and expenditure items. For short-term (sickness and maternity) benefits and employment injury benefits, income and expenditure are projected as a percentage of insurable earnings. For long-term benefits (pensions), funeral benefits and grants, projections are performed following a year-by-year cohort methodology. For each year up to 2069, the number of contributors and pensioners, and the EC dollar value of contributions, benefits and administrative expenditure, is estimated. Once the projections of the insured (covered) population, as described in the next section, are complete, contribution income is then determined from the projected total insurable earnings, the contribution rate, contribution density and the collection rate. 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 cash flow in the year. NIS administrative expenses are modelled as a flat percentage of

insurable earnings. Finally, the year-end reserve is the beginning-of-year reserve plus the net result of cash inflow and outflow.

Based on recent experience, the administrative expenses assumption is 1.2 per cent of total insurable earnings each year. This is in line, but a little more conservative, than the assumption used in the previous valuation.

3. NIS population data and assumptions

The projection of the insured population requires a certain amount of information and a number of assumptions. Projections start with the number of contributors as at the date of the analysis. The growth of this population is then estimated using the assumptions described in the next section. Several other assumptions of decrement are required, namely retirement rates by age and sex, prevalence rate of disability and mortality rates. Finally, a distribution assumption is required for new entrants into the covered population.

3.1. Insured population at the valuation date

Data on the insured population were obtained from the NIS. The information transmitted was validated to ensure that all the data were comprehensive and consistent. Table AII.8 shows the number of members who contributed during the last financial year preceding the valuation date, by age and sex. The distribution of the contributors in 2009 comes from an extraction from the computerized system of the NIS. Two adjustments have been made to adjust the data to the model and to take into account the lack of information for some contributors:

1. In the model, the contributors are aged from 15 to 69. There are 189 people (0.4 per cent of the population) outside of these ages; these have been distributed among their closest age groups.

2. For 9 per cent of contributors in 2009, the age is unknown. This is an important proportion of all contributors. The analysis of the data indicates that their salary and density of contribution are low and that the large majority of them are registered with the scheme for only one year. Given this information, we have made the assumption that 90 per cent of these people are new entrants; they are therefore distributed according the distribution of new entrants. The remaining 10 per cent are distributed according the distribution of members where all information is known.

Table AII.8. Distribution of active members (contributors) by age and sex, 2009

Age	Males	Females	Total
15-19	1 397	882	2 279
20-24	3 714	3 780	7 494
25-29	3 108	3 345	6 453
30-34	2 387	2 664	5 050
35-39	2 324	2 404	4 727
40-44	2 179	2 285	4 464
45-49	2 295	2 348	4 643
50-54	1 987	1 968	3 955
55-59	1 206	1 090	2 297
60-64	574	484	1 059
65-69	197	123	320
Total	21 367	21 373	42 740

3.2.   *Projection of the insured population*

The projection of the insured population constitutes the basis for projections of the scheme's costs. Generally, these projections require the use of assumptions pertaining specifically to the population, such as retirement rate by age and sex.

The insured population was projected by applying an annual growth rate to the initially insured population by group (see next section). Once the total growth is established, the number of new entrants into the covered population is calculated by adding to this growth the number of people who become disabled or retired. Retirement rates, mortality rates, disability rates and the distribution of new entrants are all estimated by age, sex and group.

3.2.1. Growth of insured population

In order to forecast the NIS's costs, the initial insured population has to be projected over the long term. In order to do this, annual growth rates have been used, as shown in table AII.9. The growth of the insured population reflects long-term trends in the evolution of the employed population. Over the short and medium term the growth of the insured population is higher, to compensate the decrease in the number of contributors due to the global crisis.

Table AII.9.   Insured population growth assumptions, by sex and period (percentages)

	2009-2024	2025-2039	2040-2054	2054-2069	Average
Males	2.6	0.2	0.9	-0.7	0.7
Females	2.8	0.3	0.8	-0.6	0.8
Total	2.7	0.2	0.8	-0.6	0.8

3.2.2. Distribution of new entrants

This distribution is established from the experience of the scheme. The same distribution of new entrants is used for the entire projection period. According to the model used, the number of new entrants is the difference between the population at the beginning of the year (to which an overall growth rate is applied) and the same population at the beginning of the year (to which mortality and retirement rates are applied). Table AII.10 shows the distribution of new entrants.

Table AII.10. Distribution of new entrants (percentages)

Age	Males	Females
15-19	39.0	30.0
20-24	35.0	40.0
25-29	10.0	14.0
30-34	5.0	5.0
35-39	5.0	5.0
40-44	5.0	5.0
45-49	1.0	1.0
50+	-	-
Total	100.0	100.0

3.2.3. Disability incidence rates

Table AII.11 shows the expected incidence rates of insured persons qualifying for invalidity benefit; these rates are assumed for all projection years.

Table AII.11. Disability rates (per 10,000 population)

Age	Females	Males
15	0.0	0.0
20	0.0	0.0
25	0.0	0.5
30	2.6	1.5
35	5.2	4.6
40	13.7	12.6
45	18.1	16.7
50	28.0	23.0
55	65.4	54.8

Persons with disabilities generally have a higher mortality rate than active participants. Due to the low number of such persons experienced by the NIS each year, it has been assumed that the mortality rates of the disabled are the same as for the active and insured population.

3.2.4. Retirement rates

It has been assumed that all people retire at age 60.

3.2.5. Structure of the insured population

Figures AII.1 shows the age structure of the initial insured population and the one that would prevail at the end of the projection. At the beginning of the projection period, the number of insured people is 42,740 and the average age is 36 years, while at the end of the projection period there are 68,269 people insured with an average age of 41 years.

Figure AII.1. Distribution of the insured population by age, 2009-2069
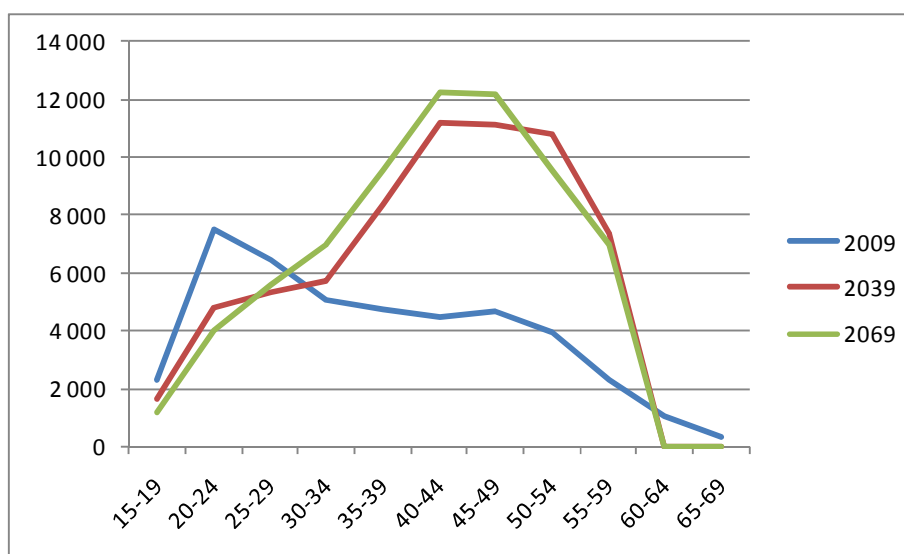
3.3. Salary scale and density of contribution

Table AII.12 shows the salary scale used at the beginning of the projection period. Earnings are projected using the assumptions described earlier.

Table AII.12. Distribution of monthly earnings* by age and sex, 2009 (EC$)

Age	Males	Females	Both sexes
15-19	941	928	936
20-24	1 176	1 107	1 141
25-29	1 426	1 298	1 359
30-34	1 629	1 413	1 515
35-39	1 752	1 457	1 602
40-44	1 782	1 459	1 617
45-49	1 770	1 465	1 616
50-54	1 755	1 457	1 607
55-59	1 708	1 407	1 565
60-64	1 612	1 334	1 485
65-69	1 491	1 253	1 399
Average	1 534	1 338	1 436

* Annual earnings divided by 12.

For the purpose of the projection, the actuarial model distributes average wages into three sections (low, medium, high) with the aim of measuring the effect of the minimum pension and the ceiling. It is estimated that the dispersion observed in the distribution of the earnings will remain constant throughout during the projection period. However, in 2010, 2012 and 2014, salaries in the highest section are increased to reflect the gradual increase in the ceiling shown in table AII.13. As of the valuation date, the ceiling is $3,000.

Table AII.13. Increase in the ceiling of insurable earnings, 2010-2014

Date of ceiling change	Level of ceiling (EC$)
1 November 2010	3 500
1 January	4 250
1 January	5 000

There is no information on salaries above the ceiling; all salaries declared at the NIS have already been cut by the employer to reflect the ceiling. For the year 2009, there were 4,095 persons, 9.6 per cent of all contributors, whose salaries are affected by the ceiling. To estimate the impact of the increase in the ceiling, salary distribution by age and sex was analysed and a corresponding polynomial regression formula was found. The same adjustment factors have been used for females and males.

Contribution density represents the proportion of the year during which participants pay contributions to the scheme. A high contribution density means that participants will accumulate pension benefits quickly and that the proportion of those entitled to a pension will increase compared to those entitled only to a grant benefit. In the private sector, it is normal that the contribution density is less than that observed in the public sector, due to less stability in employment. The contribution density assumed in this actuarial valuation is shown in table AII.14 and is based on the experience of the last three years.

Table AII.14 Contribution density by age and sex (percentages)

Age	Males	Females
15-19	37.6	34.2
20-24	62.5	68.3
25-29	71.4	79.3
30-34	76.3	81.9
35-39	78.5	82.9
40-44	78.4	83.2
45-49	78.9	85.2
50-54	79.9	84.7
55-59	82.0	80.5
60-64	61.8	53.4
65-69	37.4	22.2

3.4. Past service

Credited service for both the active and inactive insured populations was transmitted by the NIS. Table AII.15 shows the total number of years of contributions for active participants, by age and sex.

Table AII.15. Average past contribution years for the active insured, as at December 2009

Age	Years	
	Males	Females
15-19	0.3	0.2
20-24	1.5	1.3
25-29	3.9	3.8
30-34	6.4	6.3
35-39	9.2	8.7
40-44	11.8	10.8
45-49	13.0	12.9
50-54	13.6	14.0
55-59	14.1	14.3
60-64	12.6	13.0
65-69	7.0	7.8

3.4.1. Pensioners at the valuation date

The following tables show the distribution of pensioners used for this actuarial valuation as at the valuation date.

Table AII.16 Old-age pensions in payment, December 2009, by age and sex

Age	Male (old-age)		Male (Provident Fund)		Female (old-age)		Female (Provident Fund)	
	Number	Average amount	Number	Average amount	Number	Average amount	Number	Average amount
0-4								
5-9								
10-14								
15-19								
20-24								
25-29								
30-34								
35-39								
40-44								
45-49								
50-54								
55-59								
60-64	683	719	15	146	614	631	24	146
65-69	514	563	31	146	426	497	66	146
70-74	341	432	167	146	294	363	206	146
75-79	181	408	144	145	156	302	210	145
80-84	81	413	116	146	81	266	182	145
85-89	9	201	45	146	15	201	96	145
90-94			12	146	12	201	35	146
95+	1	201	4	146	2	201	9	146
Total	1 810	573	534	145	1 600	488	828	145

Table AII.17. Invalidity pensions in payment, December 2009, by age and sex

Age	Male		Female	
	Number	Average amount	Number	Average amount
0-4				
5-9				
10-14				
15-19				
20-24				
25-29				
30-34	1	201	1	201
35-39	3	391	3	486
40-44	11	472	16	264
45-49	23	396	26	284
50-54	25	436	24	248
55-59	56	503	49	433
60-64	39	434	49	385
65-69	30	353	27	334
70-74	12	284	20	247
75-79			11	229
80-84				
85-89				
90-94				
95+				
Total	200	428	226	335

Table AII.18. Survivors' pensions in payment, December 2009, by age and sex

	Female		Male	
Age	**Number**	**Average amount**	**Number**	**Average amount**
0-4				
5-9				
10-14				
15-19				
20-24				
25-29	2	388		
30-34				
35-39	1	402		
40-44	1	900		
45-49	8	484	4	395
50-54	18	483	6	336
55-59	37	366	4	641
60-64	55	292	3	262
65-69	65	351	4	300
70-74	69	265	6	253
75-79	51	226		
80-84	36	296	2	145
85-89	11	193	1	201
90-94	4	201		
95+				
Total	**358**	**308**	**30**	**339**

Table AII.19. Orphans' pensions in payment, December 2009, by age and sex

	Male		Female	
Age	**Number**	**Average amount**	**Number**	**Average amount**
0-4	17	97	10	106
5-9	47	82	45	98
10-14	93	107	109	94
15-19	116	98	113	100
20-24	1	73		
25-29	1	243		
30-34	2	241	1	604
35-39				
40-44	1	101	1	272
45-49	1	101	3	102
50-54	2	191		
55-59	1	283		
60-64				
65-69				
70-74				
75-79				
80-84				
85-89				
90-94				
95+				
Total	**282**	**101**	**282**	**100**

3.5. Family structure

Information on the family structure of the insured population is necessary for the projection of survivors' benefits. Assumptions have to be established on the probability of being married at death, the average age of spouses, the average number of orphans and their average age. Examples of the assumptions appear in table AII.20.

Table AII.20. Family statistics

Age	Probability of being married		Average age of spouse		Average number of dependent children		Average age of the children	
	Males %	Females %	Males	Females	Males	Females	Males	Females
15	-	1	18	17	-	0.1	-	0.3
20	2	11	23	21	0.1	0.6	0.5	2.9
25	14	24	28	26	0.4	1.4	4.2	6.2
30	26	32	31	32	0.7	2.1	6.6	8.4
35	33	33	34	40	1.1	2.0	10.1	9.5
40	33	35	38	45	1.1	1.6	10.9	11.3
45	37	52	42	49	0.9	0.9	11.9	12.7
50	54	49	48	54	0.7	0.5	13.6	14.1
55	47	43	51	61	0.6	0.3	14.1	15.0
60	42	36	58	65	0.3	0.2	14.6	15.9
65	35	34	63	71	0.1	0.1	16.6	16.8
70	34	34	68	77	0.1	0.0	16.9	16.9
75	34	29	72	83	0.0	0.0	16.9	16.9
80	27	21	76	92	0.0	-	16.9	16.9
85	20	16	79	97	-	-	16.9	16.9
90	15	10	82	99	-	-	16.9	16.9
95	8	1	87	99	-	-	16.9	16.9

3.6. Adjustment of pensions in payment

Under the base scenario, pensions in payment are assumed to be indexed in the future at a rate equal to the inflation rate. This assumption is made even if, in the NIS Act, there is no provision for a cost-of-living adjustment. The goal is to measure the financial soundness of the scheme in the context of maximizing opportunities for pensioners to see their pension increase in the future according to some indicator.

Appendix III

The funding of social insurance: Some concepts

1. Pure assessment – pay-as-you-go system

Under this financial system, the contribution rate during a given period – for example, one year (annual assessment) or a few years – is determined in such a way that income from contributions during a period will just cover the expenditure of the scheme during the same period, with a small margin to allow the constitution of a contingency reserve. This is the system usually applied to the financing of short-term benefits such as sickness and maternity cash benefits. Annual benefit expenditure is expected to remain at a relatively constant level once the scheme has attained a certain maturity, unless the benefit provisions themselves have been changed. The contingency reserve enables coverage of unexpected expenditure due to temporary fluctuations of the risk factors involved. The reserve should, therefore, be maintained in a sufficiently liquid form so that it can be readily accessed when necessary. If a pure assessment system were applied to a new pension scheme, it would involve frequent revisions of the contribution rate. The annual expenditure under a new pension scheme would begin at a comparatively low level and increase continuously over a long period of time. This is because there will be an increasing number of surviving pensioners. Another reason for escalating annual expenditure is that each new group of pensioners will be drawing higher rates of pension due to longer insurance periods compared to the previous generations of pensioners. Pure assessment is not appropriate for a new pension system. For a mature scheme, however, this financial system may be adopted.

2. General average premium system

A general average premium (GAP) system provides for a theoretically constant rate of contribution ensuring financial equilibrium ad infinitum. At any time, the present values of all probable future contribution income, plus accumulated reserves, should be equal to the present value of all probable future outlays, both in respect of the initial population and of future entrants. The contribution rate determined under this system would be relatively high and would lead to the formation of high reserves. Though theoretically constant, the contribution rate is likely, in practice, to be revised at periodic actuarial reviews. If this system were applied to a new pension scheme from the start, the rate of contribution would be relatively high and this could cause an undue burden on the economy and on the contributing parties.

3. Scaled premium system

It is possible to devise many intermediate systems of finance between the basically unfunded (PAYG) pure assessment system and the fully-funded GAP system. The following factors frequently lead to the adoption of an intermediate system of finance:

1. The contribution rate must not be excessive with respect to the capacities of the members and the economy in general.

2. The initial and any subsequent contribution rates established under the system of finance applied to the scheme should remain relatively stable for reasonable periods of time. Increases in the contribution rate should be gradual, particularly when they are not accompanied by an improvement in benefits.

An example of an intermediate level of funding is the scaled premium system of finance. Under this system, a contribution rate is established such that during a specified period,

which is known as the period of equilibrium, the contribution income and the interest income on the reserves of the scheme will, in each year, be adequate to meet the expenditure on benefits and administration in that year. In order to avoid a decrease in the reserves after the end of a period of equilibrium, the contribution rate must be revised prior to this and a new higher contribution rate applied during a new period of equilibrium. Thus, financial equilibrium would be assured for limited periods, such as 20, 15 or ten years, within each of which the contribution rate is supposed to remain stable. Subsequently, it would be increased by stages – 20, 15 or ten years, respectively. There would be a moderate accumulation of funds, the amount of which depends on the length of the period of equilibrium. A short period of equilibrium would result in a low contribution rate, which would have to be increased rather frequently, and would bring about a low degree of accumulation of funds, thus approaching the system of annual assessment. However, a long period of equilibrium would result in a relatively high initial contribution rate and a larger accumulation of funds, and consequently approaches the GAP system. The scaled premium system is flexible, as it permits adaptation to changes in the conditions determining the financing of the scheme. It should be emphasized, however, that the system requires periodic increases of the contribution rate which are not accompanied by benefit improvements. Although the contribution rate during the initial period of equilibrium will be lower than that under the GAP system, eventually a stage will be reached when it will exceed the contribution rate required under the latter financial system.

4. A fully-funded system

A fully-funded system is a system where liabilities are fully funded. Instead of relying on the younger generation of workers to pay the benefits, each generation is required to set aside enough money to pay its own benefits. At each moment during the life of the pension plan, accumulated contributions and investment income should be sufficient to pay all the promised benefits. If not, the deficit should be made good during a stated period. This kind of financing system is more prevalent in the private pension world because it protects workers if the pension plan ends.

Appendix IV

General methodology of the actuarial valuation

This actuarial review makes use of a comprehensive methodology developed at the Financial, Actuarial and Statistical Services of the ILO for reviewing the long-term actuarial and financial status of national pension schemes. The review was undertaken by modifying the generic version of the ILO modelling tools to fit the situation of the NIS. The 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.

1. Modelling the demographic and economic developments

The use of the ILO actuarial projection model requires the development of demographic and economic assumptions related to the general population, the economic growth, the labour market and the increase and distribution of wages. Other economic assumptions are related to the future rate of return on investments, the indexation of benefits and the adjustment of parameters, such as the maximum insurable earnings and the future level of flat-rate benefits.

The selection of assumptions for projections took into account the recent experience of the NIS to the extent that this information was available. These assumptions were selected to reflect long-term trends rather than giving undue weight to recent experience. The detailed description of the demographic and economic assumptions is presented in Appendix II.

2. General population

General population is projected starting with the most current data on the general population, and applying appropriate mortality, fertility and migration assumptions.

3. Economic growth and inflation

Labour productivity increases and inflation rates are exogenous inputs to the economic model. Real rates of economic growth are derived using the ILO economic projection model.

4. Active population and employed population

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 people in the general population. An unemployment rate is assumed for the future, and aggregate employment is calculated as the difference between labour force and unemployment. Growth in the insured population is linked to the growth in the employed population. This assumption is adequate since close to 90 per cent of the employed population is covered by the NIS. In this model, the insured population is projected starting with the most current data on insured participants, and then applying appropriate mortality, disability and retirement rates.

5. Salaries

Based on an allocation of total GDP to capital income and to labour income, a starting average wage is normally calculated by dividing the wage share of GDP by the total number of employed. In the medium term, real wage development is checked against labour productivity growth. In specific labour market situations, wages might grow faster or slower than productivity. However, due to the long-term perspective of the present

study, the real wage increase is assumed to gradually converge with real labour productivity. It is expected that wages will adjust to efficiency levels over time. In this model, in order to take into account the long-term perspective of the actuarial valuation, the long-term real wage increase is based upon a long-term assumption which is in line with assumptions observed in other actuarial valuations and a long-term view of the economy.

Wage distribution assumptions are also needed to simulate the possible impact of the social protection system on the distribution of income, for example through minimum and maximum pension provisions. Data on the wages by age and sex as well as on the dispersion of wages are used in the projection. Average earnings, which are used in the computation of benefits, are also projected.

6. Modelling the financial development of the social insurance scheme

The present actuarial review addresses all income and expenditure items of the long-term (pension) benefits and the short-term benefits. Projections for pensions are made separately for each sex. Due to the importance of the long-term benefits at the NIS, more importance is given to these projections. For short-term benefits, a targeted approach is used. As for these benefits, the future ultimate and stable probabilities were assumed and an assumption was made that the current experienced probabilities will gradually converge to these stable and ultimate probabilities.

7. Purpose of pension projections

The purpose of the pension model is twofold. First, it is used to assess the financial viability of the branch. This refers to the measure of the long-term balance between income and expenditure of the scheme. In case of an imbalance, a revision of the contribution rate, or of the benefit structure, is recommended. Second, the model may be used to examine the financial impact of different reform options, thus assisting policy-makers in the design of benefit and financing provisions. More specifically, the model is used to develop long-term projections of expenditure and insurable earnings under the scheme, for the purpose of:

1. Assessing the options for building up a contingency or technical reserve.

2. Proposing schedules of contribution rates consistent with the funding objective.

3. Testing how the system reacts to changing economic and demographic conditions.

4. Analysing the financial impact of possible modifications to the scheme.

8. Pension data and assumptions

Pension projections require the demographic and macroeconomic framework already described and, in addition, a set of assumptions specific to the social insurance scheme.

The database, as at the valuation date, includes the insured population by active and inactive status, the distribution of insurable wages among contributors and the distribution of past credited service and pensions in payment. Data are disaggregated by age and sex.

Scheme-specific assumptions, such as disability incidence rates and the distribution of retirement by age, are determined with reference to scheme provisions and the scheme's historical experience. The data and assumptions specific to the NIS are presented in detail in Appendix II.

9. Pension projection approach

Pension projections are made following a year-by-year cohort methodology. The existing population is aged and gradually replaced by successive cohorts of participants on an annual basis according to the demographic and coverage assumptions. The projection of insurable earnings and benefit expenditures are then made according to the economic assumptions and the scheme's provisions.

Pensions are long-term benefits. Hence, the financial obligations that a society accepts when adopting financing and benefit provisions for them are also of a long-term nature: participation in a pension scheme extends over a whole adult life, either as contributor or beneficiary, i.e. up to 70 years for someone entering the scheme at the age of 16 years, retiring at the age of 65 years and dying some 20 or so years later. During their working years, contributors gradually build entitlement to pensions that will be paid even after their death, to their survivors.

It is not the objective of pension projections to forecast the exact progression of a scheme's income and expenditure, but to verify its financial viability. This entails evaluating the scheme with regard to the relative balance between future income and expenditure. This type of evaluation is essential, especially in the case of the NIS, which has not yet reached its mature stage.