15th Actuarial Review

of the National Insurance Fund,
Unemployment Fund & Severance Fund
of Barbados as of December 31, 2014

Unwala House, Queen Street
Nassau, Bahamas

May 30th 2017

Dr. Justin Robinson
Chairman
National Insurance Board
Frank Walcott Building,
Culloden Road,
St. Michael, Barbados, W.I.

Dear Chairman Robinson:

Re: 15th Actuarial Review of the National Insurance Fund, Unemployment Fund and Severance Fund of Barbados

It is our pleasure to present to you the report of the 15th Actuarial Review of the National Insurance, Unemployment and Severance Funds of Barbados prepared as at December 31st, 2014.

Yours sincerely,

Morneau Shepell Ltd.

Derek Osborne,	Marcia Tam-Marks
Fellow, Society of Actuaries	Fellow, Society of Actuaries
Partner	Partner

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NATIONAL INSURANCE OFFICE
Frank Walcott Building
Flodden, Culloden Road
St. Michael, Barbados. W.I.
Tel: (246) 431-7400
Fax: (246) 431-7408
www.nis.gov.bb

Public Sector Reform
Making Barbados Work Better

July 31st, 2017

Senator, The Honourable Dr. Esther Byer-Suckoo
Minister of Labour, Social Security and Human Resource Development
Ministry of Labour, Social Security and Human Resource Development
3rd Floor, West Wing
Warrens Office Complex
Warrens
ST. MICHAEL

Dear Minister,

In accordance with Section 34 of the National Insurance and Social Security Act, which requires that an actuarial review of the National Insurance Scheme be conducted every three years, I am pleased to submit the report of the 15th Actuarial Review, prepared as at December 31st , 2014.

This Review has been conducted by Mr. Derek Osborne (FSA), the National Insurance Board's Consultant Actuary, of Morneau Shepell.

Yours sincerely,

Dr. Justin Robinson
Chairman
National Insurance Board

'National Insurance ...More than a contribution, it's your lifeline'

15th Actuarial Review

of the National Insurance Fund,
Unemployment Fund & Severance Fund
of Barbados as of December 31, 2014

BARBADOS
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Abbreviations and Acronyms

GDP	Gross Domestic Product
GOB	Government of Barbados
IE	Insurable Earnings
ILO	International Labour Office
IPS	Investment Policy Statement
ISSA	International Social Security Association
IT	Information Technology
LTB	Long-term Benefits
NI	National Insurance
NIB	National Insurance Board
NIF	National Insurance Fund
NIS	National Insurance Scheme
OECD	Organisation for Economic Co-operation & Development
PAYG	Pay-as-you-go
STB	Short-term Benefits
TFR	Total Fertility Rate

Introduction

The Barbados National Insurance Scheme (NIS) began operations on June 5, 1967. It currently covers all employed and self-employed persons and offers five main types of social security benefits with payments from three separate funds. The National Insurance Fund covers short-term benefits, long-term benefits or pensions and employment injury benefits, while the Unemployment Fund and Severance Fund cover unemployment benefits and severance payments, respectively. All benefits are financed by contributions which are levied on employment earnings up to a wage ceiling and are paid by employers, employees and self-employed persons. Funds that have accumulated in previous years that are not yet required for the payment of benefits are invested locally, regionally and internationally in various types of securities and properties.

This is the report of the 15th Actuarial Review of National Insurance, Unemployment and Severance Funds and it is being prepared as of December 31, 2014, three years after the 14th Actuarial Review. Section 34 of the National Insurance and Social Security Act requires that such reviews be conducted at three year intervals. The delayed preparation of this report is due to administrative system issues which affected the collection of timely and accurate demographic and financial data.

The main purpose of periodic actuarial reviews is to determine if the social security system in Barbados operates on sound financial and actuarial bases and if it provides adequate and affordable levels of income protection. Where considered necessary, recommendations aimed at ensuring that these objectives can be achieved for current and future generations are made.

For this review, 60-year demographic and financial projections have been performed for the National Insurance Fund while 10-year financial projections have been made for the Unemployment and Severance Funds. It should be noted that these projections are dependent on the underlying data, methodology and assumptions concerning uncertain future events and that the outcomes and eventual experience will most likely differ, possibly materially, from that indicated in the projections. Therefore, in accordance with the National Insurance Act, periodic actuarial reviews should be conducted. The next Actuarial Review of the three Funds is due as at December 31, 2017.

Data issues delayed the preparation of this report and also affected the quality and reliability of some data that was provided. In some instances, data relationships noted from previous actuarial reviews helped determine current data and assumptions. Revisions made to financial statements that were provided for the preparation of the 14th Actuarial Review resulted in some amounts presented in this report being different from those presented in the previous report.

Census, labour market and economic data published by the Barbados Statistical Service have also been used as inputs into assumptions and starting points for projections of the population, labour force and economy. In 2016, the IMF raised concerns about data inconsistencies and the credibility of some national statistics.

Although some statistical data were incomplete and financial statements unaudited, the overall data provided is considered acceptable for the primary purpose of this review. While these data issues may influence specific rates and years when key events are projected to occur, they do not, however, materially affect the general outlook for the three Funds and the conclusions drawn from the results presented.

The Actuary visited Barbados in June 2015 and December 2016 and held discussions with the Board, the Director, representatives of the Central Bank and Barbados Statistical Service, and staff of the National Insurance Office. He wishes to thank Mr. Ian Carrington - Director, Mrs. Jennifer Hunte – Deputy Director, Mr. Derek Lowe - Marketing & Research Officer, Ms. Thamie Clarke - Actuarial Analyst, and all other members of the National Insurance staff who assisted with this review.

May 30th, 2017

Executive Summary

This actuarial review analyses the experiences between 2012 and 2014 and presents prospects for the National Insurance, Unemployment and Severance Funds. Experience between January 2015 and September 2016 is also factored into all analyses and recommendations.

Periodic actuarial reviews of the three Funds provide a comprehensive assessment of the current and projected state of Barbados' social security system. They also provide policy recommendations for changes designed to ensure that a suitable balance between benefit adequacy and financial sustainability is achieved for both current and future periods.

Experience During the Review Period

During the 3-year review period, real GDP growth was weak and inflation was moderate. As unemployment rose, the estimated number of workers in 2014 fell to levels not experienced since 1999. The Government of Barbados' fiscal situation remained challenged with deficits of around 7% of GDP. At the end of 2014, central government debt exceeded 130% of GDP.

Following is a summary of key experience of the three Funds under review:

- The number of NIS contributors in 2014 declined sharply to its lowest level since 1998.
- Payouts for all pension-type benefits increased as expected.
- Interest rates on commercial bank fixed deposits fell during the period while rates on Government of Barbados debt remained relatively high.
- Total National Insurance Fund (NIF) expenditure surpassed contribution income in 2014 for the first time since 1997.
- As at December 2014, total NIF reserves were $4.7 billion, 8.0 times expenditure in 2014. Outstanding contributions totalled $224 million.
- After falling behind on its contributions and rental payments, the Government of Barbados covered some of its arrears by issuing Treasury notes and debentures to the NIF.
- The portion of combined investments held in government and quasi-government securities increased from 68% to 75%. This increase is contrary to both the Investment Policy and previous actuarial advice.
- Ninety-five (95%) of combined Funds' assets are invested in Barbados.
- Reserves of the Unemployment Fund fell to $41 million at the end of 2014, or 8 months' worth of benefit payments.
- The Severance Fund continued to generate surpluses in an environment of business closures and worker layoffs.
- Challenges related to the installation of an upgraded insurance administration system continued to plague the NIS with delays in the payment of short-term benefits.
- The NIS has not issued NIF annual reports since 2009 and has not submitted to the Minister audited financial statements since 2004.

National Insurance Fund

This report's assessment of National Insurance policy and design indicators suggests that current contribution and benefit provisions generally provide a very good level of benefit adequacy and income protection to most workers and pensioners. The legislated annual adjustments of the earnings limit and pensions have been effective in replacing most of the price inflation felt by pensioners and maintaining adequate insurance coverage for higher paid workers. No adjustments were made in 2015 and 2016.

Limited investment diversification and weak government finances remain major concerns for the Fund's long-term sustainability. At the end of 2014, 71% of Fund assets were held in GOB bonds, Treasury Notes and Treasury Bills and the NIF held 26% of outstanding GOB debt. Given that the majority of government revenues come from the same sources as NIS contributions, such high exposure to government debt raises additional concerns on the effects on the overall economy when government actually meets its debt obligations to the NIS.

The economics of a national pension fund having large holdings of government debt indicate little difference between raising NIS contribution rates and raising taxes to repay government bonds. Whether government meets its obligations through increasing taxes or defaults on its obligations, forcing the NIS to increase its contribution rate, the burden of meeting future NIS obligations will ultimately be borne by current and future generations of workers and employers. Therefore, growing government debt, financed partly by the NIS, jeopardizes the ability of the NIS to meet its promised pension obligations in the medium and long-terms.

For this Review, three sets of 60-year projections of Barbados' population and National Insurance Fund finances have been performed so that a range of reasonable prospects for the Fund may be assessed. These projections are based on there being no changes to the current contribution rate and legislated benefit rules. Given the uncertainty in projecting such an extended period, the timing of certain events and the rates that will apply are presented as ranges.

1. Total expenditure will exceed contribution income each year.
2. Total expenditure will first exceed total income between 2028 and 2045.
3. The Fund will be depleted as early as 2045 under the Pessimistic Scenario or as late as 2074 under the Optimistic Scenario.
4. The pay-as-you-go rate in 2074 will be between 27% and 37%.
5. The average long-term cost of benefits over the next 60 years, often referred to as the general average premium, is between 24.0% and 28.4%.

These results are based on Barbados Government debt being redeemed as scheduled at full face value. Should the GOB restructure any debt held by the NIF through reducing the face amount and/or yields on bonds/debentures, the outlook for Fund finances would be worse than presented above. If holdings of GOB debt are excluded from the NIF, depletion of reserves is projected to occur in 2033.

A sustainable national pension system is one that over the long-term, delivers on its financial promises in such a way that the financial burden is borne equitably by participants. These results indicate that the National Insurance Fund may not be financially sustainable over the long-term under two of the three scenarios, but will be very well funded if there is sustained economic growth.

NIF-related recommendations made throughout this report are based on the goal of further enhancing coverage, maintaining or improving benefit adequacy while enhancing the likelihood of long-term sustainability. These recommendations are:

1. Increase participation among self-employed persons by implementing a simple and attractive means by which self-employed persons can contribute and benefit from the NIF.
2. Increase investment diversification with goals of reducing the portion of the Fund held in Government of Barbados debt to 50% and increasing the portion held in overseas investments to 20%.
3. To enhance administrative efficiency:
   a. Add skilled and experienced persons in operational, IT and accounting areas so that immediate improvements can be made to all operational functions, preparing accurate and timely financial statements and being able to produce reliable reports on the Funds' operations.

b. Make maximum use of the capabilities of the information technology systems so that service levels may be improved.
c. Ensure that all key positions with the National Insurance Office are filled.

Unemployment and Severance Funds

During the extended period of economic challenges the Unemployment Fund experience was consistent with expectations - lower contributions, increasing benefits and a drawing down of reserves that had accumulated during stronger economic times. During the three-year review period, deficits totalled $63 million and reserves fell from 2 times annual expenditure to eight months worth of expenditure.

Short-term projections of the Unemployment Fund indicate that the addition of the ½% Severance contribution for 3 years will allow the Fund to meet expenditure through the next few years without any additional rate increase once all contributions are paid in cash.

For the Severance Fund, the limited payment and reimbursement rules do not appear to be in line with prevailing employment practices and behaviour as reserves continued to grow during the review period. At the end of 2014, reserves were 27 times annual expenditure. Even with the transfer of the ½% contribution rate to the Unemployment Fund for three years, the Severance Fund is expected to experience surpluses each year.

Following are recommendations for the Unemployment and Severance Funds:
(i) Determine whether a contribution rate increase for the Unemployment Fund is required prior to the end of 2017, when the ½% contribution rate now being transferred from the Severance Fund to the Unemployment Fund will cease.
(ii) Perform a comprehensive review of the provisions of the Severance Payments Act and determine what amendments are required to create a scheme that better meets the needs of both employers and workers when redundancy either occurs or is being considered.
(iii) Establish written investment policy statements for both the Unemployment and Severance Funds or provide specific guidelines for these two funds in the National Insurance Fund's Investment Policy.

Governance

Appropriate governance structures for public entities and the adherence to good governance practices are critical to their success. With the exception of Jamaica, all other Caribbean national insurance and social security funds are fully administered by statutory bodies. In Barbados, the Board's oversight is limited to the finances of the several Funds, while operational and all human resource policies and procedures are those that apply to Government.

Performance deficiencies arising from inadequate human resource skills and lack of accountability indicate the need for a review of the Department's organizational structure with a goal of enhancing the quality of services offered by the NIS. The review should also focus on all governance arrangements that will ensure the effective and efficient management of the NIS.

Independent of any structural changes, the Board is further encouraged to:
- prepare a document that contains good governance guidelines specially tailored for the NIS;
- provide for other Board sub-committees to include, and possibly be led by, non-Board members, who have experience and qualifications in the applicable field.

Chapter 1 :
National Insurance Fund Experience Since the 14th Actuarial Review

1.1 Amendments to Act and Regulations

Each year National Insurance & Social Security Orders that facilitate the annual, automatic adjustments to the earnings limit, pensions and grants are signed by the Minister with responsibility for National Insurance. For the earnings limit, annual adjustments represent the change in national wage index for the previous year while for pensions and benefits, the lower of the previous 3-years average price inflation and previous 3-years average change in wage index is used. The following table shows the recent changes to earnings limits, minimum contributory pension and pension adjustments.

Table 1.1. Earnings Limit and Pension Adjustments, 2012 to 2014

Change Effective	Monthly Earnings Limit (Ceiling)	Increases To Earnings Limit	Minimum Contributory Pension (per week)	Increases To Pensions & Grants
January 2012	$4,180	2.2%	$170	4.01%
January 2013	$4,270	2.2%	$175	3.03%
January 2014	$4,360	2.1%	$179	2.16%

Most of the pension reforms enacted in 2006 have been fully phased in with two exceptions:

i. the normal pension age increased to 66½ in 2015 and will reach 67 in 2018.

ii. Until 2022, calculations for Old Age Contributory Pensions will use a combination of the "old" and "new" bases.

Further details of all contribution and benefit provisions can be found in Appendix A.

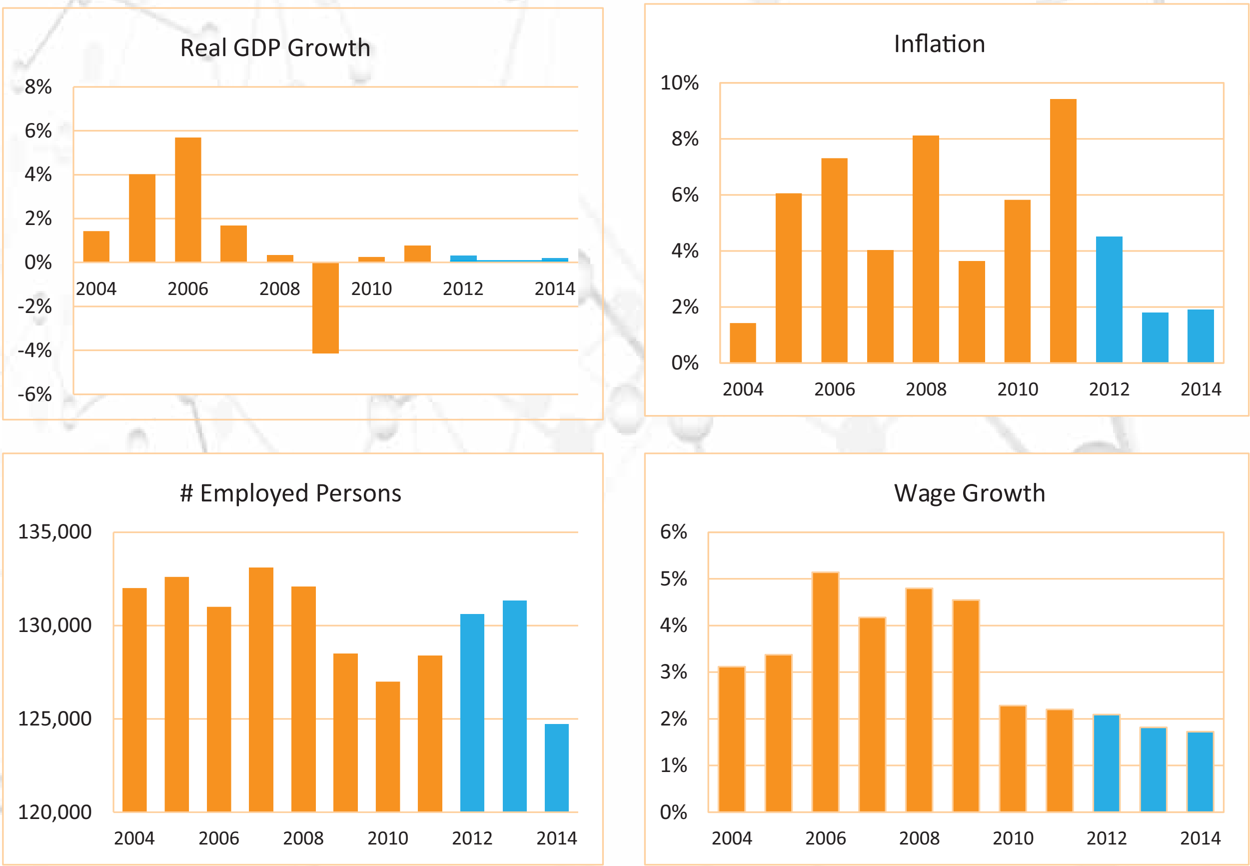
1.2 Economic Experience

The National Insurance Fund (NIF)'s two sources of income, contributions and earnings on investments, are closely linked to economic performance and labour market changes. Some benefits are also affected by economic changes. For example, more people are likely to claim Old Age Contributory Pension prior to normal pension age if they lose their job and cannot find a new one. Economic conditions, therefore, directly impact NIF finances.

As shown in the charts in Figure 1.1, economic growth in Barbados has been minimal in all but one year since 2010. Average GDP growth in the 3-year review period was 0.2% per annum. While labour force surveys suggested that employment levels increased in 2012 and 2013, the lowest level of employment in 10 years was recorded in 2014.

Inflation during the review period averaged 2.7% per annum. The average wage increase was 1.9%. Real wages, therefore, declined during the review period.

Figure 1.1. Key Economic Indicators, 2004 to 2014



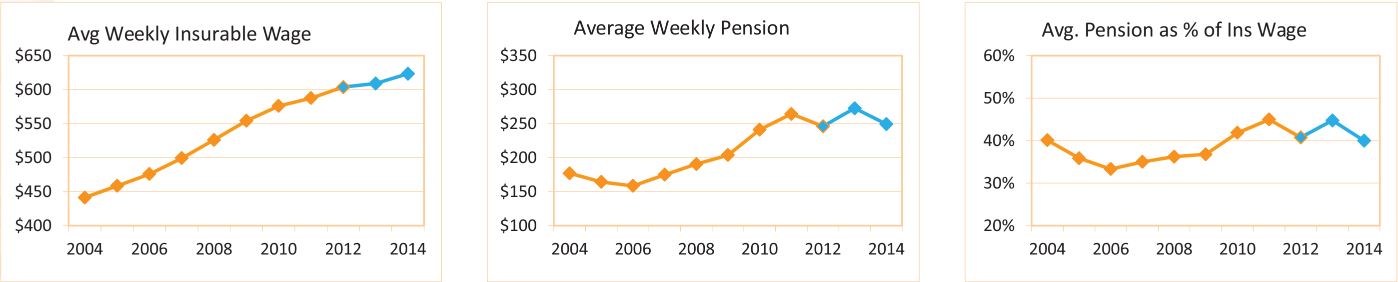
1.3 National Insurance Fund Experience

In line with recent economic patterns, the number of insured persons making contributions decreased significantly. (Figure 1.2 below) Although the number of pensions in payment has increased as expected, data issues may account for the reduction in 2012 and above average increases in 2013 and 2014. The key result from the reduction in contributors and increase in pensioners is a significant increase in the demographic ratio (number of pensioners per 100 insured persons) from 30 to 38 between 2011 and 2014.

Figure 1.2. Contributors and Pensioners, 2004 to 2014

The average insurable wage increased each year while the average pension fluctuated in recent years. This fluctuation is likely due to data issues. (Figure 1.3 below) Average pensions divided by average insurable earnings is often referred to as the replacement ratio. This ratio increased between 2006 and 2011 but since then has decreased. The effect of pension reforms on new pensions has contributed to slowing the growth of average pension amounts and replacement ratios.

Figure 1.3. Average Insurance Wages and Pensions in Payment, 2004 to 2014



The following table provides summary income and expenditure amounts for 2012 to 2014. A more detailed version of the National Insurance Fund finances for these years may be found in Appendix D.

Table 1.2. Summary of NIF Finances, 2012 – 2014 (millions of $'s)

	2012	2013	2014
Income			
Contributions (accrual basis)	570.3	598.0	532.1
Investment	273.8	276.6	266.2
Other	5.0	5.1	5.6
Total	849.1	879.8	803.9
Expenditure			
Benefits	515.1	564.1	560.6
Administrative	33.2	29.2	27.3
Total	548.4	593.4	587.9
Excess of Income over Expenditure	300.7	286.4	216.0
Change in Unrealised Investment Gains & Prior Year Adjustments	(18.1)	16.3	(31.7)
Reserves (end of year)	4,222.5	4,525.1	4,709.5

Note: Due to rounding, some totals may not correspond with the sum.

Key highlights of income and expenditure are:

- Contribution income fell in 2014 due to a reduction in the workforce.
- Investment income was relatively stable.
- Benefit expenditure was unexpectedly lower in 2014 compared with 2013.
- Administrative costs decreased during the period.
- The excess of income over expenditure fell sharply in 2014 due to a decrease in revenue and unrealized losses.
- Total reserves grew from a revised $3.9 billion at the end of 2011 to $4.7 billion at the end of 2014.

At the end of 2014, the NIF had $565.7 million of un-invested assets comprising:

- Cash and bank balances: $121.7 million
- Contributions receivable: $223.7 million
- Accounts receivable: $220.3 million

1.4 Experience Compared with Projections of 14th Actuarial Review

In the 14th Actuarial Review, projections were prepared under three scenarios – Best Estimate, Optimistic and Pessimistic. Shown below is a comparison of actual cumulative experience over the 3-year period with the projections of the Best Estimate Scenario.

Table 1.3. Projections from 14th Actuarial Review Compared with Actual Experience

	2012-2014 Projected (millions of $'s)	2012-2014 Actual (millions of $'s)	% Difference
Contribution Income	$1,566.8	$1,700.4	9% above projected
Investment Income	$758.3	$816.6	8% above projected
Benefit Expenditure	$1,559.0	$1,639.8	5% above projected
Administrative Expenditure	$85.6	$89.7	5% above projected
2014 Year-end Reserves	$4,531.2	$4,709.5	4% above projected

Actual income and expenditure were higher for all categories over the three year review period. For contribution and investment income where the differences were greatest, accrual based accounting and revisions to financial statements accounted for a large portion of the differences.

1.5 Investments

At the end of 2014, National Insurance Fund investments stood at $4.16 billion, up from $3.70 billion at the end of 2011. During the review period, the average yield on investments was 7.1% and the average yield on reserves was 6.5%. With inflation averaging 2.7% per annum, the average real rate of return on reserves was 3.7%.

The following table provides a summary of the investment mix of the National Insurance Fund at year-ends 2011 and 2014.

Table 1.4. Summary of Investments, Year-end 2014 & 2011 (millions of $'s)

Investment Category	2014		2011	
	$'s	%	$'s	%
Treasury Bills & Notes	782.9	18.8	965.6	26.1
Government Bonds	1,988.3	47.8	1,270.6	34.3
Fixed Deposits	90.6	2.2	217.9	5.9
Equities	275.8	6.6	364.5	9.8
Other Bonds & Loans	510.8	12.3	475.2	12.8
Real Estate	283.3	6.8	248.8	6.7
Foreign Investments	228.0	5.5	158.8	4.3
Total	**4,159.6**	**100**	**3,701.4**	**100**

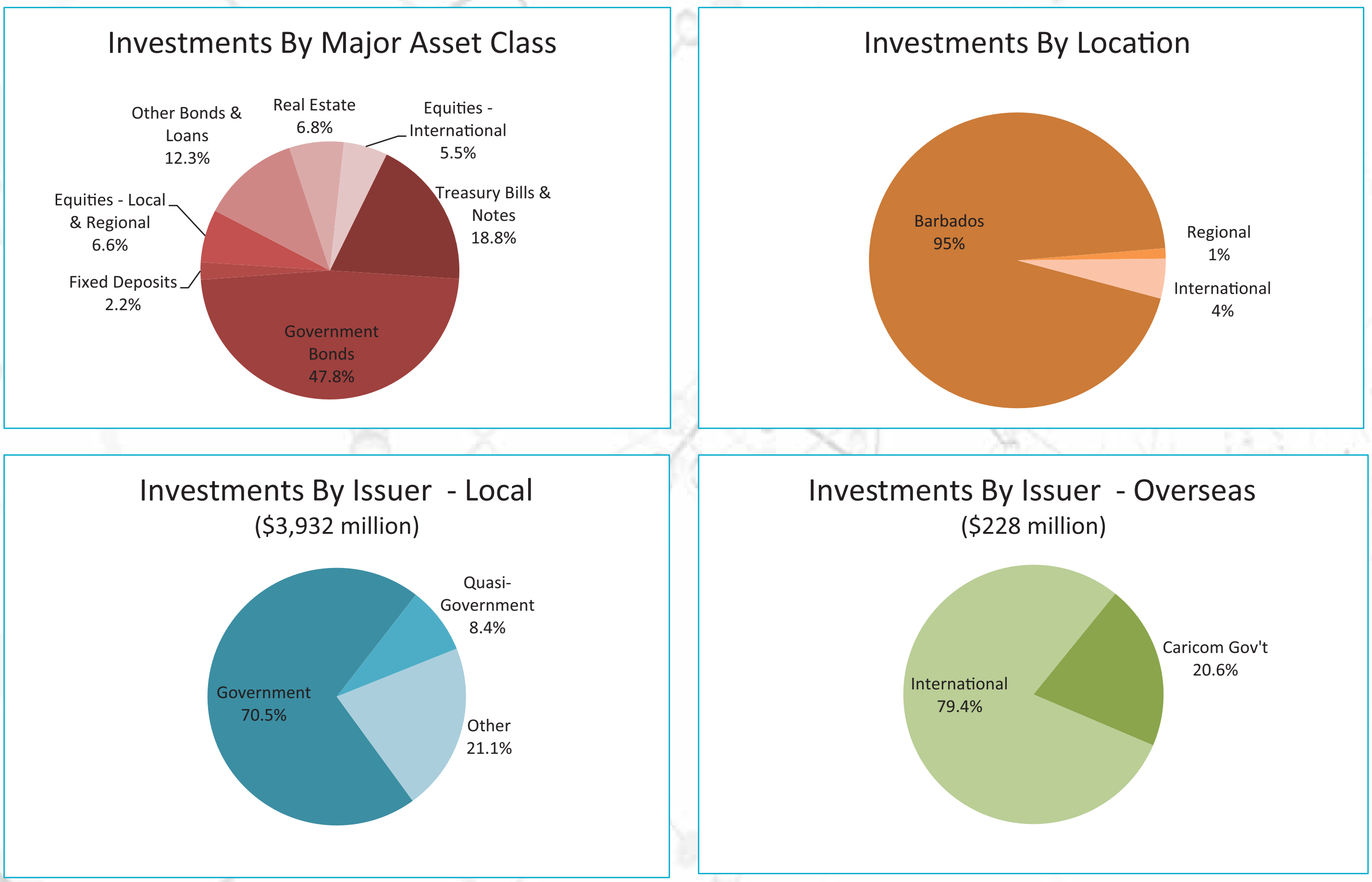
Note: Due to rounding, some totals may not correspond with the sum.

Notable changes in asset mix between 2011 and 2014 are:

a) Significant increase in the percentage of the Fund held in Barbados Government Bonds offset partially by a reduction in the percentage held in T-Bills and Notes.
b) Significant reductions in the amount and percentage held in fixed deposits.
c) Reduction in the value of local and regional equities.
d) Increase in the value of foreign investments due to unrealized gains as no new funds have been placed overseas since 2009 due to Central Bank restrictions.

Diversification is a critical component for the investment of social security assets. How well investments are diversified is often assessed using four criteria:- (i) across various asset classes, (ii) across maturity dates, (iii) across different locations and (iv) by issuer of the underlying securities. The following charts illustrate the diversification of NIF investments as of December 2014. With 75% of assets held in public sector (government and quasi-government) securities, and only 5% invested outside of Barbados, NIF assets are poorly diversified.

Figure 1.4. Investments, December 2014



The Investment Policy Statement which guides National Insurance Fund investments was revised in May 2013 and again in May 2016. Among other things, the Policy sets out investment objectives and guidelines for the Fund and a strategic asset allocation.

The following table shows the actual asset mix at December 31, 2014 compared with the target allocations found in the Investment Policy.

Table 1.5. Asset Mix Compared To IPS Strategic Allocation, Dec .2014

Investment Class	`Actual	Target	Variance
Money Market	6.3%	5%	Slightly over
Fixed Income	76.7%	62%	Well over
Equities	10.5%	16%	Well under
Real Estate	6.5%	12%	Well under
Alternatives	0.0%	5%	Significantly under

A detailed analysis of the variances between actual and target allocations for fixed income securities and equities is shown below.

Table 1.6. December 2014 Asset Mix Compared with Investment Policy Guidelines

	Actual	Target	Variance
Fixed Income			
• Debentures – Gov't of Barbados	48.0%	25%	Well In Excess
• Treasury Notes	15.8%	19%	Under
• Statutory Corporations Debt	7.7%	10%	Under
• Regional Government Debt	1.1%	2%	Under
• Corporate Loans	2.8%	3%	In line
• Corporate Debt	1.4%	3%	Under
Equities			
• Local & Regional	6.3%	7%	Inline
• International	4.2%	9%	Well Under

As shown above, the portion held in debentures is almost twice as high as the established target while international equities are less than half of the target. Immediate steps should be taken to reduce the portion of Fund assets held in securities issued by the GOB.

1.6 Subsequent Events

This report is being prepared in December 2016, almost two years after the review period ended. Listed below are events or changes between January 2015 and December 2016 that influence the findings and recommendations presented in this report.

- The earnings limit and pensions in payment were not adjusted in January 2015 and January 2016. Adjustments set to take effect January 2017 have been announced.
- As of September 2016:
  - Total reserves stood at $5.24 billion;
  - The portion of NIF investments held in GOB securities was 75%; and
  - Contributions and accounts receivable totalled $839 million.

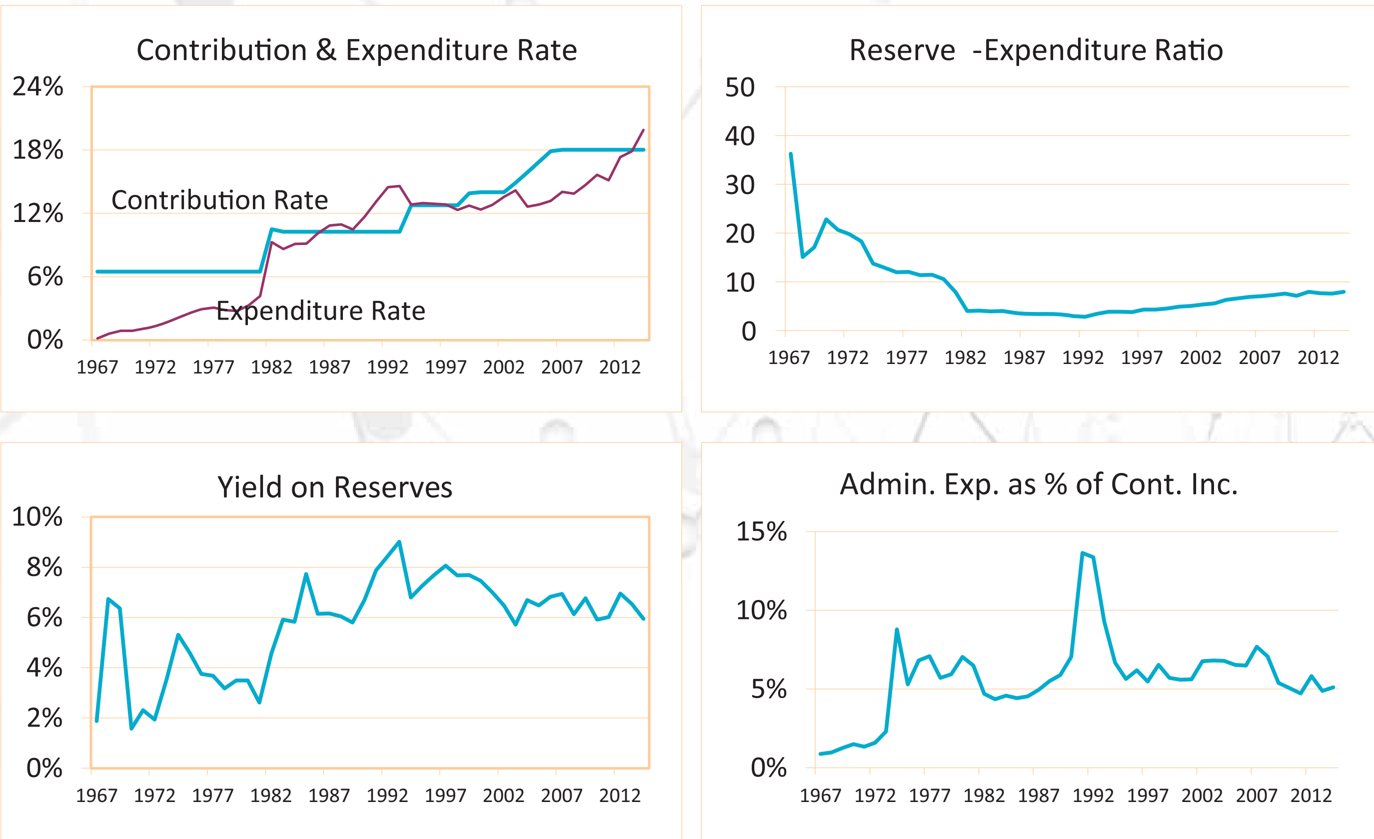
Chapter 2 :
Assessment of Performance & System Design

National social security systems must balance benefit adequacy with affordability and long-term sustainability. There is an obvious trade-off between these concepts:- higher benefits provide larger incomes to beneficiaries, but cost more. On the other hand, inadequate pensions result in pressures to increase benefits or add new ones. This chapter contains a review of past trends for key financial indicators and current design parameters, and examines how well key policy objectives are being met.

2.1 Historical Performance, 1967 – 2014

Experience for key financial factors from 1967 to 2014 is presented in the following charts:

Figure 2.1. National Insurance Financial Experience



When compared with 2008 levels, contribution income in 2014 was unchanged while benefit expenditure increased by 52%. As shown in the top left chart above, the expenditure (or pay-as-you-go) rate increased significantly, surpassing the contribution rate for the first time since 1997. As a result, portions of investment income are now required to meet benefit expenditure.

Following a series of contribution rate adjustments starting in the mid 1990's, the relative size of reserves increased. Due to high yields on GOB bonds, the Fund continued to realise a relatively high rate of return which has contributed to the relative size of reserves remaining at around eight times annual expenditure. The Fund continues to experience low administrative costs.

Following are values for several key indicators as of the dates of the 13th, 14th, and 15th Actuarial Reviews along with a brief analysis of the changes that have occurred.

Table 2.1. National Insurance Performance Indicators

	2008	2011	2014	Comments
1. Avg. Contribution Rate	18.0%	18.0%	18.0%	No change since 2006
2. Expenditure Rate	13.9%	15.1%	19.9%	Significant increase over last two review periods
3. Benefits as % of GDP	5.0%	5.3%	6.4%	Benefits growing considerably faster than GDP
4. Reserve-Expenditure Ratio	7.3	8.0	8.0	Unchanged in most recent review period
5. 3-year average nominal yield on reserves	6.6%	6.2%	6.5%	Strong returns in the current environment
6. 3-year average real yield on reserves (net of inflation)	0.1%	-0.2%	3.7%	Significant improvement over prior review periods due to reduction in inflation
7. Administrative Expenses (3-yr average) as:				
•% of Contributions	7.1%	5.1%	5.3%	Acceptable rates
•% of Insurable Wages	1.27%	0.91%	0.95%	
8. # of Contributors Per Pensioner	3.5	3.3	2.6	Significant decrease due to combination of fewer contributors and more pensioners
9. Avg. Pension as % of Avg. Insurable Wage	39%	45%	40%	Incomplete data may account for large changes in one or more of these rates.

Note: Several rates for 2011 are different from those shown in 14th Actuarial Review due to financial statement revisions.

These indicators confirm that the reduction in the number of contributors and continued increase in the number of pensioners is placing increased strain on cash flows.

2.2 Meeting Policy Objectives

The National Insurance system is mandatory for all employed and self-employed persons and is expected to be perpetual. It has a defined benefit structure where the rules governing eligibility and the amounts payable are defined. Together, the rules and the amounts at which key parameters are set determine benefit adequacy. How well certain rules are enforced, and how well the system is managed, also impact how well policy objectives are met.

To determine how well these objectives are now being met, and how likely they are to be met in the future, an analysis of current contribution and benefit provisions, key rates and parameters as well as actual performance indicators have been reviewed. While some mention is made of short-term and employment injury benefits, this analysis focuses primarily on pensions which now account for 95% of NIF benefit expenditure. The broad categories that are assessed are:

- Coverage, which looks at how well workers of all sectors are covered for income security in old age;
- Adequacy, which relates to the ability of pensions to provide a decent standard of living;
- Financial sustainability, which ultimately relates to the affordability of the system to future contributors; and
- Administrative efficiency, which relates to keeping operating and management costs low while delivering quality service.

2.2.1 Coverage

With NIS participation mandatory for all employed and self-employed persons, coverage concerns relate to actual participation rates by formal and informal sector workers and the proportion of elderly residents receiving an NIS pension. It is estimated that between 85% and 90% of employed persons make at least one contribution to the NIS each year. Most of those not contributing are likely to be self-employed.

Data to confirm the percentage of workers with earnings at or above the earnings limit were not available. It is not expected that there was any material change from the 78% in 2011 given that the limit was adjusted each year.

In total, the NIS provides coverage for a reasonably large portion of the working population.

2.2.2 Adequacy

Benefit adequacy can be broken down into two components:
- Current adequacy: Are pensions adequate today?
- Future adequacy: Under current provisions, will the pension be adequate in the future?

Current Adequacy

The minimum contributory pension in 2016 is $179 per week or $776 per month, approximately 29% of the average insurable wage. This is an acceptable minimum pension replacement rate. Annual adjustments to the minimum rate and all pensions in payment provide further support to maintaining benefit adequacy.

For pensioners receiving more than the minimum, their pension replacement rates are initially between 40% and 60% of their final average insurable earnings. Given that they now receive regular pension adjustments, benefits can also generally be considered adequate.

While new awards are no longer financed by the NIF, the existence of a government-financed Non-Contributory Old Age pension for those who do not qualify for the NIS Contributory Old Age pension or other public or private pensions provides further income protection for seniors who qualify.

Future Adequacy

A worker who has steady earnings below the earnings limit and contributes to the NIS for a full career sustaining himself/herself predominantly from his employment earnings, can expect a pension of close to 60% of pre-retirement earnings. By ILO and other international standards this is quite high and thus meets reasonable tests of benefit adequacy. The challenge quite often, especially for the self-employed, is that many workers do not have steady wages and do not consistently work and contribute for 35 or 40 years.

Legislated annual adjustments to the earnings limit and pensions should ensure benefit adequacy both at the time of award and throughout the pension payout period as the pension maintains its initial purchasing power. Since no increases were granted in 2015 and 2016, irregular earnings ceiling and pension increases could affect future benefit adequacy. The other factors that affect the uncertainty of future benefit adequacy relate to those who have employment earnings well in excess of the earnings limit and those who fail to contribute for at least 10 years.

When compared with targeted replacement rates for mandatory social security pensions in OECD countries, the Barbados NIS provides relatively high replacement rates. The NIS pension is not intended to provide all of the income required to support oneself in old age. Based on the above, current NIS contribution and benefit provisions provide pensions in old age that meet reasonable tests of future benefit adequacy.

When non-pension benefits are considered, the various short-term, employment injury and unemployment benefit provide full income protection for all contingencies that could lead to involuntary loss of employment income.

2.2.3 Financial Sustainability

Assessing the sustainability of a national pension system is complicated. Given the perpetual nature of these systems, the rules that apply to private pensions systems are not appropriate. Therefore, whether current reserves plus future contributions at the current contribution rate are sufficient to meet future expenditure should not be used to determine long-term sustainability. Instead, assessing sustainability involves looking at the cost of the system now and in the future, and considering whether or not employers and workers in the future will be able to afford the cost. A definition of financial sustainability that has become widely used in social security discussions is whether the pension system is able to meet the needs of current generations without compromising the needs to future generations.

By design, the NIF is partially funded and the current contribution rate and accumulated reserves are expected to be adequate to meet all obligations for another 30 to 40 years. As seen in the last eight years, economic and labour market changes can have a significant impact on NIF finances. With contributions alone no longer sufficient to meet expenditure, increasing portions of investment income will be needed to pay benefits and then eventually investments will have to be liquidated. This is a natural progression for partially funded national pension systems.

There are several risks associated with holding reserves of $5 billion (in 2016) that can impact long-term financial sustainability. These include reductions in investment returns, imprudent use of Fund assets and the inability of Government to return cash to the NIS when debentures mature and the NIS needs cash to meet its obligations. Finding ways to effectively mitigate these risks will be critical given the state of both the economy and Government finances.

It is not possible to determine today the highest contribution rate that workers and employers will be able to afford, or willing to pay, twenty to thirty years from now. The current average rate of 18% is already high by regional standards, but as previously exhibited by stakeholders, significant reforms can be made after wide and open consultation. The key challenge for the NIB regarding financial sustainability is determining when next to consider increasing the contribution rate or making benefit reforms.

2.2.4 Administrative Efficiency

The NIS continues to be a relatively low cost operation with around 5% of contribution income going towards administrative costs. However, the level of service and availability of reliable information remain challenges. Over the past few years the NIS has been faced with major administration system issues which negatively affected claim processing times and lengthy delays in the preparation of financial statements and annual reports.

Unlike most other social security institutions in the region that are operated as quasi-public sector entities where the Board oversees the entire administration, the National Insurance Office is staffed with public servants and the Board manages the Fund. While this approach has its advantages, experience suggests that NIS operations could be more effective if greater autonomy was given to the Board on human resource matters and the conducting of financial audits. (See Chapter 8 for a further discussion of NIS governance structure.)

Recommendations relating to each of these national pension policy objectives are presented in Chapter 5.

Chapter 3 : Best-Estimate Projections

Many demographic and economic factors, such as changes in the size and age structure of the population, economic growth, employment and wage levels and inflation, influence National Insurance Fund finances. Therefore, to best assess the Fund's long-term costs and sustainability, projections of Barbados' total population and the economy are required. For this review 60-year projections have been performed.

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

Given the significant uncertainty inherent in forecasting such a long period, projections have also been performed using two additional sets of assumptions. These alternative projection sets, which encompass assumptions that are generally more optimistic and more pessimistic than best-estimate assumptions, are labelled "Optimistic" and "Pessimistic", given the implications for future NIF finances. Results of these projections are presented in Chapter 4.

3.1 Population Projections

Barbados has experienced net out-migration for decades while fertility rates have fluctuated within a small range and life expectancy continues to increase.

3.1.1 Projection Assumptions

Projections of Barbados' population begin with the results of the 2010 census and in each projection year thereafter, fertility, mortality and migration assumptions are applied. Fertility rates are used to estimate the number of births each year while mortality rates determine how many, and at what ages, people are expected to die. Net migration represents the difference between the number of persons who permanently enter and leave Barbados, and is the most volatile of the three factors. The 2010 population census placed Barbados' population at 277,821.

The total fertility rate (TFR) represents the average number of live births per female of childbearing age in a particular year. If there is no migration, a TFR of 2.1 is required for each generation to replace itself. Barbados TFR was estimated at between 1.65 and 1.7 over the period 2006 to 2014. For these projections it is assumed that TFR's in Barbados will remain below replacement level at 1.65.

Using United Nations mortality tables, current population estimates and the number of deaths in the past few years suggest life expectancy at birth in 2015 of around 76.4 for males and 79.6 for females. Improvements in life expectancy are assumed to occur in accordance with UN estimates.

The third factor that affects population size is migration. This is the most volatile and most difficult to measure. Using the 2000 and 2010 census counts, and reported births and deaths between censuses, implied net out-migration between 2000 and 2010 is estimated at around 400 per annum.

The economic assumptions used for this report assume stable and positive economic growth and labour productivity in all years. Although simplistic, they approximate usual economic cycles and volatility that encompass periods of expansion and recession. They also account for projected changes in the population and labour force that will provide the capacity for additional output through more workers and increased productivity (real wages).

The following table indicates the principal demographic and economic best-estimate assumptions for this and the previous Review. Further details may be found in Appendix B.

Table 3.1. Principal Demographic and Economic Assumptions

		15th Actuarial Review	14th Actuarial Review
Total Fertility Rate		1.65	1.65
Mortality Improvements^		Slow	Slow
Net In-Migration Per Annum (p.a.)		-300 p.a. in 2010 increasing to -100 p.a. in 2015 increasing to 300 p.a. in 2030, constant thereafter	-300 p.a. in 2010 increasing to 0 p.a. in 2020 increasing to 300 p.a. in 2040, constant thereafter
Real GDP Growth Rates	Short-term	IMF estimate*	-0.6% in '13 -2% in '15
	Med.-term	1.0%	1.5%
	Long-term	0.75%	1.0%
Real Increase in Wages		0.75%	0.75%
Long-term Inflation		2.5%	2.5%

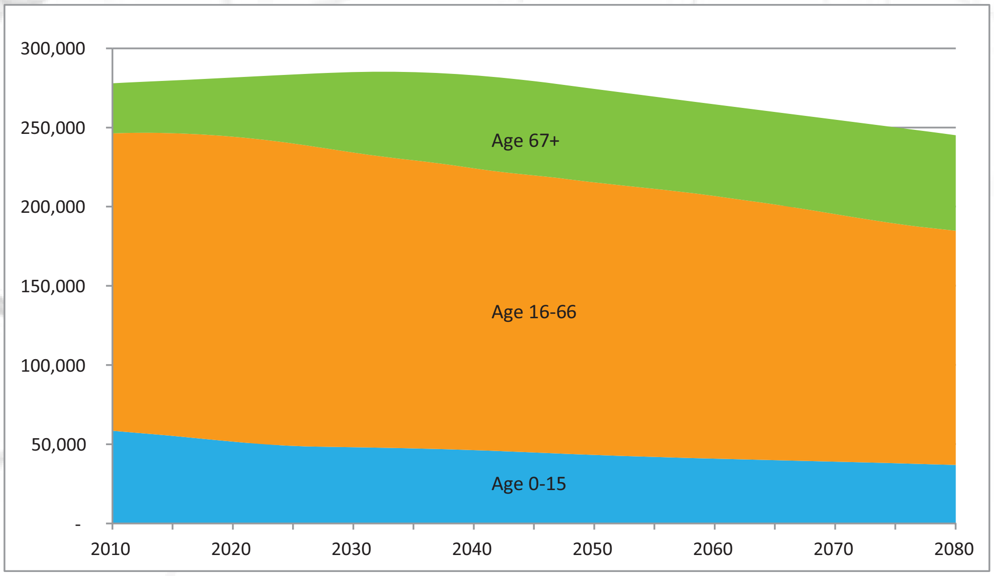
Note: ^ UN mortality improvement rates

* IMF Projections for each of 2015 to 2021: 0.8%, 2.1%, 2.3%, 1.7%, 1.5%, 1.2%, 1.2%

3.1.2 Projection Results

From the 2010 Census population of 277,821 and with the above assumptions, Barbados' population is projected to increase only slightly over the next 20 years and then gradually decrease.

Figure 3.1. Projected Barbados Population (Best-Estimate scenario)



It should be noted that the projections presented in this report have been prepared for the sole purpose of determining the implications for NIF finances under three different sets of future economic growth and development scenarios.

For the NIF, while projected future population size is important, the age distribution is more critical, as pensions to the elderly represent the bulk of expenditure and contributions will be paid by those in the working-age groups. As shown above, while the number of children and working-age persons is projected to decrease over time, the elderly population is expected to increase. These projections show a slightly smaller projected population than presented in the 14th Actuarial Review.

3.2 National Insurance Fund Projections

Best Estimate National Insurance Fund demographic and financial projections have been modelled using the best-estimate population results, best estimate NIS-specific assumptions and the contribution and benefit provisions that were in place on January 1, 2015, with provisions made for previous reforms that are being phased in gradually.

3.2.1 Assumptions

Key National Insurance assumptions are shown below.

Table 3.2. National Insurance Best Estimate Assumptions

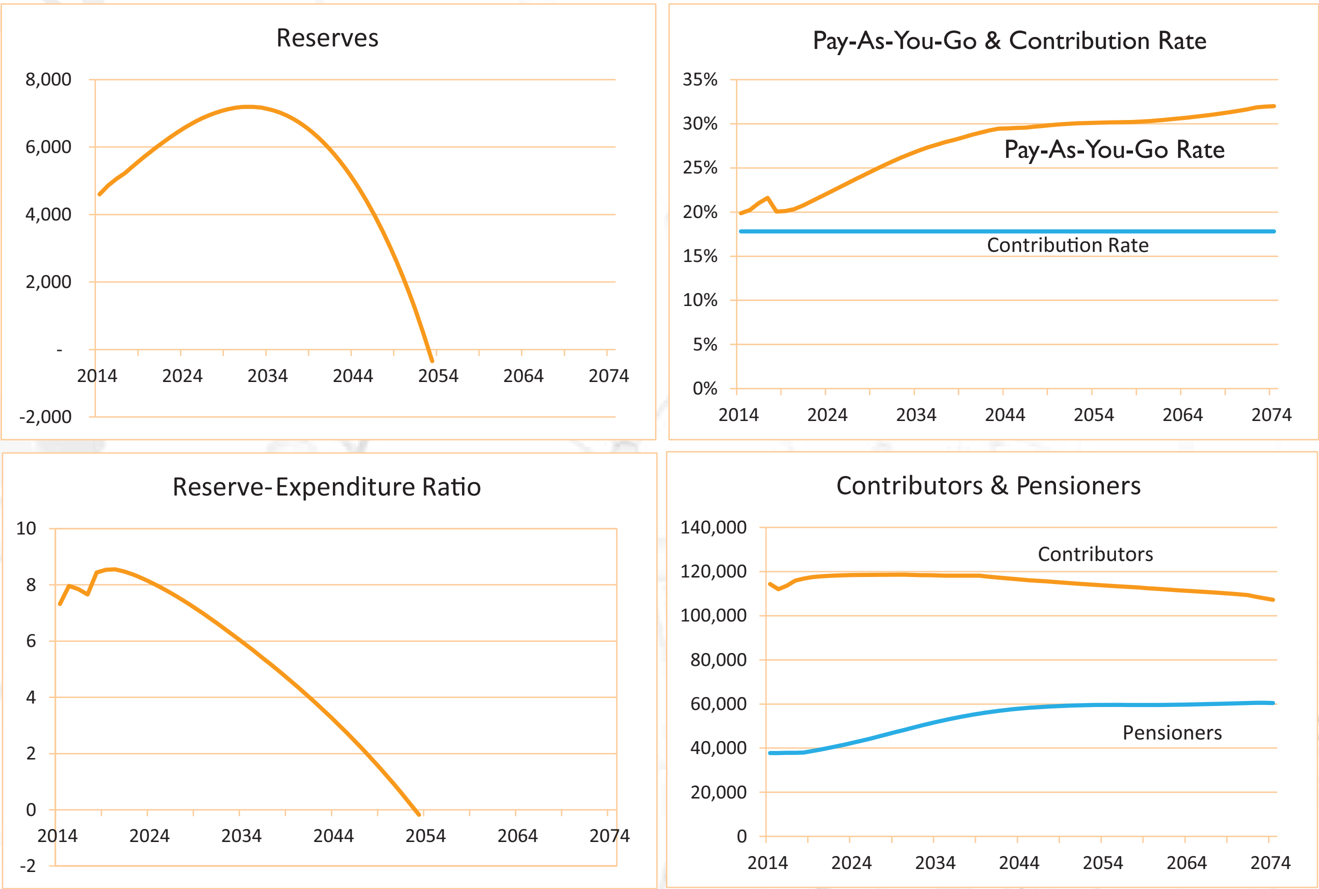
	15th Review	14th Review
Avg. Contribution Rate	17.8% in all years	18% in all years
Insurable Wage Ceiling increases	Annually by the change in the wage index starting 2017	Annually by the change in the wage index
Short-term Benefits	1.50% of Insurable Earnings	1.65% of Insurable Earnings
Pension Increases	Annually by lower of 3-year average change in prices and wages	Annually by lower of 3-year average change in prices and wages
Long-term Yield on Reserves	5.0% (2.5% above inflation)	5.0% (2.5% above inflation)
Other Income	0.9% of Contribution Income	0.9% of Contribution Income
Administrative Expenses	1.0% of Insurable Earnings (Additional $40 million in 2015-2017)	1.0% of Insurable Earnings

With the automatic annual earnings limit and pension adjustments, it is being assumed that the prevailing level of coverage and income security made possible by the earnings ceiling and the minimum pension will be generally maintained throughout the projection period.

3.2.2 Projection Results

The charts in Figure 3.2 highlight key projection results of the Best Estimate scenario assuming that the contribution rate is not increased and that there are no changes to benefit rules other than those already legislated. For these projections it is assumed that 50% of contributions receivable at the end of 2014 will not be collected. This reduces the initial reserves from $4.7 billion to $4.6 billion.

Figure 3.2. Projection Results – Best Estimate Scenario



The key results of these projections are summarised as follows:

1. Expenditure will exceed contribution income in each year.
2. The first cash flow deficit (total expenditure greater than total income) will occur in 2032.
3. Reserves are projected to be exhausted in 2053.
4. In 2053 when reserves are exhausted, annual expenditure relative to total insurable wages (pay-as-you-go rate) will be 30%. The contribution rate will therefore have to be increased to this level to meet total expenditure.
5. The pay-as-you-go rate will increase to 32% in 2074.
6. The general average premium, or the average level contribution rate required over the next 60 years to fully cover total expenditure during that period, is 25.9%.
7. The number of contributors for each pension in payment is expected to fall from 3.0 in 2014 to 1.8 in 2074.

One key funding objective of the pension reforms made in 2002 was a target reserve-expenditure ratio of 5.0 in 2030. For this Best Estimate scenario, this target is met as the projected reserve-expenditure ratio in 2030 is 6.9.

Numerical details of the financial and demographic projections for the Best Estimate scenario are provided in Tables 3.3 to 3.5.

Table 3.3. Projected Income, Expenditure and Reserves -Best Estimate (millions of $'s)

	Income				Expenditure				Reserves	
Year	Contributions	Investment	Other	Total	Benefits	Admin. & Other	Total	Surplus/ (Deficit)	End of Year	# of times current year's expenditure
2012	570.3	255.7	5.0	**831.0**	515.1	33.2	**548.4**	**282.7**	**4,222**	7.7
2013	598.0	292.9	5.0	**896.0**	564.1	29.2	**593.4**	**302.6**	**4,525**	7.6
2014	532.1	234.5	5.6	**772.2**	560.6	27.3	**587.8**	**184.3**	**4,709**	8.0
2015	546.2	286.7	24.3	**857.2**	538.4	72.7	**611.1**	**246.1**	**4,973**	8.0
2016	546.6	289.1	4.9	**840.6**	571.0	74.0	**645.0**	**195.6**	**5,059**	7.8
2017	52.1	287.7	5.1	**854.9**	607.9	75.0	**682.9**	**171.9**	**5,231**	7.7
2018	572.4	285.9	5.2	**863.5**	613.4	32.2	**645.6**	**217.9**	**5,449**	8.4
2019	586.4	284.3	5.3	**875.9**	630.4	32.9	**663.3**	**212.6**	**5,662**	8.5
2020	599.5	281.1	5.4	**886.0**	651.8	33.7	**685.5**	**200.5**	**5,862**	8.6
2024	651.5	316.8	5.9	**974.2**	777.7	36.6	**814.3**	**159.9**	**6,574**	8.1
2034	793.7	348.4	7.1	**1,149.2**	1,157.5	44.6	**1,202.1**	**(52.9)**	**7,112**	5.9
2044	955.0	249.7	8.6	**1,213.3**	1,527.2	53.7	**1,580.9**	**(367.6)**	**4,931**	3.1
2054	1,195.9	(37.2)	10.8	**1,169.5**	1,957.1	67.2	**2,024.3**	**(854.7)**	**(1,195)**	(0.6)
2064	1,496.5	(639.3)	13.5	**870.6**	2,494.0	84.1	**2,578.1**	**(1,707.4)**	**(13,968)**	(5.4)
2074	1,860.3	(1,823.4)	16.7	**53.6**	3,239.0	104.5	**3,343.5**	**(3,289.9)**	**(39,026)**	(11.7)

Notes: Negative reserves indicate the indebtedness of the Fund and negative investment income is the current cost of servicing that debt. Investment Income for 2012 to 2014 includes prior year adjustments and changes in unrealised investment gains.

Table 3.4. Projected Benefit Expenditure - Best Estimate (millions of $'s)

	Pensions, Grants & Benefits						Benefits as a % of:	
Year	Old Age Cont.	Invalidity	Survivors	Non-Cont. Old Age	Short term	Employ-Injury	Insurable Wages	GDP
2012	368.4	56.4	21.6	13.4	40.7	14.7	16.3%	5.9%
2013	404.6	63.8	24.7	17.5	38.3	15.2	17.0%	6.5%
2014	403.2	66.5	24.2	13.2	41.3	12.2	19.0%	6.4%
2015	413.5	61.4	23.7	10.7	21.8	7.4	17.8%	6.2%
2016	427.6	60.0	24.6	8.7	39.2	10.9	18.6%	6.5%
2017	459.3	63.5	26.1	7.3	40.4	11.3	19.3%	6.7%
2018	465.8	62.8	26.1	6.1	41.1	11.4	19.1%	6.6%
2019	483.5	61.9	26.2	5.0	42.2	11.5	19.1%	6.6%
2020	505.1	61.3	26.4	4.1	43.2	11.7	19.4%	6.6%
2024	625.5	62.5	28.5	1.6	47.1	12.5	21.2%	7.1%
2034	980.3	66.9	37.4	0.0	58.1	14.8	26.0%	8.3%
2044	1,316.0	76.0	46.8	0.0	70.6	17.7	28.5%	8.6%
2054	1,691.8	96.6	56.9	-	89.4	22.4	29.1%	8.9%
2064	2,158.9	124.8	68.7	-	113.1	28.5	29.7%	9.0%
2074	2,829.9	147.0	84.8	-	142.1	35.2	31.0%	9.4%

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

Table 3.5. Projected Contributors and Pensioners at Year-end - Best Estimate

Year	Contributors	Old Age Cont.	Invalidity	Survivors	Old Age Non-Cont	Death & Disablement	Total # of Pensioners	Ratio of Contributors to Pensioners
2012	120,313	25,000	3,444	3,633	3,579	346	**36,002**	**3.3**
2013	117,992	26,124	3,802	3,806	3,228	358	**37,318**	**3.2**
2014	114,323	26,707	4,190	3,842	2,878	351	**37,968**	**3.0**
2015	111,967	27,059	4,102	3,708	2,456	272	**37,597**	**3.0**
2016	113,607	27,706	4,063	3,683	2,071	270	**37,792**	**3.0**
2017	115,877	28,045	4,036	3,695	1,733	268	**37,777**	**3.1**
2018	116,774	28,472	3,997	3,713	1,436	266	**37,885**	**3.1**
2019	117,436	29,476	3,941	3,727	1,178	263	**38,584**	**3.0**
2020	117,748	30,467	3,881	3,733	955	259	**39,296**	**3.0**
2024	118,365	34,574	3,699	3,627	356	247	**42,504**	**2.8**
2034	118,200	44,831	3,309	3,635	4	224	**52,003**	**2.3**
2044	116,324	50,850	3,159	3,760	0	216	**57,985**	**2.0**
2054	113,642	52,529	3,192	3,628	-	217	**59,567**	**1.9**
2064	111,247	52,851	3,219	3,446	-	217	**59,733**	**1.9**
2074	107,274	53,921	2,958	3,325	-	201	**60,405**	**1.8**

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

For national pension systems that are partially funded and designed to be perpetual, costs are usually presented in terms of the pay-as-you-go-rates, which represent annual expenditure as a percentage of covered wages. For private pension plans, however, where full funding is the financing objective, there are other measures of the system's cost and, where applicable, financing shortfall, that may be useful for National Insurance policy makers.

3.2.3 General Average Premium

The general average premium is the average level contribution rate required over the next 60 years to fully cover total expenditure during that period. This rate may be looked at as the average long-term cost of the complete National Insurance benefits package. For the Best Estimate projections, the general average premium is 25.9%.

3.2.4 Actuarial Balance

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

a) the sum of the beginning reserves and the present value of future contributions (money available to meet expenditure), and
b) the present value of future expenditure;

divided by the present value of future insurable wages. This formula produces a rate that indicates the adequacy or insufficiency of the present contribution rate for a given period. For the National Insurance Fund, the deficiency expressed in dollars and as a percentage of GDP is shown in Table 3.6.

Table 3.6. Actuarial Balance 2014 – 2074 ($'s are in millions)

	2014 Year-end Reserves^	4,598
Plus	PV of Future Contributions	15,063
Minus	PV of Future Expenditure	21,691
Equal	PV of Surplus/(Shortfall)	(2,030)
	Actuarial Balance (% of Insurable Earnings)	-2.4%
	Actuarial Balance (% of GDP)	-23%

Note: ^ Reserves reduced by 50% of contributions receivable (see Section 3.2.2)

Consistent with previous discussions, the negative actuarial balance indicates that together with reserves, the current contribution rate is insufficient to meet future expenditure for the next 60 years. The shortfall of 2.4% indicates that the average contribution rate would have to be increased to 20.2% for the entire period in order for reserves to last up to 2074.

3.3 Comparison with Results of the 14th Actuarial Review

The projection results presented earlier in this chapter differ from those of the 14th Actuarial Review as shown in the following table:

Table 3.7. Summary Results – Pre & Post Pension Reform

	15th Actuarial Review	14th Actuarial Review
Expenditure Exceeds Income	2032	2035
Reserves Depleted	2053	2056
General Average Premium	25.9%	23.5%
Pay-as-you-go rate in 2071	31.6%	28.2%

The results of this 15th Actuarial Review show a less favourable outlook than presented in the 14th Review. The main reasons for this are tempered economic outlook with smaller populations and lower economic growth which results in fewer NIS contributors than projected previously.

3.4 Sensitivity Analysis – NIS Factors

Given the extensive set of assumptions required for projecting NIF finances and the length of the projection period, future experience will certainly differ from that projected under best estimate assumptions. To illustrate a reasonable range for the Fund's outlook, projections using two different sets of population, economic and National Insurance assumptions are presented in the following chapter. However, certain National Insurance factors such as yield on reserves will also impact the Fund's outlook. The change in long-term costs for differences in investment returns is shown in the following table.

Table 3.8. Sensitivity Tests – National Insurance Factors

Assumption	Differs From Best Estimate	Reserve Ratio in 2030	General Average Premium	Reserves Depleted
Best Estimate		6.9	25.9%	2053
Long-term Yield on Reserves (5.0%)	+1%	7.9	25.4%	Not before 2074
	-1%	5.9	26.5%	2048

As shown above, the outlook for the Fund is better/worse if yields on reserves are greater/ lower than assumed.

3.5 Sensitivity Analysis – Government Factors

Recent IMF reports refer to the level of central government debt using two metrics – one excluding and the other including securities held by the NIF. As of December 2014, the Fund held 26% of total debt securities. From an NIF perspective, excluding securities held by the NIF from public debt levels translates to removing $2.8 billion placing reserves at approximately $1.9 billion instead of $4.7 billion.

When government debt is viewed with NIS holdings excluded, the implicit assumption is that these assets are not "real" and that government raising taxes to repay the NIS is akin to raising the contribution rate on NIS contributors. This is because government tax revenue and NIS contributions come largely from the same sources - businesses, workers and consumers.

While the above discussion is primarily academic, the Fund faces the risk of GOB restructuring some or all of the debt that NIF holds. A restructuring of Government debt could include the face amount being reduced and/or yields drastically reduced. Both scenarios have occurred in the Caribbean in recent years as governments with high debt to GDP ratios sought ways to improve their fiscal positions.

The financial effects on the NIF under these scenarios are illustrated below.

Table 3.9. Implications of GOB Debt Restructuring on NIF

Assumption	Reserve Ratio in 2030	Expenditure Exceeds Income	Reserves Depleted
Best Estimate	6.9	2032	2053
NIF Assets Exclude GOB debt. ($1.9 billion as at Dec. 2014) and average yield on all reserves reduced to 4%	0.7	Immediately	2033
25% of debt written off and average yield on all reserves reduced to 4%	4.6	2026	2044
50% of debt written off and yield on remainder reduced to 3%	2.8	2022	2039

Chapter 4 : Alternative Scenarios

Best Estimate projections up to 2074 presented in the previous chapter provide estimates of future National Insurance Fund demographics and finances under best-estimate assumptions. Given the uncertainty in forecasting such a long period, two alternative scenarios that highlight the sensitivity of the results to differences in assumptions regarding future outlook have been performed. These alternative projection sets encompass assumptions that are generally more optimistic and more pessimistic than those of the Best Estimate projections. Since sustainability will likely be more sensitive to economic developments than to NIS-specific factors such as compliance rates and operating costs, the basis for the alternative scenarios focus more on economic growth and employment.

The Optimistic scenario represents one with positive economic growth starting in 2016 with employment levels returning close to 2008 levels over a 10-year period. The Pessimistic scenario represents a smaller population where employment levels gradually decline each year.

Following is a summary of the main assumptions for the three projection scenarios. The values for all other assumptions are similar across scenarios.

Table 4.1. Principal Demographic, Economic and National Insurance Assumptions

		Pessimistic	Best Estimate	Optimistic
Ultimate Total Fertility Rate		1.7	1.65	1.6
Mortality Improvements^		Medium	Slow	Very Slow
Net (In) Migration Per Annum (p.a.)		-450 p.a. in 2010 increasing to -150 p.a. in 2015 increasing to 150 p.a. in 2030, then to 75 p.a. after 2040	-300 p.a. in 2010 increasing to -100 p.a. in 2015 increasing to 300 p.a. in 2030, constant thereafter	-150 p.a. in 2010 increasing to -50 p.a. in 2015 increasing to 450 in 2030 then to 600 p.a. after 2040
Ultimate Real GDP Growth Rates (p.a.)	Short-term Med.-term Long-term	-0.5% each year	IMF estimates up to 2021 2022-39: 1.0% 2040+: 0.75%	+0.5% each year
Real Increase In Wages (p.a.)		0.8%	1.0%	1.2%
Inflation (p.a.)		3.0%	2.5%	2.0%
Long-term Yield on Reserves		4.5%	5.0%	5.5%

Notes: ^UN mortality improvement rates

The main population and National Insurance demographic and financial results of the three projection sets are presented in Figure 4.1 and Table 4.2. As expected, the outlook for National Insurance finances is closely linked to the size and age distribution of the general population and National Insurance performance indicators such as contribution collection rates and yield on investments.

Figure 4.1. Projection Results – All Scenarios

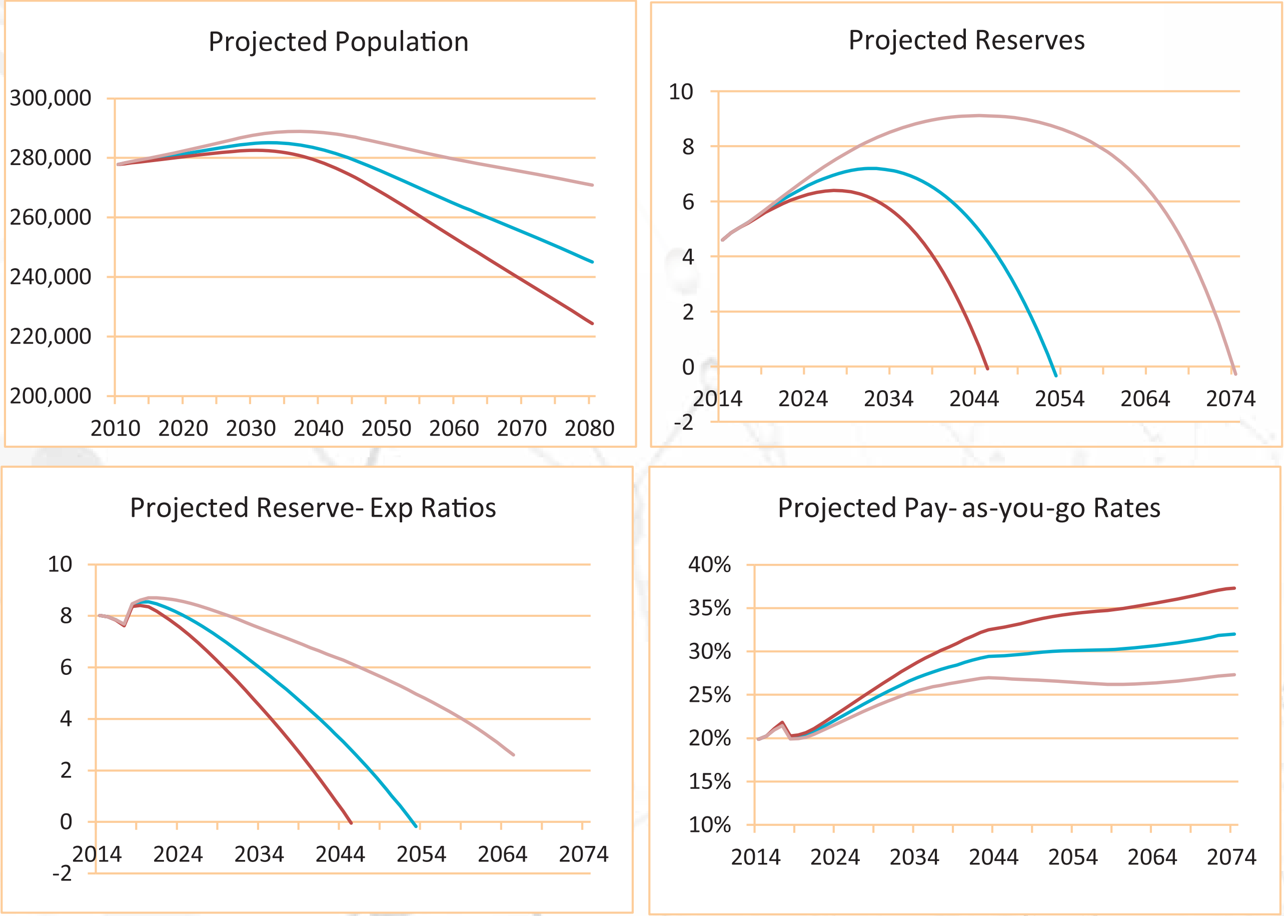


Table 4.2. Summary Results – All Scenarios

	Pessimistic	Best Estimate	Optimistic
Expenditure First Exceeds Total Income	2028	2032	2045
Reserves Depleted	2045	2053	2074
Reserve Expenditure Ratio in 2030	5.8	6.9	8.0
General Average Premium	28.4%	25.9%	24.0%
Pay-as-you-go rate in 2044	32.6%	29.5%	26.9%
Pay-as-you-go rate in 2074	37.3%	32.0%	27.3%
# of Contributors per pensioner – 2074	1.5	1.8	2.0
Actuarial Balance (% of Ins. Earnings)	-5.4%	-2.4%	0%
Actuarial Balance (% of GDP)	-56%	-23%	0%

Chapter 5 : Balancing Adequacy and Sustainability

Several policy issues and financial challenges faced by the Fund have been identified in previous sections of this report. These challenges are categorized in Table 5.1 and a summary of the recommendations is shown. Discussion of each issue follows.

Table 5.1. POLICY OBJECTIVE CHALLENGES AND OPTIONS FOR REFORM

	Current Challenges	Recommended Action
Coverage	• Most self-employed persons do not contribute to the NIS	• More flexible options for self-employed contributions using new technologies
Benefit Adequacy	• No Old Age Contributory pension prior to normal pension age if calculated benefit less than minimum pension	• Allow reduced Early Age pensions
Financial Sustainability	• Investments heavily concentrated within Barbados and in Government debt • Funding policy/contribution rate increases	• Diversify investments outside of public sector and outside of Barbados • Revise current funding policy
Administrative Efficiency	• Lengthy service times, incomplete data, no audited financial statements and annual reports	• Make greater use of available technology or upgrade where necessary • Ensure adequate staff in key positions
Governance	• No single, comprehensive good governance guidelines manual • NIS administered by a government department	• Prepare good governance policies & guidelines for the NIS in line with ISSA recommendations • Review options for more effective administration

5.1 COVERAGE

5.1.1 Self-employed Persons Contributions

It is estimated that fewer than 20% of self-employed persons make NIS contributions. Such a low participation rate is not uncommon in the Caribbean. Many individuals do not register and/or contribute simply because they either do not understand or appreciate the many benefits available to them, or they think that they can use their earnings more effectively to provide for themselves. There are some, however, who delay and eventually do not pay because of the paperwork involved and limited payment options available. While targeted campaigns on educating self-employed persons will likely help, new ways for self-employed persons to pay contributions should be put in place. Approaches that have been suggested before include:

- automatic bank transfers of a set contribution amount each without the need to complete a contribution form;
- allow those with irregular income to make lump sum payments at any time - simply "put money on their account" as their means allow, without the need to complete a form. This latter approach will require revisions to current procedures as the contribution payable now is based on the amount earned and the number of weeks worked.

Mobile technology now provides new opportunities for conducting businesses. Commercial banks have been extremely successful at using such new platforms allowing customers to conduct most of their banking needs without having to visit a branch. The NIS should use existing systems and consider new technologies that can significantly reduce the need for faceto-face interactions with self-employed persons.

Enhanced and sustained public education activities highlighting the benefits of self-employed persons and informal sector workers contributing to the NIS should be continued.

5.2 Benefit Adequacy

5.2.1 Old-Age Benefit Awards Prior to Normal Pension Age

Two issues related to benefit adequacy were discussed in detail in the 14th Actuarial Review. These are:

a) Denial of claims for Old Age Contributory pension where the applicant is less than normal pension age and the calculated reduced pension amount is less than the minimum pension. This provision was added when the ability to receive reduced pensions from age 60 was introduced. This restriction has disadvantaged many claimants.
b) The payment of Old Age Contributory or Invalidity pension together with Survivors pension. Currently, only the higher of the two is paid.

No amendments were made to either since the report of the 14th Actuarial Review was presented and it is unclear if the recommendations were rejected. Therefore, these issues should be reviewed.

For the issue of awarding Old Age Contributory pensions prior to normal pension age two possible alternatives and their implications were presented:

a) Award early pensions at a rate lower than the current minimum rate	• Set minimum pension rates for each age under normal pension age. These minimums could be either the full 0.5% reduction per month or slightly less.
b) Award the minimum pension	• This would lead to increased cost over current rules as the full effect of the reduction for early payment would not be applied to lower income pensioners.

For the issue of paying both Old Age Contributory or Invalidity pensions together with Survivors pension, two reasonable options provided were:

Option 1:

Where both spouses are pensioners, the survivor would receive the higher of two pensions, but not less than 60% of combined pensions.

Where a Survivor pensioner later qualifies for an Old Age Contributory pension, pay 130% of the larger pension plus 50% of the smaller pension.

Option 2:

In all cases, pay 100% of the Old Age Contributory pension (their own pension) plus 50% of what the Survivors pension would otherwise have been. This translates to approximately 100% of one's own pension plus 25% of the deceased spouse's pension.

If adopted, persons who have already claimed Survivors' pensions and who are now receiving only the greater of two benefits would have their pensions reworked under the new laws and would receive larger pensions going forward only. The rules that apply for Old Age Contributory pension should also apply to Invalidity pension.

It is recommended that these two issues be reviewed.

5.3 Financial Sustainability

Enhancing financial sustainability can be achieved through avenues that either increase revenue from contributions and investments, or reduce the growth of benefit expenditure and administrative costs. Annual NIF costs are often expressed in terms of the pay-as-you-go rate. Therefore, if future pay-as-you-go rates can be reduced, long-term financial sustainability can be enhanced.

The contribution and benefit provisions that could be revised to effect changes in long-term costs can be clearly illustrated by breaking down the pension pay-as-you-go rate formula into components.

Figure 5.1. Components of the Age Pension Pay-As-You-Go Rate

$$
\begin{aligned}
\text{Expenditure as a \% of Insurable Wages } (\textit{pay-as-you-go rate}) &= \frac{\text{Total Pension Expenditure}}{\text{Total Insurable Wages}} \\
&= \frac{\text{\# Pensioners} \times \text{Avg. Pension}}{\text{\# Contributors} \times \text{Avg. Ins. Wage}} \\
&= \underbrace{\frac{\text{\# Pensioners}}{\text{\# Contributors}}}_{\text{Demographic Ratio}} \times \underbrace{\frac{\text{Avg. Pension}}{\text{Avg. Ins. Wage}}}_{\text{Replacement Ratio}}
\end{aligned}
$$

As illustrated in Chapter 3, the overall pay-as-you-go rate is expected to exceed 30%.

To reduce ultimate pension pay-as-you-go rates, one or both of the two ratios (demographic and replacement) would need to be lower than under the Best Estimate scenario. The following table summarises the means by which each ratio could be reduced over time.

Table 5.2. Options For Reducing Long-term Pension Costs

	Lower Demographic Ratio	Lower Replacement Ratio
1. **Economic growth**	☆	☆
2. **Award OACP later**	☆	
3. **Award OACP only if retired**	☆	
4. **Strengthen requirements to qualify for OACP**	☆	
5. **Reduce average new OACP amount** **(slower pension accruals, longer period for average wages, career average formula)**		☆
6. **No pension increases**		☆

Many measures aimed at reducing both demographic and replacement ratios were addressed during the pension reforms made fifteen years ago. While further reforms may be required, sustained economic growth will have a significant positive impact on long-term sustainability.

5.3.1 Investments

At the end of 2014, 67% of total NIF investments were held in securities issued by the Government of Barbados. With large deficits and growing debt, the risk of Government being unable to repay the face amount of Treasury Notes and Debentures on or before their maturity dates is growing. While investment managers and some policy makers may focus primarily on the Fund's overall rate of return, the rate of return in the short-term will be irrelevant if the Fund is not able to realise the full face value of fixed income securities when needed. The NIF should therefore seek to reduce its exposure to Barbados Government and public sector securities to a maximum of 50% over the next 5 years. To achieve this, the Board and investment managers should resist participating in new debt issues and treat all loan/investment requests from Government and statutory bodies with the same amount of scrutiny and due diligence that it would non-traditional investments. Where proposals do not meet the Fund's investment criteria or fit within investment guidelines, they should be rejected.

The Investment Policy Statement and Guidelines states:

> "The National Insurance Board and Management have a fiduciary responsibility to ensure that the objectives of the Fund are achieved. They must ensure that all investment decisions are made in the best interests of the Fund's beneficiaries."

Tables 1.7 and 1.8 showed that the current mix of investments is not fully in line with the target asset allocation set out in the Funds' Investment Policy. Investment classes that were furthest away from desired targets were government securities (high) and international equities (low). Immediate steps should be taken to rebalance the investment portfolio. To ensure that the asset mix remains consistent with current and future needs of the Fund, it is further recommended that the Investment Policy Statement be reviewed periodically as prevailing investment and economic conditions change.

5.3.2 Contribution Rate Increases

Even though total expenditure currently exceeds contribution income, no increase in contribution rate is recommended at this time. One of the stated objectives of pension reforms made in 2002 was a target reserve-expenditure ratio of 5.0 in 2030.

Other reasons for not recommending a rate increase at this time are:

- There is sufficient cash flow to meet current expenditure,
- Current investments are considered high-risk and additional funds could exacerbate the challenge of finding suitable investments.

While the current funding objective sets a target reserve-expenditure ratio for 2030, it does not speak to what should happen if projected reserves fall short of this target. Further, it would be better if the target year were set as a certain number of years from the review date (say 20 years) instead of a fixed date of 2030. Also, as the Fund matures, pay-as-you-go rates are likely to stabilise and a funded ratio of less than 5 will be acceptable. It is therefore, recommended that a new funding policy be adopted. A recommended revised financing objective is:

1. Reserves of 5 times annual expenditure in 2030 years, and reserves of at least 3 times annual expenditure 30 years from the review date.
2. Should projections in two successive actuarial reviews suggest that these targets will not be met, a combination of contribution rate adjustments and benefit reforms should be implemented to bring the Fund back into projected balance.

Based on the projections presented in Chapters 3 and 4, the goal of having reserves of 5 times annual expenditure in 2030 is met under all scenarios. However, a ratio of 3 times annual expenditure in 2044 is not met in the Pessimistic scenario and only barely met in Best Estimate scenario.

5.4 Administrative Efficiency

Administrative efficiency relates to both how well the National Insurance Office administers the National Insurance program (collects contributions, adjudicates and pays benefits and invests surplus funds) and how much it costs to perform these functions. As shown in Section 2.2, administrative costs remain low (between 5% and 6% of contribution income) by regional standards. However, several service and reporting challenges prevail.

Given the significant investment made in an administration/IT system over the past fifteen years, the National Insurance Office underperforms what would reasonably be expected in delivering timely benefit adjudication. The concerns relate primarily to the time that it takes to award short-term claims and the time it takes to award pensions.

Obtaining complete and reliable data, both financial and statistical, from the National Insurance Office is also a major concern. These challenges may be both system-related and due to the lack of adequate human resources devoted to various tasks. As a result, the publishing of annual reports and the provision of data required for this report have been delayed extensively.

To enhance overall administrative efficiency the Board is encouraged to:

a) review all workflows and businesses processes ensuring that they make best use of available technology and capabilities of the administration/IT system.
b) ensure that the NI Office is adequately staffed at all levels with the skills required to ensure that exceptional customer service is consistently provided, and
c) engage the Minister and other relevant Government officials, in discussions aimed at identifying ways of ensuring the National Insurance Office could be more effective in the delivery of its services and fulfilling statutory obligations.
(See Chapter 8)

Chapter 6 : Unemployment Fund

Unemployment benefits are administered by the National Insurance Board and are paid from the Unemployment Fund. This Fund finances weekly payments to unemployed persons of 60% of average insurable earnings for up to 26 weeks. (Between August 2010 and June 2012 the maximum benefit period was extended to 40 weeks and the benefit rate for the extended period was set at 40%.)

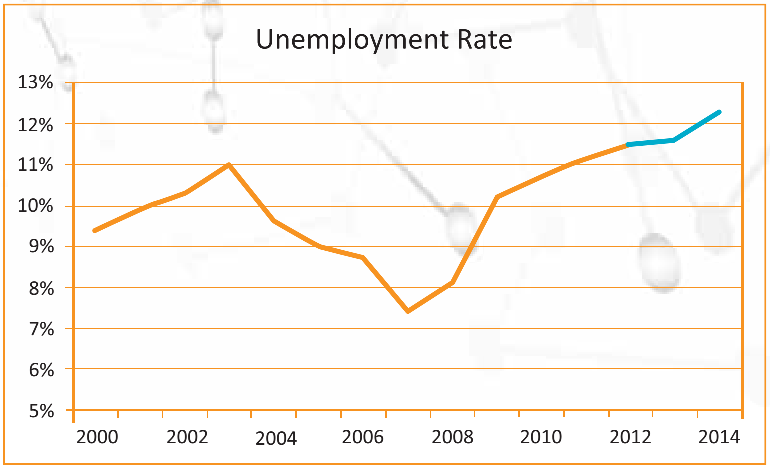
The contribution rate for unemployment benefits has been fixed at 1.5% since 1998. Effective January 2015, Severance Fund contributions which are paid by employers only at a rate of ½% of insurable wages, are being transferred to the Unemployment Fund.

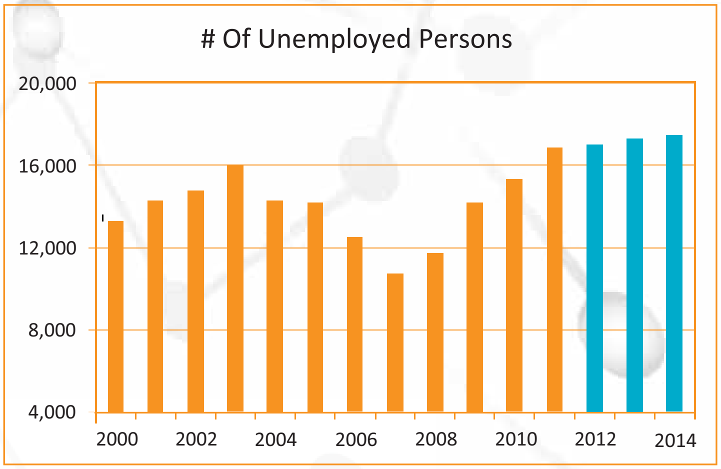
Details of unemployment benefit provisions may be found in Appendix A.

6.1 Unemployment Fund Experience

The following charts show the national unemployment rate from 2000 to 2014 and the total number of unemployment claims approved by the National Insurance Office. Consistent with the global economic crisis and the recession in Barbados, unemployment rates and the number of claims awarded began trending upwards in 2008.

Figure 6.1. Barbados Unemployment Rate & # Of Unemployed Persons

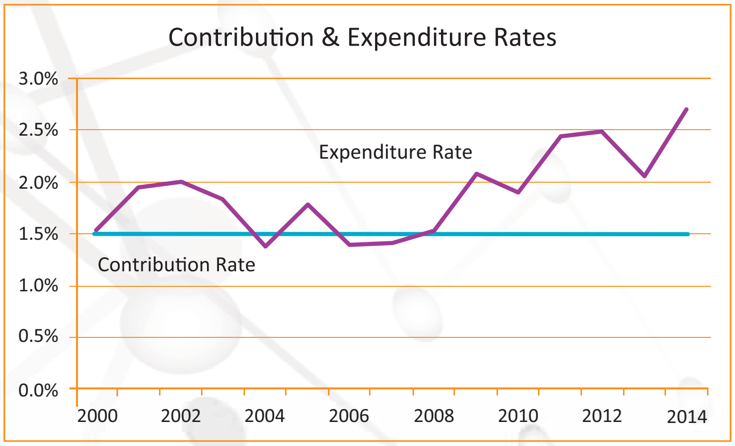


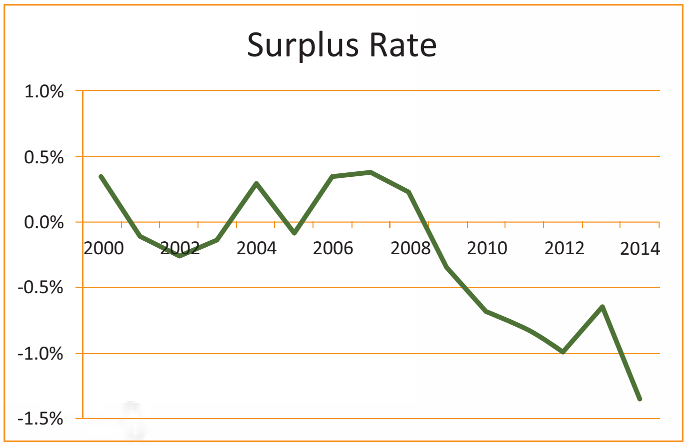


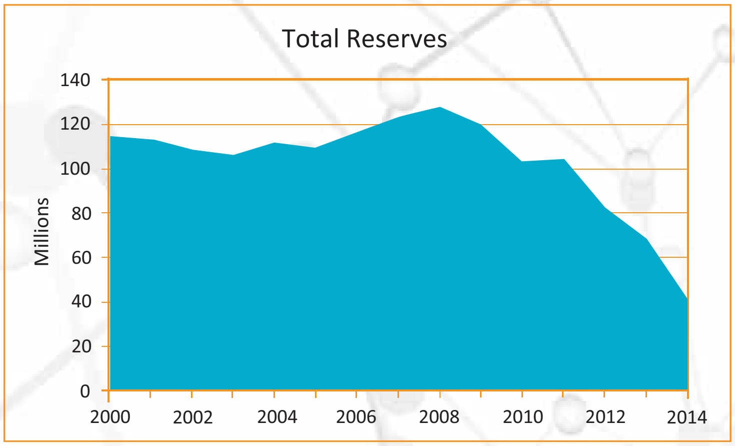
Source: Barbados Statistical Service, Labour Force Surveys

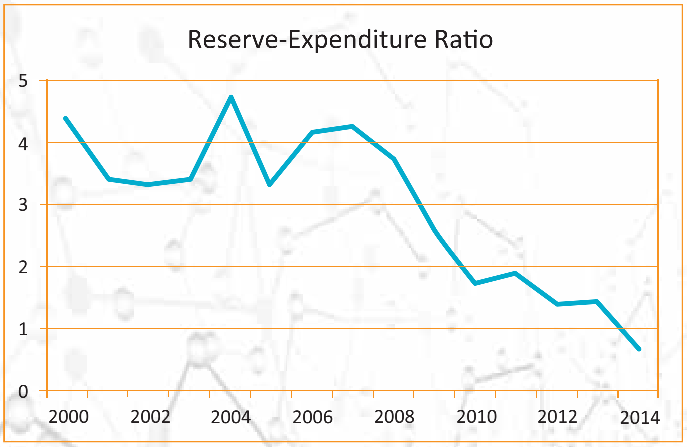
Figure 6.2. Unemployment Fund Experience, 2000 to 2014

The following charts illustrate Unemployment Fund experience from 2000 to 2014.









As shown above, expenditure exceeded contribution income each year since 2008 and deficits led to a sharp reduction in the size of reserves. At the end of 2014, reserves represented less than total expenditure in 2014.

The following table highlights Fund income and expenditure for 2012 to 2014.

Table 6.1. Unemployment Fund Experience, 2012 to 2014 ($'s in millions)

	2012	2013	2014
Contribution Income	33.2	32.1	30.8
Investment Income	4.0	1.9	1.2
Total Income	**37.3**	**34.0**	**32.1**
Benefits	55.2	44.0	55.5
Administrative Expenses	3.8	3.9	4.3
Total Expenditure	**59.0**	**47.9**	**59.8**
Excess of Income Over Expenditure	(21.8)	(13.9)	(27.7)
Year-end Reserves	**82.6**	**68.7**	**41.0**
Contribution Rate	1.50%	1.50%	1.50%
Benefit Rate (as % of IE)	2.49%	2.06%	2.70%
Yield on Reserves	4.4%	2.6%	2.3%
Administrative Costs as of IE	0.17%	0.18%	0.21%
Reserve-Expenditure Ratio	1.40	1.43	0.68

As shown above, the Unemployment Fund incurred deficits in each of the three years in the review period. The volatility in benefits is partly due to the significant backlog of unprocessed claims that has been experienced in recent years.

All contributions due to the Unemployment Fund were not received in cash. Contributions receivable at the end of 2014 were $26.3 million. It is uncertain what portion of this amount will be collected.

6.2 Subsequent Experience

Unemployment Fund experience in 2015 and first six months of 2016 were:

- In 2015, total expenditure was 1.6% of insurable wages, slightly more than the 1.5% core unemployment contribution rate but well below the combined 2% unemployment and severance contribution rates.
- Also in 2015, the GOB injected $3 million into the Unemployment Fund. This one-time payment from Government plus the transfer of Severance contributions resulted in the Unemployment Fund experiencing a surplus of $17.6 million in 2015. Contributions receivable increased to $31.4 million at the end of 2015.
- Contribution income exceeded total expenditure during the first half of 2016.
- As of May 31, 2016 reserves were $71.8 million, approximately 28 months of monthly Unemployment benefit payments.

6.3 Unemployment Fund Investments

As of December 31, 2014 the Unemployment Fund investments totalled $7.6 million, all held in Treasury Notes. As of September 2016, the Fund had no investments. As annual surpluses result in the size of the Fund increasing, funds should be shifted into income generating investments.

6.4 Short-term Unemployment Fund Projections

To determine the adequacy of the current contribution rate and reserve funds to support future benefit expenditure, 10-year projections of the Unemployment Fund under four different scenarios are presented. Key assumptions for these projections are shown in Table 6.2. Common assumptions for all scenarios are:

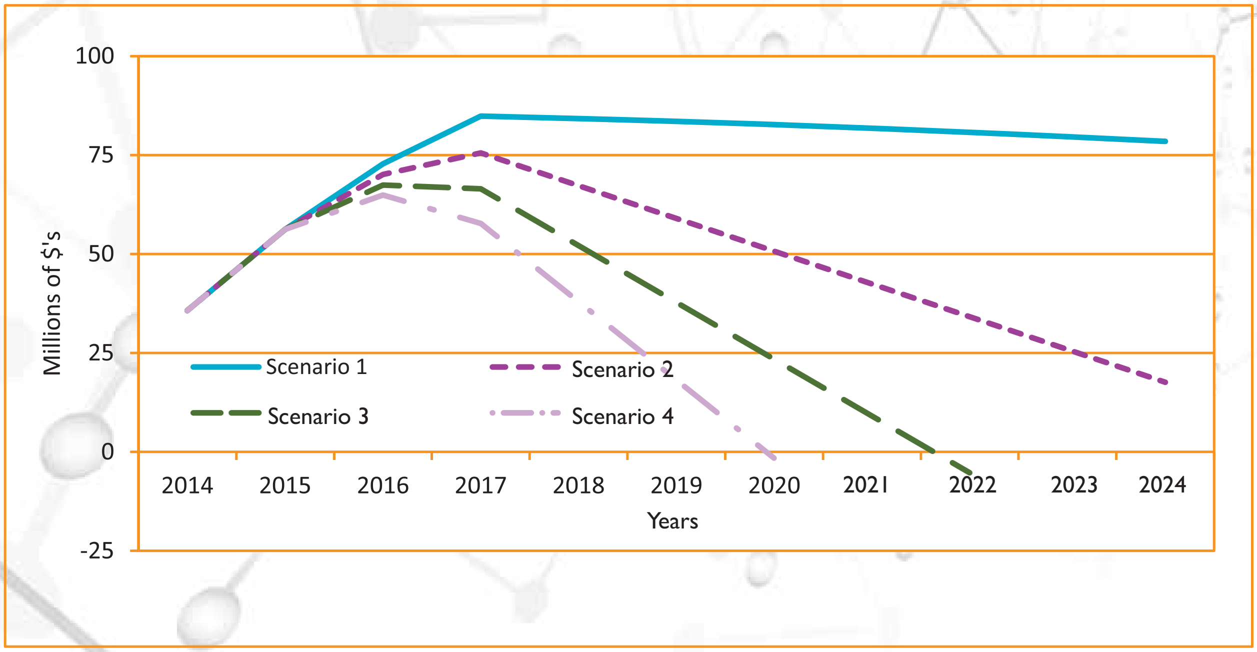
- Contribution rate of 2% for 2015 to 2017 and 1.5% thereafter;
- Investment yield of 3.0%;
- Administrative costs of 0.13% of insurable earnings;
- 20% of the contributions receivable as of December 31, 2014 will not be collected.

Table 6.2. Key Assumptions For Unemployment Fund Projections

Scenario	**Increase in Ins. Wages**	**Benefits As % of Insurable Earnings**		
		2015	**2016**	**2017+**
1	2%	1.60%	1.30%	1.50%
2	1%	1.60%	1.40%	1.75%
3	0%	1.60%	1.50%	2.00%
4	-1%	1.60%	1.60%	2.25%

Figure 6.3 below illustrates the results of these projections:

Figure 6.3. Projected Unemployment Fund



Note: The above Unemployment Fund projections include actual income and expenditure for 2015.

Under all scenarios reserves are projected to decrease after the temporary reallocation of ½% from the Severance Payments Fund to the Unemployment Fund ceases at the end of 2017. How quickly reserves decline thereafter will depend on the level of unemployment benefit costs in the following years.

No increase to the core 1.5% Unemployment Fund contribution rate is required or recommended at this time. The contribution rate should, however, be reviewed in the third quarter of 2017.

Chapter 7 : The Severance Fund

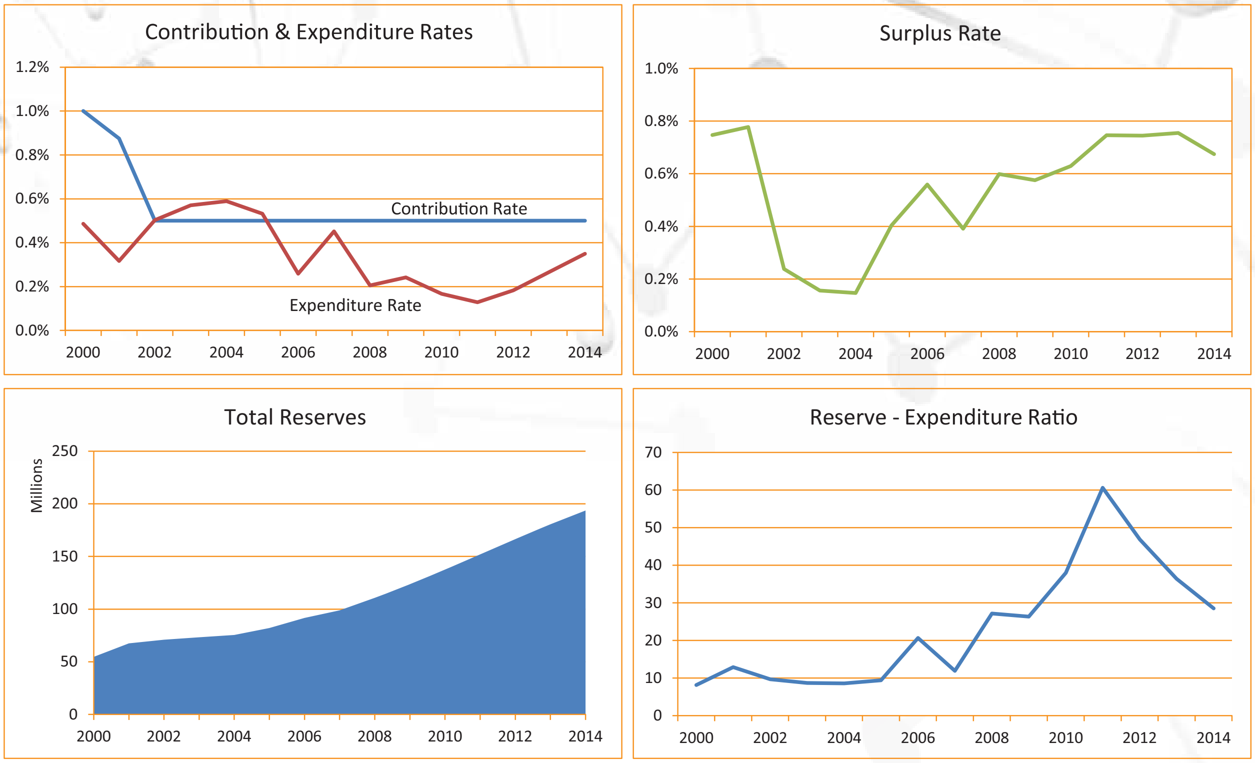
The National Insurance Board administers the Severance Payments Fund as established under the Severance Payments Act. The Severance Payments Fund provides a 25% refund to employers who make the required severance payments in accordance with the Severance Payments Act. In cases where the employer refuses to, or is unable to make such payment, the Severance Fund makes the payment directly to the employee and the amount paid is recoverable by the National Insurance Board from the employer.

7.1 Severance Fund Experience

Since October 2001, the contribution rate for Severance benefits has been fixed at 0.5% of insurable earnings. This rate is payable by private sector employers only. There were no amendments to Severance payment rules during the review period. Delays in the processing of Severance payments have affected the timing of actual payments. Further details of eligibility conditions and rates of payment can be found in Appendix A.

The following charts highlight experience of the Severance Fund from 2000 to 2014.

Figure 7.1. Severance Fund Experience, 2000 to 2014



Surplus generated in each year of the three years resulted in the Severance Fund increasing during the review period, but increasing expenditure resulted in the value of reserves relative to annual expenditure decreasing.

The following table highlights Fund income and expenditure for 2012 to 2014.

Table 7.1. Severance Fund Experience, 2012 to 2014 ($'s in millions)

	2012	2013	2014
Contribution Income	9.7	9.3	9.1
Investment Income	8.3	9.7	10.2
Total Income	18.0	19.1	19.3
Net Benefits Paid	2.5	3.9	5.8
Administrative Expenses	1.0	1.1	1.1
Total Expenditure	3.5	5.0	6.9
Excess of Income Over Expenditure	14.5	14.1	12.4
Year-end Reserves^	161.1	175.2	187.7
Contribution Rate	0.50%	0.50%	0.50%
Benefit Rate (as % of Ins. Earnings)	0.13%	0.21%	0.32%
Reserve-expenditure Ratio	45.5	35.2	27.3
Yield on Reserves	5.5%	6.0%	5.8%
Admin. Expenses as % of Ins. Earnings	0.05%	0.06%	0.06%

Note: ^ After the preparation of the 14th Actuarial Review, 2011 reserves were revised from $152.05 million to $146.67.

All contributions due to the Severance Fund were not received in cash. Contributions receivable at the end of 2014 were $5.6 million. It is uncertain what portion of this amount will be collected.

7.2 Subsequent Experience

Effective January 2015, Severance Fund contributions, which are paid by private sector employers only, have been reallocated to the Unemployment Fund. In 2015, and during the nine months of 2016, the Fund was still able to generate a surplus as investment income exceeded benefit expenditure.

7.3 Fund Investments

The following table shows the asset mix of the Severance Fund as at December 31, 2014.

Table 7.2. Severance Fund Investments, December 2014

	Amount (millions of $'s)	% of Total
Deposits	3.4	2.1
Treasury Bills	21.1	12.8
Treasury Notes	33.2	20.2
Debentures	101.8	61.8
Bonds & Loans	5.1	3.1
Total	**164.6**	**100.0**

As shown above, the Severance Fund is almost fully invested in Government of Barbados securities of varying maturities.

Unlike the National Insurance Fund, the Severance Fund does not have a written Investment Policy that guides how and where its investments are placed. As the Fund continues to grow without any need for liquid assets, aiming for a higher rate through longer-term securities should be considered. It is therefore recommended that a written investment policy be created and approved at the earliest opportunity.

7.4 Future Severance Payments

Effective January 2015, the income derived from the 0.5% Severance contribution rate paid by employers is being reallocated to the Unemployment Fund to shore up its finances. This rate reallocation of contributions was approved by employers after legal advice indicated that a direct transfer of reserves from the Severance Fund to the Unemployment Fund was not possible. Even without contributions for three years (until December 2017), the Severance Fund is expected to experience annual surpluses as investment income on Fund investments should exceed total expenditure.

The issue of low Severance payments and growing reserves during an extended recessionary period was raised in the previous actuarial report. The primary concern remains whether the provisions of the Severance Payments Act, which came into force in 1973 and was last amended in 1991, are relevant to the current labour market and economy. It is once again recommended that a comprehensive review of the objectives and key features of the Severance Payments Act be conducted, to determine whether they are relevant to current employment practices and employer behaviour regarding redundancy, and if not, recommend changes.

Chapter 8 : Good Governance

8.1 NIS Governance Structure

The current NIS governance structure can be described as follows:

- The National Insurance Board (NIB) is a body corporate and reports to Parliament through the Minister responsible for Social Security. The NIB is governed by a 9-member tripartite board. Members of the Board are appointed by the Minister. Generally, control and management of the National Insurance Fund are entrusted to the Board.

- The National Insurance Office, a department of the civil service, falls under the control of the Minister. The Director, who is the Chief Executive Officer of the department, is responsible for the day-to-day management of the Office.

- The powers and duties of the Minister and some key functions of the Board and the Director are outlined in the relevant act and regulations.

With the exception of Jamaica, all other Caribbean national insurance and social security funds are fully administered by statutory bodies. While the Barbados National Insurance Board is a statutory body, its oversight is limited to management of the Fund as the majority of National Insurance Office employees are civil servants and their terms of engagement, salary and benefit structure, recruiting policies etc., are governed by General Orders which are enforced by the Personnel Administration Division. One advantage to this existing structure is the relatively low administrative costs.

Over the past ten years, the NIS faced major challenges with the installation of a new insurance administration system resulting in service deficiencies, including delays in the payment of benefits. Annual reports of the NIF have not been sent to Parliament since 2009 and audited financial statements have not been finalised since 2004. Contrary to advice provided in previous actuarial reviews, the portion of funds invested in government securities has increased significantly.

In its Good Governance Guidelines, the International Social Security Association (ISSA) states:

> "A sound governance structure is essential for the effective functioning of the social security institution. It should ensure an appropriate division of operational and oversight responsibilities as well as the suitability and accountability of the persons involved."

Specific recommendations for a new or revised governance structure are beyond the scope of this Review. However, performance deficiencies in recent years, and the appearance of increased government influence on NIS decisions, are sufficient for us to recommend that an independent study on the most appropriate governance structure for the NIS be conducted. The Review should also focus on all governance arrangements that will ensure the effective and efficient management of the NIS.

8.2 Good Governance Guidelines

The report of the 14th Actuarial Review contained an extensive discussion of Good Governance Guidelines for social security institutions prepared by the International Social Security Association (ISSA). A recommendation was made for the Board to adopt the principles and guidelines included in ISSA's Good Governance Guidelines, prepare similar guidelines for the NIS, and initiate steps to ensure that good governance practices are commonplace in all aspects of the NIS's administration and operations. To date, a document with such good governance guidelines has not been prepared.

It is again recommended that a Good Governance Guidelines manual that is localized for the NIS be prepared and should include the following:

a) **Powers and Duties of the Minister:** These are found in various sections of the Act and Regulations but a comprehensive list should be prepared.

b) **Functions and Duties of the Board:** These include strategy & management, financial reporting & internal controls, contracts, communication, remuneration, delegation of authority and corporate governance matters.

c) **Terms of Reference for the Chairman:** In addition to providing coherent leadership of the NIF and leading Board meetings, the Chairman is expected to ensure the orientation, development and performance evaluation of Board members and lead all relations with stakeholders and the general public. He/she is also expected to uphold high standards of integrity, set the agenda, style and tone of Board discussions, ensure effective implementation of Board decisions, promote high standards of corporate governance, ensure the continual improvement in quality and calibre of managers, establish a close relationship of trust with the Director and management team, provide support and advice while respecting executive responsibility, and ensure that Ministerial approval is obtained for all Board decisions that require such approval.

d) **Board Member Orientation:** Board Members are expected to exercise due care and skill in the performance of their duties. They should possess the relevant knowledge, qualifications, experience and wherewithal to be effective. They are expected to ask questions and participate in discussions at meetings, and to contribute relevant insights and experience. This can only be achieved by Board Members who have the requisite information and up-to-date training.

e) **Board Member Code of Conduct:** Board Members have an obligation to act in the best interests of the NIS with due regard for the interest of all insured persons and other stakeholders, and in accordance with the Act & Regulations, good governance guidelines, best practices and Social Security's policies and procedures. Board Members should exercise the highest level of integrity, honesty and diligence. Specific guidance for Board members should include: preparation, attendance and conduct at meetings, knowledge of Social Security's business and personal conduct.

f) **Conflict of Interest:** Conflicts of interests may arise where an individual's or Board Members' personal or family interests and/or loyalties conflict with those of the NIS. Such conflicts have the potential to inhibit free discussions, result in decisions or actions that are not in the interests of the NIS, and risk the impression that NIB has acted improperly. The aim of the policy should be to protect both the NIB and the individual(s) involved from any appearance of impropriety.

g) **Terms of Reference for the Director:** The Director/CEO is accountable and reports to the Board and is responsible for daily operations of the NIS. He/she is responsible for business strategy and management, investment and finance, risk management and controls, human resources, communication and other duties which derive from these responsibilities.

h) **Confidential Information:** This policy should provide guidance for all NIS employees, managers and Board Members to prevent inadvertent disclosure of confidential information. Some specific items to be covered include access limitations to confidential information, how documents (paper and electronic) containing confidential information should be maintained, what circumstances may require confidentiality agreements to be entered into, who may speak to the press and general public and what information may be shared, and regular reminders to staff re not to disclose confidential information to anyone, except in the necessary course of business. Given the extensive nature of NIS information the policy may not cover all circumstances and exceptions may be justified from time to time.

i) **Disclosure of Information:** Material information with respect to the Board should be disclosed to the public promptly and in a consistent manner. Such information includes annual reports inclusive of financial statements and statistical information on operational performance, and actuarial review reports. The policy should also provide for the sharing of information with government departments, international agencies and other relevant authorized external bodies.

Statement of Actuarial Opinion

It is my opinion that for this report of the 15th Actuarial Review of the National Insurance, Unemployment and Severance Funds:

- the data on which the projections and analysis are based are sufficient and reliable;
- the assumptions used are, in the aggregate, reasonable and appropriate; and
- the methodology employed is appropriate and consistent with sound actuarial principles.

This report has been prepared in accordance with the Caribbean Actuarial Association Actuarial Practice Standard #3 for Social Security Programs.

Morneau Shepell Ltd.

Derek Osborne, FSA
Partner

Marcia Tam-Marks, FSA
Partner

May 30th, 2017

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13th and 14th Actuarial Review of the National Insurance, Unemployment and Severance Funds, Horizonow Consultants, 2011

Annual Reports and Financial Statements of the National Insurance, Unemployment and Severance Funds

Barbados, Selected issues, International Monetary Fund, 2016

Barbados: 2016 Article IV Report, IMF, 2016

National Insurance and Social Security Act and Regulations

Various reports and publications by the Barbados Statistical Service and Central Bank of Barbados

Appendix A : Summary of Contribution and Benefit Provisions

A.1 Funds, Benefits, Insured Persons and Contribution Rates

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

1. National Insurance Fund

- Long-term benefits: Old Age Contributory, Invalidity and Survivors' Benefits.
- Short-term benefits: Sickness & Maternity Benefit, Funeral Grant.
- Employment Injury Benefits: Injury Benefit, Disablement Benefit, Medical Expenses, Death Benefit and Funeral Grant.
- Non-contributory pensions: Old Age Contributory (for existing pensioners at December 31, 1999)

2. Unemployment Fund

- Unemployment Benefit

3. Severance Payment Fund

- Employer Payments
- Rebates

Employed and self-employed persons between 16 and pensionable age (66½ years effective January 2014) are covered for the above contingencies as follows:

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

Employed persons under 16 or over normal pension age are covered for Employment Injury benefits only.

Earnings used for determining contributions and benefits are limited to a weekly or monthly ceiling. If earnings are below $91 per month, no contributions are payable. Earnings include basic salary and all other remuneration in cash or kind such as bonuses.

Starting 2005, the earnings ceiling has been indexed annually in line with changes in average wages. The weekly and monthly ceilings on insurable wages has increased since 1967 as follows:

Period	Weekly	Monthly	Period	Weekly	Monthly
1967 - 1973	$50		**2007**	$782	$3,390
1974 - 1977	$130		**2008**	$819	$3,550
1978 - 1981	$230	$1,000	**2009**	$858	$3,720
1982 - 1984	$506	$2,200	**2010**	$900	$3,900
1984 - 1986	$598	$2,600	**2011**	$944	$4,090
1987 - 1991	$600	$2,600	**2012**	$965	$4,180
1991 - 2004	$715	$3,130	**2013**	$985	$4,270
2005	$736	$3,190	**2014 - 2016**	$1,006	$4,360
2006	$759	$3,290	**2017**	$1,073	$4,650

Contributions are computed as a percentage of insurable earnings. Rates of contributions vary according to the type of employment. The contribution rates applicable to the four main categories of contributors in effect in January 2015 are shown below.

Contributions are computed as a percentage of insurable earnings. Rates of contributions vary according to the type of employment. The contribution rates applicable to the four main categories of contributors in effect in January 2015 are shown below.

	National Insurance & Non-Contributory Pensions		Unemployment Benefits		Severance Benefits	
	E'ee	**E'er**	**E'ee**	**E'er**	**E'ee**	**E'er**
Employed Persons	8.75%	9.50%	0.75%	0.75%	-	0.50%
Temporary Government	8.75%	9.50%	0.75%	0.75%	-	-
Permanent Government	8.20%	8.95%	-	-	-	-
Self-employed*	15.50%		-	-	-	-

Notes: * Self-employed are not covered for Employment Injury benefits. Please note that E'ee and E'er represent Employee and Employer respectively.

The average contribution rate payable in 2015 for National Insurance and Non-Contributory pensions is approximately 17.8%.

A.2 Summary of Benefits Provisions

A.2.1. LONG-TERM BENEFITS

(a) OLD-AGE CONTRIBUTORY PENSION

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

Age Requirement:
Full Pension: Normal pension age: 66½ from 2014 to 2017 and 67 thereafter. Pensions payable at normal pension age are
not dependent on retirement from the workforce.

Reduced Pension: 60 years to normal pension age. This pension is dependent on retirement from the workforce.

Increased pension: From normal pension age to age 70.

Amount of Benefit:

<u>Old Basis:</u> 40% of average earnings over the best five years, plus 1% of total insurable earnings on which contributions were based subsequent to the first 500 weekly contributions. These rates apply to persons attaining normal pension age up to 2012.

New Basis: Effective 2023, pension accrual rates will be 2% for each 50 weekly contributions up to 1,000 weekly contributions plus 1.25% for each further 50 weekly contributions subsequent to the first 1300 weekly contributions up to a maximum of 60%.
Transition: For persons attaining normal pension age between 2013 and 2022, 50% of the benefit will be based on the Old Basis and 50% on the New Basis.

Pensions are reduced by ½% for each month the age at award is less than normal pension age and increased by ½% for each month the age at award exceeds normal pension age.

Maximum Pension: 60 % of average earnings over the best five years.

Minimum Pension: The listed minimum pension is $179.00 per week effective January 2014 to December 2016. The minimum pension and all pensions will increase each year in accordance with the lesser of 3-year average wage increases and 3-year average price inflation. (The minimum pension was not adjusted in 2015 and 2016)

(b) OLD AGE CONTRIBUTORY GRANT

Contribution Requirement: 50 paid or credited weekly contributions.

Eligibility: Other than for the contribution requirement, the applicant must be eligible for Old Age Contributory pension.

Amount of Benefit: 6 times average weekly insurable earnings for each 50 weekly contributions paid or credited. This amount is paid as a lump sum.

(c) INVALIDITY PENSION

Contribution Requirement: 150 paid weekly contributions.

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

Amount of Benefit: 40% of average earnings over the best three years, plus 1% of total insurable earnings on which contributions were based subsequent to the first 500 weekly contributions.

Duration of Pension: Payable for as long as invalidity continues or until normal pension age when converted to an Old Age Contributory pension.

Minimum Pension: As for Old Age Contributory pension.

(d) INVALIDITY GRANT

Contribution Requirement: 50 paid or credited weekly contributions.

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

Amount of Benefit: Same as Old Age Contributory grant.

(e) SURVIVORS' PENSION

Contribution Requirement: The deceased, at time of death, was receiving or was qualified to receive an Invalidity or Old Age Contributory pension.

Eligibility: Widow or widower married for at least three years (includes common-law spouse) or a child who is under age 16, up to age 25 if in full-time education or invalid.

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

Widow or widower: 50% if age 50 or over and married for at least 3 years; 33⅓% if between 45 and 50 and married for at least 3 years;

Child: 16 ⅔% – up to 3 children at any one time if a spouse is also entitled;
Child (orphan or disabled): 33⅓%;

Maximum benefit: 100% Duration of Benefit:

- Widow or widower age 45 or over at time of death and married for 3 years, or disabled: life pension or until the beneficiary is entitled to a larger Old Age pension in his/her own right.
- For a widow or widower under age 45 and not disabled: one year.
- For children, age 16 or 25 if in full-time education, for as long as invalidity continues, if invalid.

(f) SURVIVORS' GRANT

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

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

Amount of Benefit: Same as Old Age Contributory or Invalidity grants.

(g) NON-CONTRIBUTORY OLD AGE PENSION

Eligibility: Current normal pension age or over, or in the case of a blind person or a deaf mute aged 18 or over. Applicant must also be a Barbados citizen or a permanent resident who has lived in Barbados for a period of:

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

Amount of Benefit: $145 per week effective January 2014 to December 2016. NIS is only responsible for the first $74.75 per week as since 1998, all increases above this level and the cost associated with new awards after 1999 are being met by the Consolidated Fund. The pension payable is reduced to take account of any other pensions being received.

A.2.2. SHORT-TERM BENEFITS

(a) SICKNESS BENEFIT

Contribution Requirements:

7 weekly paid or credited contributions in the quarter but one before the quarter in which the person became ill and either,

i. 39 weekly paid or credited contributions in the four quarters ending with the quarter but one before the quarter in which the person became ill, or
ii. Person is engaged in employment immediately before becoming ill.

Self-employed persons must satisfy criteria (i).

Waiting Period: 3 days. If incapacity lasts for two weeks or more, benefit is payable from the first day. Two periods of illness separated by less than thirteen weeks are treated as one.

Amount of Benefit: 66 ⅔% of average weekly insurable earnings during the quarter but one before the quarter in which the person became ill. Benefit paid on the basis of six days per week.

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

(b) MATERNITY BENEFIT

Contribution Requirement:

For an employed person, insured for at least 26 weeks, and paid at least 16 contributions in the two quarters but one before the quarter the benefit becomes payable.

For a self-employed person, not less than 39 contributions should have been paid or credited in the four quarters ending with the quarter but one before the quarter benefit becomes payable, and not less than 16 contributions should have been paid in two quarters but one before the quarter the benefit becomes payable.

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

Duration of Benefit: Up to 12 weeks.

c) MATERNITY GRANT

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

Amount of Grant: $1,150 effective January 2014 to December 2016. This amount will increase each year in accordance with the lesser of 3-year average wage increases and 3-year average price inflation.

(d) FUNERAL GRANT

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

Amount of Grant: $1,995 effective January 2014 to December 2016. This amount will increase each year in accordance with the lesser of 3-year average wage increases and 3-year average price inflation.

A.2.3. EMPLOYMENT INJURY BENEFITS

(a) INJURY BENEFIT

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

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

Duration of Benefit: 52 weeks.

Waiting Period: 3 days. If incapacity lasts for two weeks or more, benefit is payable from the first day. Two periods of incapacity separated by less than eight weeks are treated as one.

(b) DISABLEMENT BENEFIT

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

Waiting Period: If the Injury benefit is awarded, the period of payment of Injury benefit.
Amount of Benefit: The payment of a pension or a grant is based on the percentage loss of faculty suffered.

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

(c) DEATH BENEFIT

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

Amount of Benefit: Proportion of Disablement pension - same percentage as for Survivors benefits. (See A.2.1(e)) Other dependants receive 16 ⅔%.

(d) MEDICAL EXPENSES

Expenses Covered:

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

(e) FUNERAL GRANT

Condition of Payment: Death of insured must be related to employment. (Only one funeral grant is payable.)

CARICOM Agreement On Social Security

Some former contributors with fewer contributions than required for Age, Invalidity and Survivors pensions, may qualify for a pension under the CARICOM Agreement on Social Security based on the total of all contributions made in participating countries.

A.2.4. UNEMPLOYMENT BENEFITS

Contribution Requirement:

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

Amount of Benefit: 60% of average insurable earnings during the quarter but one before that in which unemployment began.

Waiting Period: 3 days. If unemployment lasts for two weeks or more, benefit is payable from the first day. Two periods of unemployment separated by less than thirteen weeks are treated as one.

Duration of Benefit: 26 weeks of continuous unemployment, or (if different periods of unemployment occurred) a maximum of 26 weeks in the last year. Between August 2010 and June 2012 the maximum duration was 40 weeks.

A.2.5. SEVERANCE PAYMENTS

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

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

Employees aged 16 to normal pension age are covered for Severance payments with the following exceptions:

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

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

Amount of Benefit: 25% of benefits in line with the scale shown below are refunded to the employer:

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

Appendix B : Methodology, Data and Assumptions

This actuarial review makes use of the comprehensive methodology developed at the 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 Barbados and the National Insurance Fund. These modelling tools include population, economic, labour force, wage, longterm benefits and short-term benefits models.

The actuarial valuation begins with a projection of Barbados' future demographic and economic environment. Next, projection factors specifically related to National Insurance are determined and used in combination with the demographic/economic framework to estimate future cash flows and reserves. Assumption selection takes into account both recent experience and future expectations, with emphasis placed on long-term trends rather than giving undue weight to recent experience. Projections have been made under three assumption sets for which the demographic and economic assumptions vary.

B.1 Modelling the Demographic and Economic Developments

The general Barbados population has been projected beginning with totals obtained from the 2010 national census and by applying appropriate mortality, fertility and migration assumptions. For the Best Estimate scenario the total fertility rate (TFR) is assumed to remain at 1.65. For the Pessimistic and Optimistic scenarios, total fertility rates are assumed to gradually reach 1.6 and 1.7, respectively, in 2021, remaining constant thereafter. Table B.1 shows ultimate age-specific and total fertility rates.

Table B.1. Age-Specific and Total Fertility Rates

Age Group	2014	Ultimate Fertility Rates: Optimistic	Best Estimate	Pessimistic
15 - 19	0.045	0.046	0.045	0.043
20 - 24	0.085	0.087	0.085	0.082
25 - 29	0.078	0.081	0.078	0.076
30 - 34	0.073	0.075	0.073	0.071
35 - 39	0.041	0.043	0.041	0.040
40 - 44	0.012	0.012	0.012	0.011
TFR	**1.65**	**1.70**	**1.65**	**1.60**

Mortality rates have been determined using United Nations life tables for Latin America. These rates have been adjusted to model closely the actual number of deaths in Barbados from 2010 to 2014. Improvements in life expectancy for the Best Estimate scenario have been assumed to follow the "slow" rate as established by the United Nations with a "medium" rate assumed for the Pessimistic scenario and "very slow" for the Optimistic scenario. Sample mortality rates for the Best Estimate scenario and the life expectancies at birth and at age 67 for sample years are provided in Table B.2.

Table B.2. Sample Mortality Rates and Life Expectancies

Age	2014	Males 2044	Males 2074	Females 2014	Females 2044	Females 2074
0	0.0056	0.0041	0.0039	0.0068	0.0049	0.0037
5	0.0003	0.0001	0.0001	0.0003	0.0003	0.0002
15	0.0004	0.0002	0.0001	0.0003	0.0002	0.0001
25	0.0010	0.0009	0.0007	0.0004	0.0004	0.0003
35	0.0010	0.0009	0.0007	0.0007	0.0006	0.0005
45	0.0024	0.0019	0.0017	0.0017	0.0014	0.0011
55	0.0064	0.0054	0.0046	0.0041	0.0033	0.0027
65	0.0159	0.0128	0.0107	0.0102	0.0080	0.0061
75	0.0447	0.0371	0.0310	0.0322	0.0257	0.0201
85	0.1251	0.1151	0.0998	0.1059	0.0923	0.0808
95	0.2817	0.2739	0.2547	0.2647	0.2462	0.2327
Life Expectancy at:						
Birth	**76.3**	**78.1**	**79.8**	**79.5**	**81.5**	**83.3**
Age 67	**15.0**	**16.1**	**17.2**	**16.8**	**18.1**	**19.3**

Life Expectancies At Age 67

	2014	2074 Optimistic	2074 Best Estimate	2074 Pessimistic
Male	15.0	16.0	17.2	18.2
Female	16.8	18.0	19.3	20.8

Net migration (in minus out) for each scenario and 10-year age group is shown below for years 2015 and 2040.

Table B.3. Net Migration

Age	2015 Optimistic	2015 Best Estimate	2015 Pessimistic	2040+ Optimistic	2040+ Best Estimate	2040+ Pessimistic
0 - 9	(4)	(8)	(13)	51	25	6
10 - 19	(5)	(9)	(14)	57	28	7
20 - 29	(27)	(54)	(81)	322	161	40
30 - 39	(13)	(25)	(38)	150	75	19
40 - 49	(2)	(5)	(7)	27	14	3
50 - 59	0	0	0	(1)	(0)	(0)
60 - 69	0	1	1	(4)	(2)	(0)
70+	0	0	1	(3)	(1)	(0)
All Ages	**(50)**	**(100)**	**(150)**	**600**	**300**	**75**

The projection of the labour force, i.e. the number of people available for work, is obtained by applying assumed labour force participation rates to the projected number of persons in the total population. Over the first 20 years age-specific labour force participation rates for females are assumed to increase by 5%. Further, for both males and females for ages above 59, participation rates are assumed to gradually approach the rates that in 2014 apply to persons one year younger. Table B.3 below shows the assumed age-specific labour force participation rates in 2014 and 2071. Between these two years, rates are assumed to change linearly.

Table B.4. Age-Specific and Total Labour Force Participation Rates

	Males		Females				
Age	**2014**	**2074**	**2014**	**2074**	**Year**	**Males**	**Females**
17	27%	27%	20%	21%			
22	75%	75%	68%	71%	**2014**	75%	68%
27	89%	89%	85%	89%	**2024**	75%	69%
32	89%	89%	86%	90%			
37	91%	91%	85%	90%	**2034**	77%	72%
42	90%	90%	85%	89%	**2044**	77%	72%
47	89%	89%	84%	89%	**2054**	77%	72%
52	88%	88%	79%	83%			
57	83%	83%	68%	72%	**2064**	76%	71%
62	72%	74%	53%	59%	**2074**	76%	71%
67	18%	47%	10%	36%			

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

Estimates of increases in the total wages as well as the average wage earned are required. Annual average real wage increases are assumed equal 0.8%, 1.0% and 1.2% for the Pessimistic, Best Estimate and Optimistic scenarios, respectively. The inflation assumption affects nominal average wage increases. Actual projection assumptions may be found in Table 4.1.

B.2 Projection of National Insurance Income and Expenditure

This actuarial review addresses all National Insurance Fund revenue and expenditure items. For Short-term and Employment Injury benefits, income and expenditure are projected as a percentage of insurable earnings. Projections of pensions are performed following a year-by-year cohort methodology. For each year up to 2074, the number of contributors and pensioners; and the dollar value of contributions, benefits and administrative expenditure, is estimated.

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

Benefit amounts are obtained through contingency factors based primarily on plan experience and applied to the population entitled to benefits. Investment income is based on the assumed yield on the beginning-of-year reserve and net cash flow in the year. National Insurance's administrative expenses are modelled as a percentage of insurable earnings. Finally, the end-of-year reserve is the beginning-of-year reserve plus the net result of cash inflow and outflow.

B.3 National Insurance Population Data and Assumptions

The data required for the valuation of the National Insurance Fund is extensive. As of December 31st, 2014, required data includes the insured population by active and inactive status, the distribution of insurable wages among contributors, the distribution of paid and credited contributions and pensions in payment, all segregated by age and sex.

Scheme specific assumptions such as the incidence of invalidity, the distribution of retirement by age, density and collection of contributions, are determined with reference to the application of the Scheme's provisions and historical experience.
Projecting investment income requires information of the existing assets at the valuation date and past performance of each class. Future expectations of changes in asset mix and expected rates of return on each asset type together allow for long-term rate of return expectations.

Details of National Insurance specific input data and the key assumptions used in this report are provided in Tables B.5 through B.12.

Table B.5. 2014 Active Insured Population, Earnings and Past Credits

	# of Active Insureds		Average Monthly Insurable Earnings		Average # of Years of Past Credits	
Age	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
15 - 19	769	620	1,130	1,012	1.2	1.1
20 - 24	4,403	4,740	1,721	1,581	4.1	3.9
25 - 29	5,668	6,513	2,354	2,322	7.8	7.6
30 - 34	6,010	7,376	2,715	2,671	11.7	11.5
35 - 39	5,773	7,430	2,864	2,789	15.8	15.5
40 - 44	6,210	7,898	2,914	2,716	20.0	19.6
45 - 49	6,123	7,628	2,970	2,687	24.2	23.7
50 - 54	6,255	7,846	2,981	2,616	28.4	27.9
55 - 59	5,641	6,788	3,042	2,635	32.7	32.1
60 - 64	3,854	4,128	2,972	2,415	34.9	34.2
65+	1,354	1,296	-	-	35.0	34.3
All Ages	**52,060**	**62,263**	**2,725**	**2,526**	**19.1**	**19.0**

Table B.6. Pensions in Payment - December 31, 2014

	Old-Age Benefit		Invalidity Benefits		Survivors Benefit		Disablement & Death Benefits		Non-Contributory Benefit	
Age	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
0 - 4	-	-	-	-	166	-				
5 - 9	-	-	-	-	353	-				
10 - 14	-	-	-	-	385	-				
15 - 19	-	-	-	-	173	-				
20 - 24	-	-	-	-	12	-	1	-	-	-
25 - 29	-	-	4	4	8	3	1	1	-	-
30 - 34	-	-	20	20	18	21	3	2	-	-
35 - 39	-	-	43	48	44	47	8	7	-	-
40 - 44	-	-	65	81	55	61	22	10	-	-
45 - 49	-	-	156	144	63	88	21	9	-	-
50 - 54	-	-	300	324	53	121	43	22	-	-
55 - 59	-	-	450	582	61	165	44	32	-	-
60 - 64	981	1,031	652	780	42	186	48	18	-	-
65 - 69	4,023	3,835	-	-	30	274	20	13	-	-
70 - 74	3,249	3,318	-	-	20	264	4	3	-	-
75 - 79	2,308	2,471	-	-	7	268	5	4	281	980
80 - 84	1,372	1,588	-	-	9	318	4	1	171	744
85 - 89	698	883	-	-	5	302	2	1	68	401
90 - 94	300	406	-	-	-	158	2	-	32	166
95 - 99	78	130	-	-	-	43	-	-	7	26
100+	9	27	-	-	-	19	-	-	-	2
# of Pensioners	**13,018**	**13,689**	**1,690**	**1,983**	**1,504**	**2,338**	**228**	**123**	**559**	**2,319**
Avg Monthly Pension	**$1,397**	**$1,150**	**$1,314**	**$1,143**	**$ 306**	**$ 703**	**$ 252**	**$ 226**	**$ 324**	**$ 324**

Note: The average amount for Non-contributory pensions is the amount payable from the NIF.

The following table shows assumed density factors, or the average portion of the year for which contributions are made. These rates are assumed to remain constant for all years.

Table B.7. Density Of Contributions

Age	Males	Females
17	41%	36%
22	71%	67%
27	82%	81%
32	84%	85%
37	87%	87%
42	88%	89%
47	89%	90%
52	91%	90%
57	90%	91%
62	90%	90%

Table B.8. Rates of Entry Into Invalidity

Age	Males	Females
17	-	-
22	-	-
27	0.110	0.191
32	0.345	0.281
37	0.790	0.670
42	0.801	0.814
47	2.032	1.604
52	3.083	3.463
57	6.139	5.132
62	9.196	6.801

Table B.9, shows the assumed probability of Survivor benefit claims and the average ages of new claimants, groups by the age of the deceased.

Table B.9. Probability of a Deceased Having Eligible Survivors and Their Average Ages

	Males		Females	
Age	Probability of Eligible Spouse	Avg # of Eligible Children	Probability of Eligible Spouse	Avg # of Eligible Children
17	0%	-	0%	-
22	8%	0.0	0%	0.0
27	5%	0.0	0%	0.1
32	25%	0.1	8%	0.2
37	23%	0.3	15%	0.4
42	26%	0.4	13%	0.4
47	31%	0.4	10%	0.4
52	29%	0.2	8%	0.3
57	32%	0.2	10%	0.1
62	31%	0.2	10%	0.0
67	26%	0.1	7%	-
72	10%	0.0	4%	-
77	9%	0.1	3%	-
82	8%	0.0	2%	-
87	6%	0.0	1%	-

Appendix C : Projection Results – Alternate Scenarios

Table C.1. Projected Barbados Population, All Scenarios

Year	All Ages	0-15		16-66		67+		Age Depend. Ratio
2010	277,821	58,523	21.1%	187,698	67.6%	31,601	11.4%	0.17
2014	279,284	55,981	20.0%	190,515	68.2%	32,788	11.7%	0.17
				Best Estimate				
2020	281,456	51,546	18.3%	192,606	68.4%	37,305	13.3%	0.19
2030	284,886	48,103	16.9%	186,005	65.3%	50,778	17.8%	0.27
2040	282,873	46,293	16.4%	177,862	62.9%	58,718	20.8%	0.33
2050	274,433	43,260	15.8%	172,054	62.7%	59,119	21.5%	0.34
2060	264,418	40,900	15.5%	165,734	62.7%	57,785	21.9%	0.35
2070	254,920	39,016	15.3%	156,155	61.3%	59,749	23.4%	0.38
				Optimistic				
2020	282,488	52,160	18.5%	193,267	68.4%	37,061	13.1%	0.19
2030	287,607	49,946	17.4%	187,750	65.3%	49,911	17.4%	0.27
2040	288,564	49,023	17.0%	182,576	63.3%	56,966	19.7%	0.31
2050	284,463	47,294	16.6%	180,658	63.5%	56,511	19.9%	0.31
2060	279,472	46,203	16.5%	178,462	63.9%	54,806	19.6%	0.31
2070	275,277	45,291	16.5%	173,342	63.0%	56,644	20.6%	0.33
				Pessimistic				
2020	280,514	50,932	18.2%	191,968	68.4%	37,614	13.4%	0.20
2030	282,568	46,287	16.4%	184,329	65.2%	51,951	18.4%	0.28
2040	278,540	43,728	15.7%	173,633	62.3%	61,180	22.0%	0.35
2050	266,923	39,737	14.9%	164,639	61.7%	62,547	23.4%	0.38
2060	252,650	36,425	14.4%	155,009	61.4%	61,216	24.2%	0.39
2070	238,570	33,827	14.2%	141,951	59.5%	62,793	26.3%	0.44

Table C.2. Projected Cash Flows and Reserves, Pessimistic Scenario (millions of $'s)

	Income				Expenditure				Reserves	
Year	Contributions	Investment	Other	Total	Benefits	Admin. & Other	Total	Surplus/ (Deficit)	End of Year	# of Times Current Year's Expenditure
2012	570.3	255.7	5.0	**831.0**	515.1	33.2	**548.4**	**282.7**	**4,222**	7.7
2013	598.0	292.9	5.0	**896.0**	564.1	29.2	**593.4**	**302.6**	**4,525**	7.6
2014	532.1	234.5	5.6	**772.2**	560.6	27.3	**587.8**	**184.3**	**4,709**	8.0
2015	546.2	286.7	24.3	**857.2**	538.4	72.7	**611.1**	**246.1**	**4,973**	8.0
2016	545.1	289.0	4.9	**839.0**	571.7	74.0	**645.7**	**193.3**	**5,057**	7.8
2017	558.1	274.9	5.0	**838.0**	609.1	75.0	**684.1**	**153.9**	**5,211**	7.6
2018	568.4	271.7	5.1	**845.2**	614.8	31.9	**646.7**	**198.4**	**5,409**	8.4
2019	582.2	268.6	5.2	**856.0**	633.4	32.7	**666.1**	**189.9**	**5,599**	8.4
2020	595.3	250.0	5.4	**850.7**	656.4	33.4	**689.8**	**160.9**	**5,760**	8.4
2024	647.1	273.1	5.8	**926.0**	794.6	36.4	**830.9**	**95.1**	**6,252**	7.5
2034	788.9	252.0	7.1	**1,048.0**	1,229.2	44.3	**1,273.5**	**(225.5)**	**5,610**	4.4
2044	948.1	47.8	8.5	**1,004.4**	1,685.7	53.3	**1,739.0**	**(734.5)**	**714**	0.4
2054	1,187.1	(436.3)	10.7	**761.5**	2,227.8	66.7	**2,294.5**	**(1,533.0)**	**(10,687)**	(4.7)
2064	1,485.4	(1,371.7)	13.4	**127.1**	2,883.9	83.4	**2,967.4**	**(2,840.3)**	**(32,597)**	(11.0)
2074	1,850.2	(3,076.3)	16.7	**(1,209.4)**	3,774.9	103.9	**3,878.9**	**(5,088.3)**	**(72,447)**	(18.7)

Note: Negative reserves indicate the indebtedness of the Fund and negative investment income is the current cost of servicing that debt. Investment Income for 2012 to 2014 includes prior year adjustments and changes in unrealised investment gains.

Table C.3. Projected Benefit Expenditure– Pessimistic Scenario (millions of $'s)

Year	Pensions, Grants & Benefits						Benefits as a % of:	
	Old Age Cont.	Invalidity	Survivors	Non-Cont. Old Age	Short-term	Employ. Injury	Insurable Wages	GDP
2012	368.4	56.4	21.6	13.4	40.7	14.7	16.3%	5.9%
2013	404.6	63.8	24.7	17.5	38.3	15.2	17.0%	6.5%
2014	403.2	66.5	24.2	13.2	41.3	12.2	14.3%	6.4%
2015	413.5	61.4	23.7	10.7	21.8	7.4	17.8%	6.2%
2016	428.4	60.0	24.5	8.8	39.1	10.9	18.7%	6.6%
2017	460.7	63.6	26.0	7.4	40.1	11.3	19.4%	6.8%
2018	467.5	62.9	26.0	6.2	40.8	11.4	19.3%	6.6%
2019	486.7	62.0	26.1	5.1	41.9	11.5	19.4%	6.6%
2020	509.8	61.5	26.3	4.2	42.9	11.7	19.6%	6.7%
2024	641.7	63.4	28.6	1.6	46.8	12.5	21.9%	7.3%
2034	1,049.3	69.2	38.0	0.0	57.7	14.9	27.7%	8.9%
2044	1,469.8	79.5	48.5	0.0	70.1	17.9	31.6%	9.6%
2054	1,954.9	101.5	59.9	-	88.8	22.7	33.4%	10.1%
2064	2,537.4	131.7	73.7	-	112.3	28.8	34.6%	10.5%
2074	3,352.7	153.5	91.9	-	141.4	35.5	36.3%	11.0%

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

Table C.4. Projected Contributors and Pensioners, Pessimistic Scenario

Year	# of Contributors	# of Pensioners					Total # of Pensioners	Ratio of Contributors to Pensioners
		Old Age Cont.	Invalidity	Survivors	Non-Cont. Old Age	Death & Disablement		
2012	120,313	25,000	3,444	3,633	3,579	346	**36,002**	3.3
2013	117,992	26,124	3,802	3,806	3,228	358	**37,318**	3.2
2014	114,323	26,707	4,190	3,842	2,878	351	**37,968**	3.0
2015	111,972	27,085	4,103	3,705	2,463	272	**37,628**	3.0
2016	113,254	27,760	4,065	3,677	2,083	270	**37,854**	3.0
2017	115,159	28,134	4,040	3,685	1,748	268	**37,875**	3.0
2018	115,687	28,599	4,002	3,699	1,453	266	**38,019**	3.0
2019	115,978	29,646	3,947	3,708	1,195	263	**38,759**	3.0
2020	115,923	30,685	3,887	3,709	972	259	**39,513**	2.9
2024	115,092	35,027	3,705	3,580	367	247	**42,925**	2.7
2034	111,464	46,149	3,292	3,532	5	222	**53,199**	2.1
2044	106,185	53,163	3,092	3,614	0	211	**60,080**	1.8
2054	100,646	55,248	3,061	3,451	-	208	**61,967**	1.6
2064	95,656	54,948	3,019	3,246	-	204	**61,417**	1.6
2074	90,651	54,865	2,676	3,077	-	182	**60,800**	1.5

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

Table C.5. Projected Cash Flows and Reserves, Optimistic Scenario (millions of $'s)

	Income				Expenditure				Reserves	
Year	Contributions	Investment	Other	Total	Benefits	Admin. & Other	Total	Surplus/ (Deficit)	End of Year	# of Times Current Year's Expenditure
2012	570.3	255.7	5.0	**831.0**	515.1	33.2	**548.4**	**282.7**	**4,222**	7.7
2013	598.0	292.9	5.0	**896.0**	564.1	29.2	**593.4**	**302.6**	**4,525**	7.6
2014	532.1	234.5	5.6	**772.2**	560.6	27.3	**587.8**	**184.3**	**4,709**	8.0
2015	546.2	286.7	24.3	**857.2**	538.4	72.7	**611.1**	**246.1**	**4,973**	8.0
2016	548.2	289.2	4.9	**842.3**	570.6	74.0	**644.6**	**197.7**	**5,061**	7.9
2017	566.2	287.9	5.1	**859.2**	607.3	75.0	**682.3**	**177.0**	**5,238**	7.7
2018	576.5	286.4	5.2	**868.1**	612.6	32.4	**645.0**	**223.1**	**5,461**	8.5
2019	590.5	298.6	5.3	**894.4**	628.1	33.2	**661.2**	**233.2**	**5,695**	8.6
2020	603.7	311.3	5.4	**920.4**	648.1	33.9	**682.0**	**238.4**	**5,933**	8.7
2024	655.8	361.2	5.9	**1,022.8**	762.6	36.8	**799.5**	**223.4**	**6,857**	8.6
2034	798.2	455.4	7.2	**1,260.8**	1,097.2	44.8	**1,142.0**	**118.8**	**8,564**	7.5
2044	959.2	488.0	8.6	**1,455.8**	1,397.6	53.9	**1,451.5**	**4.3**	**9,115**	6.3
2054	1,201.7	463.0	10.8	**1,675.5**	1,717.9	67.5	**1,785.5**	**(109.9)**	**8,590**	4.8
2064	1,502.0	349.7	13.5	**1,865.2**	2,140.5	84.4	**2,224.9**	**(359.7)**	**6,347**	2.9
2074	1,875.5	11.3	16.9	**1,903.7**	2,771.1	105.4	**2,876.5**	**(972.8)**	**(273)**	(0.1)

Notes: Negative reserves indicate the indebtness of the Fund and negative investment income is the current cost of servicing that debt. Investment Income for 2012 to 2014 includes prior year adjustments and changes in unrealised investment gains.

Table C.6. Projected Benefit Expenditure– Optimistic Scenario (millions of $'s)

Year	Pensions, Grants & Benefits						Benefits as a % of:	
	Old Age Cont.	Invalidity	Survivors	Non-Cont. Old Age	Short-term	Employ. Injury	Insurable Wages	GDP
2012	368.4	56.4	21.6	13.4	40.7	14.7	16.3%	5.9%
2013	404.6	63.8	24.7	17.5	38.3	15.2	17.0%	6.5%
2014	403.2	66.5	24.2	13.2	41.3	12.2	14.3%	6.4%
2015	413.5	61.4	23.7	10.7	21.8	7.4	17.8%	6.2%
2016	427.1	60.0	24.6	8.7	39.3	10.9	18.5%	6.5%
2017	458.4	63.5	26.1	7.3	40.6	11.4	19.1%	6.7%
2018	464.6	62.8	26.2	6.1	41.4	11.5	18.9%	6.6%
2019	481.0	61.8	26.3	5.0	42.5	11.6	18.9%	6.5%
2020	501.2	61.1	26.5	4.1	43.5	11.7	19.1%	6.6%
2024	611.2	61.6	28.4	1.5	47.5	12.5	20.7%	7.0%
2034	922.7	64.8	36.6	0.0	58.4	14.7	24.5%	7.8%
2044	1,191.1	72.8	45.2	0.0	71.0	17.6	25.9%	7.9%
2054	1,461.1	91.0	53.9	-	89.9	22.1	25.4%	7.7%
2064	1,816.9	117.2	64.9	-	113.5	28.0	25.4%	7.7%
2074	2,371.8	140.6	80.6	-	143.3	34.9	26.3%	8.0%

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

Table C.7. Projected Contributors and Pensioners, Optimistic Scenario

Year	# of Contributors	# of Pensioners: Old Age Cont.	Invalidity	Survivors	Non-Cont. Old Age	Death & Disablement	Total # of Pensioners	Ratio of Contributors to Pensioners
2012	120,313	25,000	3,444	3,633	3,579	346	**36,002**	3.3
2013	117,992	26,124	3,802	3,806	3,228	358	**37,318**	3.2
2014	114,323	26,707	4,190	3,842	2,878	351	**37,968**	**3.0**
2015	111,964	27,043	4,101	3,710	2,451	272	**37,577**	**3.0**
2016	113,959	27,669	4,061	3,688	2,061	269	**37,749**	**3.0**
2017	116,595	27,982	4,034	3,702	1,721	268	**37,707**	**3.1**
2018	117,864	28,377	3,994	3,724	1,423	266	**37,783**	**3.1**
2019	118,902	29,343	3,937	3,741	1,164	262	**38,448**	**3.1**
2020	119,591	30,292	3,876	3,751	942	259	**39,121**	**3.1**
2024	121,715	34,210	3,696	3,663	347	247	**42,164**	**2.9**
2034	125,356	43,891	3,333	3,722	4	226	**51,176**	**2.4**
2044	127,070	49,207	3,233	3,909	0	221	**56,570**	**2.2**
2054	125,912	50,437	3,325	3,856	-	227	**57,845**	**2.2**
2064	123,878	50,982	3,410	3,776	-	231	**58,399**	**2.1**
2074	120,240	52,848	3,223	3,750	-	220	**60,042**	**2.0**

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

Appendix D : Income, Expenditure and Reserves, 2012–2014 (Expressed in Millions of $'s)

	2012	2013	2014
Income			
Contribution Income	570.3	598.0	532.1
Investment Income	273.8	276.6	266.2
Other Income	5.0	5.1	5.6
Total Income	**849.1**	**879.8**	**803.9**
Expenditure			
Benefits			
Sickness Benefit	28.1	26.3	28.7
Maternity Benefit	9.4	8.5	8.7
Maternity Grant	0.3	0.3	0.3
Funeral Benefit	2.9	3.2	3.5
Old Age Contributory Benefit	368.4	404.6	403.2
Invalidity Benefit	56.4	63.8	66.5
Survivor's Benefit	21.6	24.7	24.2
Non-Contributory Old Age Benefit	13.4	17.5	13.2
Travelling Expenses	0.1	0.1	0.0
Medical Expenses	0.5	0.4	0.4
Injury Benefit	5.6	4.7	4.7
Disablement Benefit (Pension & Grant)	8.1	9.5	6.7
Death Benefit	0.4	0.4	0.4
Total Benefit Expenditure	**515.1**	**564.1**	**560.6**
Administrative Expenditure	**33.2**	**29.2**	**27.3**
Total Expenditure	**548.4**	**593.4**	**587.8**
Excess of Income over Expenditure	**300.7**	**286.4**	**216.0**
Change in Unrealised Investment Gains & Prior Year Adjustments	**(18.1)**	**16.3**	**(31.7)**
Reserves at End of Year	**4,222.5**	**4,525.1**	**4,709.5**

Appendix E : Benefit Experience and Analysis

Table E.1. Benefit Expenditure As % of Insurable Wages, 2012-2014

Benefit Type	2012	2013	2014
Sickness Benefit	0.89%	0.79%	0.97%
Maternity Benefit & Grant	0.31%	0.26%	0.30%
Funeral Grant	0.09%	0.10%	0.12%
Old-age Contributory Benefits	11.63%	12.18%	13.64%
Invalidity Benefit	1.78%	1.92%	2.25%
Survivor's Benefit	0.68%	0.74%	0.82%
Non-Contributory Old Age Pension	0.42%	0.53%	0.45%
Disablement Benefit	0.26%	0.29%	0.23%
Death Benefit	0.01%	0.01%	0.01%
Injury Benefit	0.18%	0.14%	0.16%
Medical & Travelling Expenses	0.02%	0.02%	0.01%
Total	**16.27%**	**16.98%**	**18.96%**

Table E.2. Pensions In Payment, Awarded & Terminated, 2011- 2014

Pension Type	Paid in Dec. 2011	Awarded 2012-2014	Terminated 2012-2014	Paid in Dec. 2014
Age	23,309	10,356	(6,958)	26,707
Invalidity	3,711	2,209	(1,730)	4,190
Survivors	1,795	1,285	(325)	2,755
Disability	292	390	(361)	321
Death	36	1,285	(1,291)	30

National Insurance and Social Security Office
Frank Walcott Building, Culloden Road, St. Michael, BB11115, Barbados, W.I.
Tel#: (246) 431-7400 | Fax#: (246) 431-7408 | Website: www.nis.gov.bb

National Employment Bureau
1st Floor, Warrens Office Complex, Warrens, St. Michael, BB12001, Barbados, W.I.
Tel#: (246) 535-1535| Fax#: (246) 535-1575 | Website: www.labour.gov.bb