

**Actuarial review of the  
Mauritius National Savings Fund  
as at 30 June 2005**

Date: September 2008

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Mauritius National Savings Fund  
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TO: THE HONOURABLE Mrs SHEILABAI BAPPOO,  
Minister of Social Security, National Solidarity and Senior Citizen Welfare and Reform  
Institutions,  
Government of Mauritius

Madam,

In accordance with the terms of Section 11 of the National Savings Fund Act 1995, I have carried out an actuarial review of the National Savings Fund as at 30 June 2005. A summary of my conclusions is given in the first section of the report and a fuller description of the review in later sections.

I should like to thank the officials of all the Government Departments (particularly those at the Ministry of Social Security) who provided assistance to me in connection with this report.



Martin Lunnon  
Chief actuary  
Fellow of the Institute of Actuaries  
26 September 2008

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## **1 Summary and conclusions**

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- 1.1 This review provides projections of the income and expenditure of the National Savings Fund (NSF) over the next 40 years. It also comments on relevant financial aspects of the operation of the Fund.
- 1.2 This first section summarises the results and conclusions of the review. The background to the review is described in Sections 2 and 3. The data and assumptions are described in Sections 4 and 5. The results are set out and discussed in Sections 6, 7 and 8.
- 1.3 At this time I do not recommend any adjustment to secure the future value of the Fund.

### **Financial Reporting**

- 1.4 The annual report and accounts of the scheme show transactions on a receipts and payments basis, with the only liabilities shown being the current liabilities. However, the most important balance sheet figure is the value of member accounts. It would be most helpful if the annual report and accounts showed as a liability on the balance sheet the total value of member's contributions, plus interest awarded to date, less payments made. Transactions for the year should show the interest awarded on member's accounts.
- 1.5 The Ministry website currently has a table showing a breakdown on NSF assets split by asset class. Again, it would be most helpful if similar table were included in the annual report and accounts showing the position at the year end. The assets reported in the accounts could usefully show unrealised as well as realised capital gains.

### **Calculation of the lump sums**

- 1.6 It is important for the satisfactory operation of the NSF that the interest allocated to the individual accounts each year does not exceed the investment return earned by the assets of the fund (including any capital gains or losses) less the amount of the administration charge. The calculations currently carried out to determine the interest to be allocated each year allow for these items. If the interest allocated to the savings accounts exceeds this, then the liabilities of the fund will exceed the value of its assets. To correct such a position, the interest allocated in later years would have to be lower than the amount earned less the administration charge.
- 1.7 If the interest allocated in any year were lower than the investment income less the administration charge, the size of the NSF would exceed its liabilities to the individual savings account holders. In effect, current contributors would be paid less interest than their savings deserves. This could perhaps be made up at a later date, when unrealised capital gain from investments subject to fluctuating values had been realised. However either of these two misallocations could introduce unfairness between different generations of member. In order to ensure that the members are treated fairly in relation to the investment returns which their contributions have generated, the investment return should include unrealised as well as realised capital gains or losses as appropriate at least over the whole period of membership of each member.
- 1.8 Any minor departure from this general requirement due to the rate of interest credited including some element of estimation or rounding of the rate of return allocated to the accounts should be offset as far as practicable by appropriate adjustments in subsequent years. This will ensure that the accumulated interest will be as fair as possible.

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- 1.9 This requirement applies particularly when an individual receives a lump sum from the Fund. They should receive the amount of their accumulated entitlement based on their contributions and the allocated investment return during their membership. This is the case whether the payment is made when the individual reaches their normal age for retirement or at an earlier age as a result of some other contingency. It also applies if the legal provisions under which lump sum payments are made were amended, whether that resulted in earlier or later payment of lump sums.

**Investment strategy, the lump sum guarantee and awarding interest**

- 1.10 It is necessary for the investment strategy to take into account the guarantee attaching to the lump sum payments. The Act does not state precisely how the lump sums are to be calculated but Section 24 (2) (c) refers to regulations which may provide for payments of the lump sum. In the (Claims and Payments) Regulations 1997 it defines the "lump sum" as follows:

*"lump sum" means a lump sum, payable to an employee under Section 4(a) of the Act [which states the objects of the Fund], which shall be made up of contributions paid by an employer under Sections 5 and 9(1)(b) of the Act [these cover contributions deduction and payments under an earlier Act] in respect of that employee, together with accrued interest as determined by an actuary.*

- 1.11 This implies that a beneficiary cannot receive a lump sum of less than the amount of the contributions which have been paid into his or her account. Because of this guarantee, the accumulated interest to be added cannot be negative. If the investments taken as a whole were subject to significant capital value risk, it could be possible for the amount of the investment income to be less than the 2.5% of contributions charged for administration which is deducted from the investment income in calculating the interest rate to be allocated. As a result, it is essential that the proportion of the fund invested in assets with a capital value risk is restricted to a level such that the possible loss in capital value would not result in the calculated interest rate to be added to the individual accounts becoming negative; this is already done to some extent in the law.
- 1.12 At the date of this report, the investments were mainly in Treasury Bills and other holdings in government and similar stocks. The capital value risk is currently minimal and should not endanger the guarantee. Whilst maintaining such investments as priorities, it might be possible to secure a higher overall return on the Fund's assets by extending the range of possible investments for part of the fund. However, any proposal to increase significantly the proportion of the NSF which is invested in assets whose capital value is exposed to potential falls, such as property or shares in the stock exchange, would need to be examined carefully and take the lump sum guarantee fully into account.
- 1.13 If some of the investments held are subject to the risk of capital losses, one approach would be to delay awarding interest in respect of returns on those asset classes. The delay in awarding interest should be based on the level of capital risk due to the assets currently held rather than whether capital gains have been realised or not. To ensure equity for all members, investment return held back would need to be awarded later, possibly as a "terminal award" when the lump sum becomes payable – in effect the scheme would then be run on a "with profits" basis, and considerable actuarial input would be needed.

### **Projections of the level of the NSF**

- 1.14 For the next 20 years or so, the contributions are expected to exceed expenditure on lump sums. The investment income earned by the Fund's assets, together with this positive cash flow, will be available for new investment. Thereafter, expenditure on the lump sums is estimated to increase to such an extent that it will eventually exceed contribution income. It will then be necessary for increasing amounts of the investment return achieved to be used, together with the contributions received in the year, to finance the cash flow expenditure on lump sums.
- 1.15 The annual excess of contributions and investment income over total expenditure will slowly reduce as the average level and number of lump sum payments increase. It will however remain positive throughout the projection period under the assumptions of the principal projection.
- 1.16 The Fund will continue to increase but, as the NSF matures, will tend to stabilise as a multiple of contribution income, apart from some fluctuations from year to year depending on the precise number of people reaching age 60 and receiving lump sums in each year. On average, on the main assumptions, the fund is estimated to be eventually about 22 times the annual contribution income and 16 times the annual lump sum expenditure.
- 1.17 The ratio of lump sum payments to contribution income rises to a peak in the early 2040s, around the end of the period covered by the detailed projections, with the annual payments about 65% higher than the annual contribution income.

### **Administration charge**

- 1.18 All the estimates in the report assume that the annual administration charges in future will continue, as at present, to be equal to 2.5% of the gross contributions. This administration charge is paid to the National Pension Fund (NPF), which carries out the administration for the NSF. It is not part of the actuarial review to assess whether this level of charge is reasonable in the light of the actual cost of administration carried out by the NPF for the NSF. It is however clearly efficient for the contribution collection to be done in conjunction of that for the NPF.
- 1.19 At present there are very few payments of lump sums. The amounts involved and the costs of administering them are relatively small. In future, the administration charge, based solely on the level of contribution income, will have to pay for both the collection of the contributions and the payment of a steadily increasing number of lump sums. This may make unsuitable a charge based solely on the contribution income. At the very least, it might be reasonable for those responsible for the administration to review from time to time the actual costs involved and the level of the charge. As stated above, provided the actual administration charge is correctly allowed for in the formula used for calculating the rate of return allocated to the individual accounts, the finances of the NSF will continue to remain sound.
- 1.20 It may be noted that if for some reason the scheme were to close down and no contributions were paid after some date in future, there would then be no administration charge levied using the current formula as there would be no contributions. However payments and associated administrative costs would continue for another 40 or so years.

### **Changes to the scheme**

- 1.21 Since the last review, the Sugar Industry Efficiency Act introduced Voluntary Retirement Schemes and Optional Retirement Schemes (VRS and ORS) which allow a

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member to receive the accumulated value of their account if they take retirement under one of these schemes.

- 1.22 At present, the average balance in individual accounts is relatively small and contribution income greatly exceeds expenditure. The increase in the short term in the number of lump sum payments as a result of VRS and ORS is unlikely to affect the liquidity of the Fund. It has been assumed that VRS and ORS payments will continue at their current level. A reduction in these payments will not have a significant effect on the liquidity of the Fund.
- 1.23 The principal projections in this report allow for the scheme as it currently stands. An increase in pension age from 60 to 65 has been announced, but not yet legislated. The effect of this change is to increase the projected fund size. During the transition to retirement at 65, aggregate lump sum payments are reduced in years when the change is to be introduced, but ultimately, they are higher than under the current scheme.

## **2 Introduction**

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- 2.1 This is the second actuarial review in accordance with Section 11 of the National Savings Act 1995 ("the Act"), which requires an actuarial valuation at 5 yearly intervals to be made by an actuary appointed by the Minister. After the valuation has been carried out the Minister then shall then determine if any adjustment is necessary to secure the future value of the Fund.
- 2.2 The previous report was signed by Andrew Young of the Government Actuary's Department in October 2001. The next report is expected to be carried out with an effective date of 30 June 2010.
- 2.3 The Mauritius National Savings Fund was introduced in July 1994 by means of the Act. According to the 1995 Act, the commencement date was July 1995. However contributions were paid and credited to the NSF and the individual accounts in respect of 1994/1995. From the accounting information, no payments of lump sums were made before 1997/1998.
- 2.4 A number of minor amendments have been to the rules of the Fund since the effective date of the last review. In particular, these changes have widened the definition of "retirement" enabling people under certain extra circumstances to be eligible for their lump sum payment before their normal age retirement. In addition, from 2001/2002, a lump sum can now be paid if a contributor is part of a VRS or ORS.
- 2.5 The NSF now provides payment of lump sums on the following conditions:
- > on retirement or redundancy if meeting the qualifying conditions
  - > on the death of a contributor. Payments in respect of deaths are made to the surviving spouse, children (if no spouse) or legal representative (if no spouse or children)
- Full details are given in Appendix A.
- 2.6 The financial projections allow for such retirement before the normal retirement age based on the data provided for the review.
- 2.7 The Act also makes provision for other schemes of payments including loan schemes to be operated "as may be prescribed". The data provided for the review did not contain any such cases. It is recommended that any such payments must be made on appropriate commercial terms, in order that equity is maintained between those members who receive such loans and those who do not. Similarly, as long as any such loans are treated in an equitable and correct way in the calculation of the individual's entitlement for the Fund, the financial position of the Fund as a whole should be unaffected.

Further details of the Scheme are contained in Appendix A.

- 2.8 The lump sums payments are equal to the amount of the individual's account balance at the time of payment. The balance in an individual's account is equal to the contributions paid together with the interest added between the dates when the contributions were made and the date of receiving the lump sum. Thus, provided the interest allocated is calculated correctly, and the total amount allocated in respect of a particular year is equal to the total investment return less the administration cost, the Fund should operate satisfactorily. The total amount of the Fund's assets at any one time should be the sum of the contributions paid by all the current members together with the investment income generated from the contributions of these members, including any unrealised and realised capital gains, and this should be identical to the liabilities. At present, the level of

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unrealised capital gains is relatively small, but in future might become more significant. In order to ensure that all members are rewarded fully for the investment return generated by their contributions, it is important that capital gains or losses, whether realised or not, are included in the calculation of the allocated investment return.

- 2.9 Contributions equal to 2.5 per cent of salary are paid by employers in respect of all employees in the public and private sector. There is a lower earnings limit (LEL) and upper earnings limit (UEL) for contributions, both of which have increased over the 5 years since July 2000. The limits are shown in Appendix B.

**Objectives of the review**

- 2.10 The main purposes of the review are to ensure that the way in which the fund operates is financially sound from an actuarial point of view and to examine the likely future trends in the income and outgo of the NSF and in the balance of the Fund assets.
- 2.11 As the NSF only started some 13 years ago, it will be many years before lump sums are awarded after a full working life of contributions. In addition, the population projection shows that the number of people reaching retirement age will rise substantially in future. For both of these reasons, the expenditure from the NSF will increase rapidly. On the other hand, contribution income will remain relatively stable if salary inflation is ignored, as the number of contributors is not expected to increase as fast as the number of people reaching age 60. As a result of the changes in the numbers at working ages in future in the light of the population projection assumptions, the number of contributors increases for a time and then starts to fall.
- 2.12 Thus, apart from the inevitable increase in the average level of lump sums as the NSF itself matures, the main factors affecting the annual finances of the NSF in future are:
- > changes in the relative numbers of contributors and of people reaching retirement age in each future year
  - > future rates of increase in earnings and interest rates.
- 2.13 The assumptions made concerning these and other factors are discussed later in the report.

**Professional Standards**

- 2.14 This report complies with the International Actuarial Association (IAA) Guidelines of Actuarial Practice for Social Security Programs effective on 1 January 2003.

### **3 The finances of the fund 2000-2005**

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- 3.1 The finances of the NSF mainly depend on:
- > contribution income, which in turn depends on the numbers employed and the level of earnings
  - > amounts paid out as lump sums, based on the annual contributions up to the time the lump sums are paid and the interest income allocated to the individual accounts
  - > the investment income earned by the assets of the NSF
  - > the rate of interest awarded to members' accounts
- 3.2 The accounts of the NSF showing these amounts as well as the smaller financial items for the financial years from 1 July 2000 to 30 June 2005 are summarised in Appendix B.
- 3.3 Total expenditure on lump sums in 2004/2005 was more than three times higher than in 2000/2001. This rapid increase over the short period is inevitable at present as the lump sums become based on more years of contribution. The accounts for the NSF show that the amounts paid out as lump sums were Rs35 million in 2000/2001, rising to Rs109 million in 2004/2005.
- 3.4 Contribution income increased by about 30% between 2000/2001 and 2004/2005. This is mainly due to the rise in the average amount of contributions as a result of increases in average earnings and of the earnings limits determining contribution liability.
- 3.5 In each of the 5 years 2000/2001 to 2004/2005, there was a substantial excess of income over expenditure. As a result, the Fund balance increased by about 170%, from Rs2,378 million in July 2000 to Rs6,398 million as at June 2005. The large increase in the Fund balance over the period was due to the excess of contributions over the expenditure, which is to be expected in the early years of the NSF. In addition, the continued increase in the balance of the Fund and high investment returns earned on the NSF's assets have already produced substantial amounts of investment income.
- 3.6 The average internal rate of return achieved on the Fund was 10.8% a year over the period from July 2000 to June 2005. This contrasts with the average earnings index which increased by 6.4% a year on average. Over the period July 2000 to June 2005, the average rate of interest awarded to members' accounts was 9.1%.

## 4 Data

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- 4.1 The estimates for the review were based on a large amount of demographic, economic, statistical and membership data. The data were found to be of sufficient quality to carry out the projections, although some adjustments were carried out, as described below.
- 4.2 The Central Statistical Office provided us with the latest population projections, both with and without assumptions for levels of future migration. The results were in 5-year age groups and at 5-year intervals from 2004 to 2044. A projection for each year by single age with allowance for migration was also provided and this formed the basis of the estimates for the period 2004 to 2044. Other demographic data were available from regular publications produced by CSO.
- 4.3 The Ministry of Social Security provided data on the number of contributors and the amounts of contributions paid in respect of contributory members of the Fund for each of the last 5 years, analysed according to age, sex and year of contribution. Information on benefit payments were provided in respect of each of the last 5 years, analysed according to benefit type, the age and sex of the member, and into capital and interest components. Lump sums paid to policemen with over 25 years' service were not separated from other lump sums. Data were also provided on the total of the individual accounts accumulated up to June 2005 by contributory members, analysed according to age and sex.
- 4.4 There is inevitably a time lag between contributions paid recently and their being fully allocated to the individual members' accounts. The most recent data appeared to be as complete as that for the other years. However, the total contributions recorded in the accounts were on average around 9% higher than the amounts implied from the detailed contribution data. For instance the accounts for the year 2004/2005 recorded contributions of Rs 510 million but the detailed data only showed Rs 481 million. The total of the individual accounts data was 14% lower than the value of the assets recorded in the accounts at 30 June 2005. Tables B1, C2 and C3 in appendices B and C show a summary of the accounts and the data in respect of the amounts of contributions and accumulated accounts.
- 4.5 The difference between the assets recorded in the accounts and the total of the individual accounts data may be because data from some individual accounts were missing from the analyses provided, or it may reflect at least in part that the value of individual accounts is in aggregate less than the value of the assets, because the interest added to accounts in the past has not used up all the investment return, including (realised and unrealised) capital gains. This highlights the need for the annual accounts of the NSF to show an accurate and up-to-date figure for the aggregate value of individual accounts.
- 4.6 It was assumed that the amounts of contributions received each year were equal to the amount recorded in the accounts, and that the age/sex profile of contributors was the same as that seen in the detailed data. It was also assumed that the aggregate value of member accounts at 30 June 2005 was the same as the value of assets in the fund at that date, but that the age/sex profile was the same as in the detailed data.

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- 4.7 In general, the above data were used to estimate the parameters needed for the projections. Adjustments, based on comparisons with the accounting information or other data, were made as necessary to the factors derived directly from the data to allow for any deficiencies in the data.
- 4.8 A summary of the main data on membership of the NSF is included in Appendix C.

## 5 Demographic and other assumptions

- 5.1 The estimates for the future levels of contribution income and the lump sum payments are based on the projected future population in the Republic of Mauritius. Paragraphs 5.5 to 5.10 describe and consider the population projections used for the review. Paragraphs 5.11 to 5.19 describe the methods used to estimate the number of contributors and amounts of contribution income. Paragraphs 5.20 to 5.25 outline the general nature of the assumptions made in estimating the benefit expenditure. Paragraphs 5.26 to 5.28 explain the estimates for the administrative costs.
- 5.2 The assumptions adopted are considered to be a reasonable best estimate of what future experience may be. However, section 7 describes the effect of altering some of the key assumptions.

### Financial assumptions

- 5.3 The amounts in the main projection assume average earnings growth of 2% a year in excess of price increases. Over the last 12 years, earnings grew at 1% a year higher than prices. However, the experience during this relatively short period cannot be taken as a reliable guide to the long-term future: average earnings growth may have been low in real terms in this period due to the increases in the working-age population.
- 5.4 Over the period 1994-2005, the average investment return was about 10.6% a year, including capital gains. This was about 2.5% a year higher than the increase in average earnings. For the main projections, therefore, it has been assumed that, over the long term, investment returns will exceed increases in average earnings by 2.0%, which is reasonable in the light of historical and international longer term rates of investment return and the likely rates which can be earned in the longer term in future. However, the rate of investment return assumed in the report should not be intended to be an investment target. The effect of alternative assumptions is shown in Section 8 of the report.

### Future population

- 5.5 The population projections used were prepared by the Mauritius CSO. The detailed results of the projection are shown in Appendix D. Table 1 summarises the main features of the projections relevant for the review, together with the key "beneficiary support ratio" in specific future years covered by the review. For the NSF, the key ratio is the number in the population at working ages divided by the number reaching age 60. For this purpose, the working ages are taken to be 18-59.

**Table 1: Population projection, 2005 – 2044**

Year	Population (000's) at working ages (18-59)	Population (000's) aged 60	Ratio of: working ages/ age 60
2005	758.6	9.4	80.6
2010	795.7	12.8	62.2
2015	814.9	14.0	58.3
2020	818.8	16.8	48.6
2025	812.5	18.5	43.9
2030	811.1	17.6	46.0
2035	813.5	18.3	44.4
2040	799.9	21.8	36.6
2044	793.2	16.6	47.8

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- 5.6 The projection provided by the CSO ended in 2044, the final year shown in Table 1. The ratio of the number at working ages to the number reaching age 60 reaches 36.6 at the “worst” point in 2040 (when the number reaching age 60 is particularly high), and then rises back above 40.
- 5.7 Note that, unlike a scheme that pays pensions for life, the ratio in the table below will necessarily be volatile, depending on births in particular years. However even if there is a particular cohort all reaching age 60 at the same time, in reality they may not all retire and draw benefit at exactly the same time.
- 5.8 The main features of the projections summarised in Table 1 which will influence the future finances of the NSF are as follows:
- > The main expenditure is on age grounds, when people reach age 60. The numbers reaching age 60 and becoming eligible for the lump sum on age grounds are expected to double over the next 20 years and then to fluctuate over the following 20 years. There will also be increases over the next 30 years or so in the level of savings in each individual account by the time the individual reaches age 60 as those who reach 60 in later years will potentially have been members of NSF for a longer period of their life. As a result, there will be large increases in the estimated future expenditure.
  - > The number of people at working ages is expected to increase by about 7% between 2005 and 2020 and then fall slightly (by about 3%) over the subsequent 25 years. The trend in the number of employees in respect of whom contributions were paid over the review period is likely to be closely related to the changes in the numbers at working ages unless there are dramatic changes in labour force participation rates or the level of unemployment. This implies that there will be steadily increasing contributions for the first 20 years followed by relatively constant income thereafter if the income is considered in constant earnings terms.
  - > The projections show that the number of children is estimated to decrease gradually. The number of children in 2005 reflects the numbers of births in the past 15 years, and the reduction in future numbers reflects the assumed continuing lower level of fertility rates. Although the eventual level of fertility will be important in determining the finances of the NSF in the very long term, the assumptions about future fertility will have little impact over the next 40 years. Only people who are at least age 20 in 2005 will reach age 60 during the 40 year projection period. Similarly, future births will have no effect for the first 15 years on the projections of contributions. Subsequently, from 2020, any fertility effect will build up very slowly as births after 2005 enter the working population and pay contributions.
- 5.9 Projecting the future population of any country is subject to uncertainty. In small economies, the effect of migration, either inwards or outwards, can be significant. The assumptions used for this review are considered to be reasonable in the light of past trends. But it is important to bear in mind the underlying uncertainties when assessing the projection for future contributions and lump sum expenditure.
- 5.10 However, we would not expect any reasonable variations from the assumptions used for the projection to have a material effect on the projections and especially on the conclusions which can be drawn from them. As mentioned in paragraph 5.4.3, changes to fertility have little effect during the 39 years of the projection. Changes to the mortality assumptions could have a significant effect on the total number of pensioners and therefore on the finances of the National Pension Fund. However as most people who start contributing to the NSF are expected to reach retirement age on the basis of the current mortality assumptions, the scope for any reasonable changes

to the mortality assumptions to affect the numbers who reach retirement age is much less. Moreover, as lump sum payments equal to the accumulated individual funds are paid on death, changing the mortality rates will simply affect the timing of a relatively small number of payments rather than affect the fundamental balance between income and expenditure. Thus the potential for any changes in mortality rates to materially affect the financial projections for the NSF is relatively limited.

### **Contributors and contributions**

- 5.11 The first stage in estimating the amount of contributions in future years was to calculate the total numbers in respect of whom contributions were paid by applying age and sex specific factors for the "proportions contributing to the NSF" to the projected population at working ages. These proportions are the same as those adopted for the 2000 review and are assumed to remain constant in the future. At the 2000 review, rates were estimated from the data of contributors provided by the Ministry of Social Security for the 1995-2000 period. The experience from 2000 to 2005 was compared with these rates and found to be broadly in line with them, so those rates have been retained.
- 5.12 Contributions are based on the level of earnings and are collected on a "pay-as-you-earn" basis. The contribution rate to the NSF is 2.5 per cent of relevant earnings. This rate was in force during the past five years and has been assumed to continue for all future years. There are upper and lower limits to the earnings on which contribution liability is based. Contributions are not payable in respect of those employees with earnings below the earnings floor, which was Rs1,095 a month in 2004/2005. Those with higher earnings have contributions paid in respect of all their earnings up to the earnings ceiling of Rs7,205 a month from July 2004 (and Rs 7,990 from July 2005).
- 5.13 These earnings limits are the same as for contributions to the National Pension Fund (NPF) and, given the way the NSF operates, it is reasonable to assume that this link will be maintained in future. In recent years, the floor and ceiling have been raised from time to time, usually every year. On average over the past 12 years the increase has been higher than price inflation but lower than earnings inflation. However, if the floor were increased over time by less than the changes in earnings, then very low wage earners would become liable to pay small amounts of contribution. Similarly, if the ceiling fell relative to earnings then those with higher earnings would pay contributions on a steadily decreasing proportion of their earnings. The government should monitor the limits and consider each year what level they should be set at, based on its policy objectives, particularly policy objectives for the NPF as that fund will be more sensitive to changes in the relative value of the limits. Allowing the limits to fall in real terms as the accidental effect of inflation would not be advisable.
- 5.14 It has therefore been assumed that, in the long term, the earnings floor and ceiling for contributions purposes will effectively be increased in line with general increases in earnings. This implies that the proportion of employees for whom contributions are paid to the Fund should not change significantly over time.
- 5.15 The estimates for total contribution income also depend on the average amounts of contributions per contributor. The factors used for the estimates were the same as for the 2000 review, increased in line with increases in the upper earnings limit since 1999/2000. The 2000 review factors were derived from the contribution data for the years 1995 to 2000. Contributions from 2000 to 2005 were found to be in line with the assumption adopted at the previous review.
- 5.16 In order to obtain the projected numbers of contributors and contributions, the age specific factors were assumed to remain constant in future years. It has, therefore, effectively been assumed that, over the period covered by the review, the proportion of

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people of working ages who are contributors will remain constant for each sex and age group, and that the earnings of each group of contributors will increase in line with general increases in earnings.

5.17 It is also assumed that the age-specific distribution of earnings remains constant. Thus if the average age of workers falls, the lower contributions made in respect of younger workers would result in lower average contributions to the scheme, all other things being equal.

5.18 On the basis of the assumptions described in the preceding paragraphs, the estimated future numbers of contributors are shown in Table 2. This shows a steady rise over the next 15 years to a total about 8% higher than at present, followed by a levelling off and ultimately a slight decline of around 3% thereafter.

**Table 2: Projected numbers of contributors, 2005 to 2044**

<b>Year ending 30 June</b>	<b>Men (000's)</b>	<b>Women (000's)</b>	<b>Total (000's)</b>
2005	231.1	127.8	358.8
2010	242.7	132.1	374.8
2015	248.9	135.4	384.4
2020	251.4	136.2	387.6
2025	250.4	135.0	385.4
2030	250.6	134.2	384.8
2035	252.3	133.8	386.1
2040	250.3	131.7	382.0
2044	247.1	130.0	377.1

Note : Figures for Men and Women may not sum to Total due to rounding.

5.19 More details of the method used to project contributions are included in Appendix E in paragraphs 13.2 to 13.12.

### **Lump sum payments**

5.20 The amount of the lump sum payable is always equal to the total of the contributions paid and the interest allocated to the individual's account.

### **Retirement lump sums**

5.21 Although there are several circumstances whereby people can receive their lump sums before the "normal" retirement age, lump sums are mostly payable from age 60. The detailed data included some payments of lump sums after age 60 as well as contributions paid at age 60. Some allowance for such delays has been included in the projections by allowing for payments at age 61 in respect of contributions made while age 60. However in general, individuals are assumed to claim retirement benefit no later than age 60. Estimates of future expenditure allow for the total amounts of contributions that each age group reaching age 60 could have paid and the investment return allocated each year to the age group. The total amounts of accumulated contributions projected to be paid by each group up to the point of receiving the lump sums are consistent with the estimates for the future contribution income to the Fund.

### **Survivors' lump sums**

5.22 Contributory survivor's lump sums are payable on the death of a contributor, the amount payable being equal to the balance of the account at death. The estimates allow for lump sum payments on the death of contributors up to age 59. Table E4 shows the assumptions adopted to calculate the projected lump sums.

### **Early retirement lump sums**

- 5.23 The rules include several provisions for “early retirements” and these are also allowed for in the estimates based on the numbers included in the data. The projected amounts of the different types of lump sum payments are based on the detailed factors set out in tables E5 to E7 in appendix E. The amount of lump sums paid between 2000 and 2005 that were categorised as “early” and “medical” were consistent with the assumption for early retirement lump sums adopted at the 2000 review so this assumption has been retained for those categories of lump sum. In practice, the number of medical lump sums paid was not large enough to merit a separate assumption.
- 5.24 Redundancy lump sums were paid in a different pattern to early retirement lump sums and an assumption has been derived based on experience in 2004/2005.
- 5.25 The new VRS and ORS lump sum payable from 2001/2002 has been modelled separately from other early retirement lump sums. The assumption is based on experience in 2004/2005. There were not enough “ORS” lump sums to merit a separate assumption for this type of lump sum. It has been assumed that levels of payments of these lump sums will continue at the same level in the future. However, a reduction in levels of VRS and ORS payments would not have a significant effect on the Fund since most payments are made to people who are close to age 60; a reduction would simply mean that payments are delayed by a few years to age 60.

### **Costs of administration**

- 5.26 Currently, the NSF pays the NPF a sum equal to 2.5 per cent of the annual contribution income for the services of the NPF in administering the collection of contributions and the payment of lump sums. The projections are based on the assumption that this percentage will remain unchanged in future.
- 5.27 The current transfer to cover administration is solely dependent on the number of contributors and the average contributions. As the main administrative burden is currently the collection and recording of contributions, this simple method of assessing the transfer is reasonable for the time being. The number of lump sum payments is small at present but will increase substantially in future. This could imply that the actual costs of carrying out the administration will increase rather faster than the changes in the level of contributions (and therefore in the 2.5% charge). This would be particularly so if the number of ways in which lump sums can be paid are increased, and especially if the conditions governing eligibility for payment become more difficult to determine and administer and differ from those determining eligibility for pensions from the NPF.

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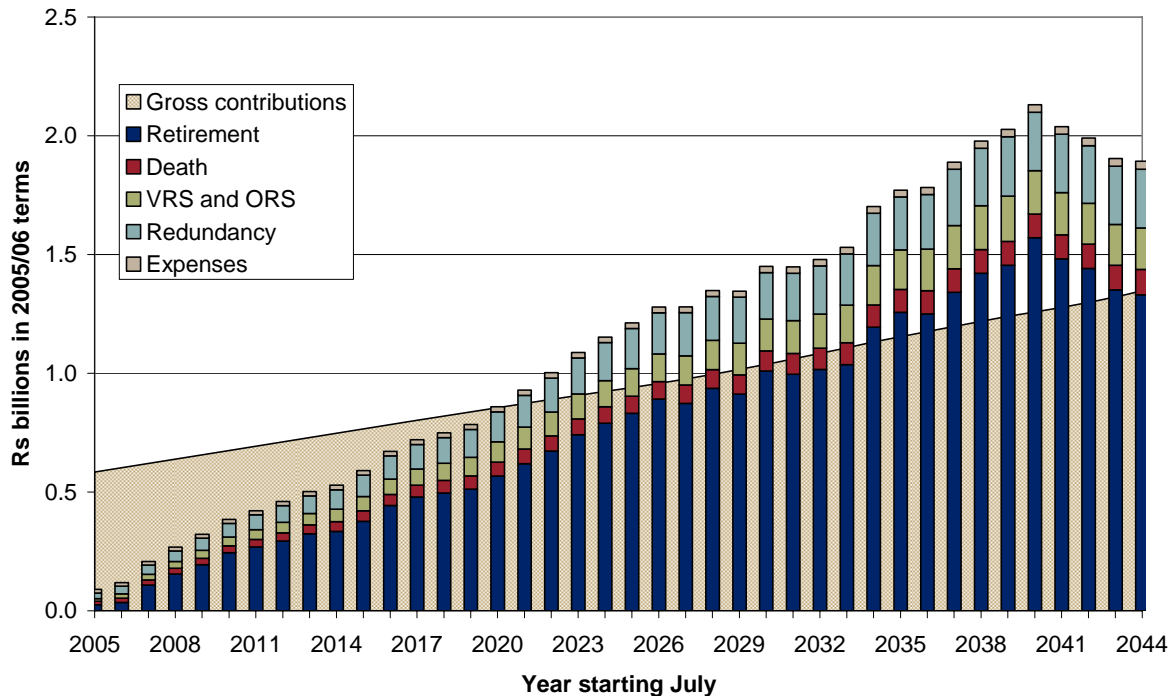
5.28 For 2004/2005 there were around 14,200 actual payments, of which about 6,300 were age retirements. The population projection shows around 8,700 people reaching age 60 in that year – it is not surprising that the number of lump sum awards is a lower than the population given the proportion of the population likely to have been contributing at some time in the 13 years immediately before reaching age 60 without having previously received a lump sum for another reason such as redundancy. By 2044 the numbers reaching 60 will be around 16,000 and by then probably nearly all will have some entitlement. There may be around 26,000 claims a year, some twice the present level. In view of this large change, the actual costs of administering the NSF might be reviewed from time to time to ensure that the charge remains reasonable. The projected number of claims each year would only be significantly higher than the number of people reaching 60 each year if a proportion of members receive more than one lump sum from NSF during their lifetime. For instance, this could happen where a person received a redundancy lump sum part-way through working life and then returned to work and received a retirement lump sum at age 60 in respect of contributions made during the second period of employment.

## **6 Main financial projection**

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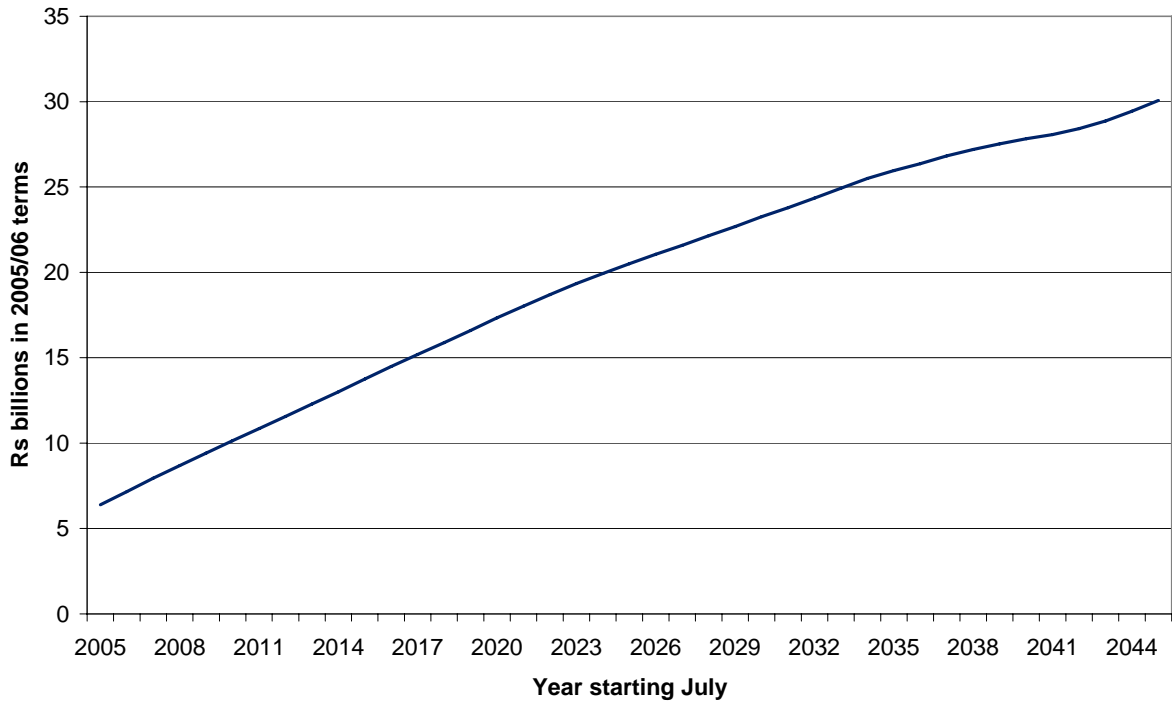
- 6.1 As well as being dependent on the demographic changes in future, the projected amounts in real terms of income and expenditure in future years will depend on the future level of earnings and of interest rates and investment returns. If future inflation were assumed to be similar to current levels, then contribution income and lump sum payments expressed in cash terms would increase rapidly over the 40 years covered by this report. The results would only be meaningful if compared against corresponding estimates for gross national product, total earnings and such like in future years. Even then it would be difficult to compare them with the corresponding amounts at the present time. The projections are, therefore, expressed in equivalent present day terms.
- 6.2 All the figures are therefore shown in 2005/2006 prices terms so that they can be directly compared with the most recent accounts.
- 6.3 Chart 1 shows the projected income and expenditure of the NSF for the period 2005/2006 to 2044/2045, the last year of the detailed population projection. Further details are included in Appendix E. There is, inevitably, a degree of uncertainty about the projections of both contributions and lump sum payments and there is even greater uncertainty over the difference between these two figures and therefore the precise trend in future in the annual cash flow surplus and the growth in the level of the NSF. The projections become increasingly uncertain the further one moves into the future. Estimates for years more than 10 years hence should therefore be regarded as indicators of the various amounts rather than precise estimates.
- 6.4 The projected rising trend in contribution income and expenditure is the direct result of the assumed increase in real earnings together with increases in contributors and beneficiaries and the increasing amounts in savings accounts when people become eligible for their lump sum payments.
- 6.5 Chart 1 indicates that contribution income is expected to increase by about 61% over the next 20 years and to rise by a further 43% over the following 20 years in constant price terms. This reflects the rise in the numbers at working ages over the next 20 years, followed by a levelling off thereafter as the effects of the reduction in the birth rate feed through to the numbers at working ages, combined with the real increase in earnings compared with prices which gives rise to the continued increase in contribution income.
- 6.6 As can be seen from Chart 1, the lump sums are projected to rise very rapidly over the period of the projection as the numbers reaching age 60 increase and the average amount of lump sum rises due to the longer period during which contributions have been paid and accumulated interest has been earned by the Fund.

**Chart 1: Projected cashflows of the NSF in constant price terms**

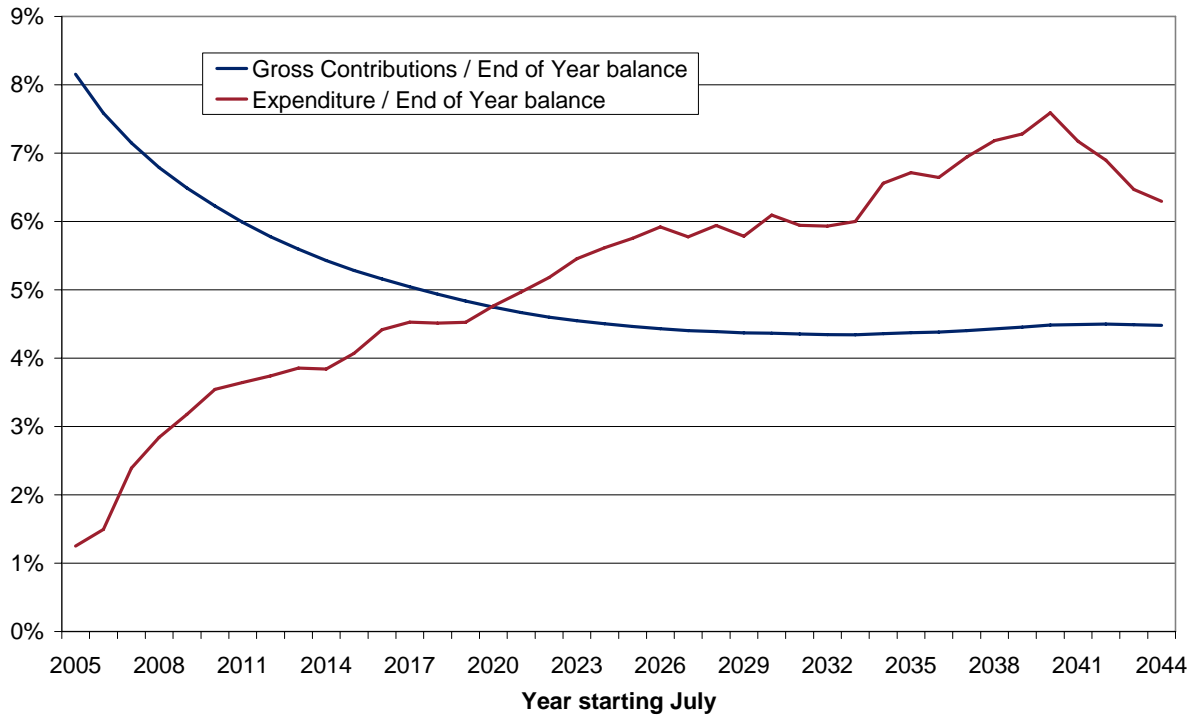


- 6.7 By June 2005 the NSF amounted to some Rs 6.4 billion, about 13 times the annual level of contribution income in 2004/2005. Chart 2 shows the projected balance of the Fund on the assumption that investment yields, on average, exceed earnings increases by 2 per cent a year. The Fund is projected to increase steadily as a proportion of contribution income over the next 20 years, reaching a level of about 23 times the annual contribution income.
- 6.8 In a funded scheme such as this, there is initially an excess of contributions over payments during which a significant fund is built up. This should equal (or even exceed) the aggregate value of individual accounts in a defined contribution arrangement like this. The current large excess of contributions over expenditure is expected to decline slowly over the next 15 years and contributions and expenditure are estimated to be broadly equal by around 2020. Thereafter, lump sum benefit expenditure is expected to exceed contribution income and the excess expenditure will be met from the investment income.

**Chart 2: Projected Fund Balance of the NSF in constant price terms**



**Chart 3: NSF cashflows as a proportion of fund balance**



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- 6.9 Expenditure on lump sums is, at present, small because contributions have only been accruing since 1994. Lump sums paid to date have therefore been based on only a few years of contribution. Consequently, contribution income is currently much greater than expenditure on lump sums and substantial amounts of net income are available for new investment. Chart 2 shows the projected size of the balance of the NSF in future. It is important to remember that this is shown in constant 2005/2006 prices terms. In estimating the future balance of the Fund, as stated in paragraphs 6.2 and 6.3 above, it has been assumed that the investments held will, on average, yield a rate of return on average 2 per cent a year in excess of the increase in earnings and earnings will increase on average 2 per cent more than prices. By June 2045 the Fund, in real terms, is projected to be some five times the level of June 2005.
- 6.10 Chart 3 shows the contributions and payments in each year as a percentage of the size of the fund at the end of the year (EOY). This shows that payments in any one year are always a relatively low proportion of the total amount in the NS Fund balance, even when the scheme is more mature and payments have increased greatly from the current level.

## **7 Investments and investment return**

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- 7.1 The investment policy of the National Savings Fund is governed by the objectives which are set out in Section 10 of the National Savings Act as follows:

*Any surplus remaining in the Fund may be held on deposit with the Government, loaned or invested in such manner as the Minister of Finance may determine, having regard to:*

- (a) the need for an appropriate level of liquidity in the Fund*
- (b) the need to secure the future value of the Fund*
- (c) any advice received from the Committee*

The NPF and NSF Investment Committee is currently responsible for the investment of the Fund.

- 7.2 Chart 1 shows that for the next 15 years the income from contributions is expected to exceed the cost of lump sums. Even without taking any account of investment income, the normal operation of the cash flow will generate adequate liquidity for the NSF. After 15 years, paying the lump sums will increasingly rely upon the income from the investments, and the liquidity will therefore depend increasingly upon the timing of the investment income receipts or on the sale of assets. As can be seen from Chart 1, the total annual income from investments and contributions is expected to continue to exceed the lump sum payments by relatively large amounts. So, taking any year as a whole, there should not be any problems as far as liquidity is concerned. As long as the investment income receipts are reasonably regular throughout the year, the cash flow should be satisfactory.
- 7.3 It should therefore be possible to pay particular attention to the pursuance of the second objective, that is, to secure the future value of the Fund. This should lead to an investment policy whose primary aim would be to maximise the return on the investments subject, of course, to ensuring satisfactory security of the assets and the management of the Fund. This in turn should maximise the lump sums to be paid in future to members of the NSF.
- 7.4 However, it is also necessary for the investment strategy to take into account the guarantee attaching to the lump sum payments.
- 7.5 The Act does not state precisely how the lump sums are to be calculated but Section 24 (2) (c) refers to regulations which may provide for payments of the lump sum. In the (Claims and Payments) Regulations 1997 it defines the "lump sum" as follows:
- "lump sum" means a lump sum, payable to an employee on his retirement or on his death, and shall be made up of contributions paid by an employer under Sections 5 and 9(1)(b) of the Act [these cover contributions deduction and payments under an earlier Act] in respect of that employee, together with accrued interest as determined by an actuary.*
- The interest is determined by an actuary from the State Insurance Company of Mauritius using the formula set out by paragraph 9.9 in Appendix A.
- 7.6 This implies that a beneficiary cannot receive a lump sum of less than the amount of the contributions which have been paid into his or her account. Whenever a lump sum is paid, the accumulated interest as determined by an actuary is added to the total contributions. As stated in paragraph 2.5, this interest to be allocated should in

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aggregate be equal to the amount of the investment income less the administration charge earned on the contributions paid.

- 7.7 Because of this guarantee, the accumulated interest to be added cannot be negative. If the investments taken as a whole were subject to the risk of significant falls in their capital value, it could be possible for the amount of the investment income to be less than the 2.5% of contributions charged for administration which is deducted from the investment income in calculating the interest rate to be allocated. As a result, it is essential for the proportion of the fund invested in assets with a capital value risk to be restricted to a level such that the possible loss in capital value would not result in the calculated interest rate to be added to the accounts becoming negative.
- 7.8 At December 2005, the investments of the NSF were mainly in Treasury Bills and notes (52% of the total), with other significant holdings in government stocks and bonds (23%). Smaller amounts were in Foreign Currency deposits (13%), other Loans and Rupees deposits (4%). 8% of the fund was invested in shares on the stock exchange, unlisted shares, foreign equities and hedge funds. Since then, the asset allocation has not changed significantly. The value of assets reported in the accounts does not generally include unrealised capital gains, so the capital value risk is currently small and should not endanger the guarantee. However, this method of reducing risk is arbitrary since it depends on the period of time that assets are held for, rather than their underlying level of risk.
- 7.9 Whilst maintaining such investments as priorities, it might be possible to secure a higher overall return on the Fund's assets by extending the range of possible investments for part of the Fund. However, any proposal to increase significantly the proportion of the NSF which is invested in assets whose capital value is exposed to potential falls, such as property or shares in the stock exchange or investments denominated in currencies other than the Mauritius Rupee whose values are subject to exchange rate fluctuations, would need to be examined carefully and take the guarantees fully into account. The level of risky assets held should also affect the amount of interest awarded each year. A delay could be introduced in awarding interest based on returns on assets with the potential for capital or currency losses. However it should also be borne in mind that this delaying would mean that it would be the younger members who receive the benefit of investing in riskier assets.
- 7.10 The Investment Strategy and Guidelines set out in May 1999 set some limits on investments as follows:
- > Loans to an organisation will not exceed 10% of the fund value
  - > Investments in the stock exchange should not exceed 5% of the fund value
  - > Overseas investment should not exceed 10% of the fund value
  - > Investment in government stocks should not exceed 50% of the fund value
  - > Any remaining funds will be invested in the short-term reputable and safe commercial banks or approved financial institutions
- 7.11 The actual investments include some asset classes that are not mentioned in the Guidelines, such as Treasury bills (T-bills) and notes, foreign currency deposits, unlisted shares and hedge funds. It is recommended that a revised set of guidelines is produced. This should describe all the asset classes in which NSF may invest and state the limits within which the investments may be made. If the Fund is to be invested in another asset class, then the guidelines should be amended to reflect this.

## **8 Effect of alternative assumptions**

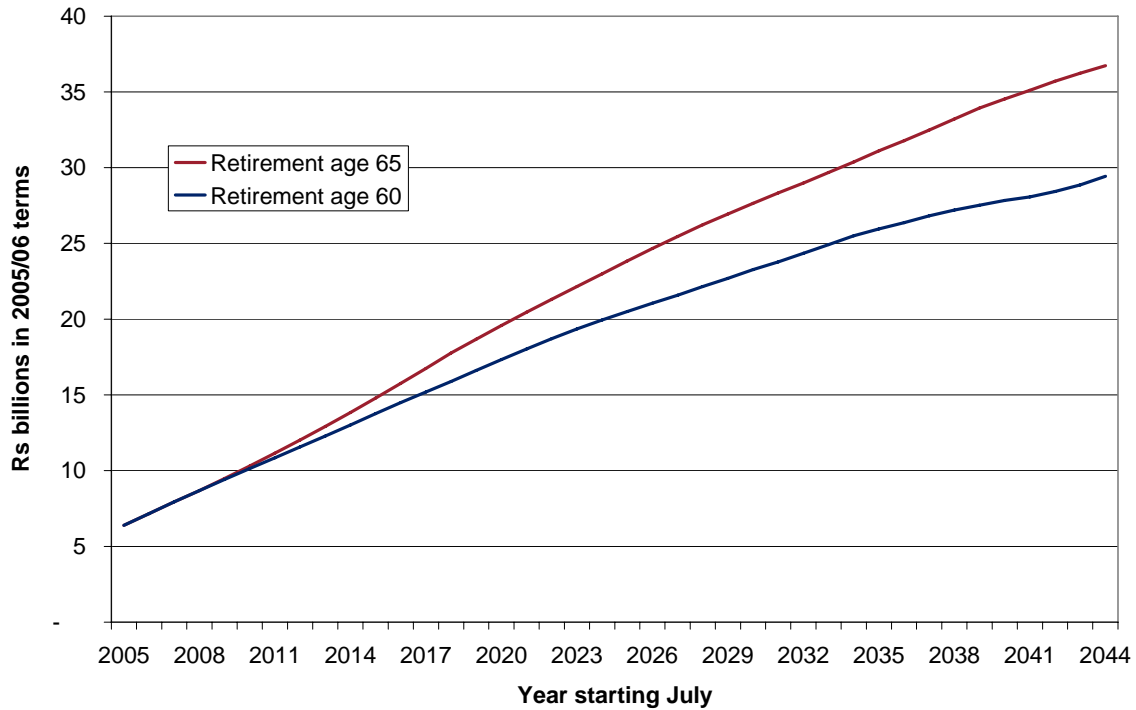
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8.1 The eventual experience will most likely differ, possibly materially, from that indicated in the projections. The financial estimates in Section 6 are based on the current retirement age of 60 and assuming that average earnings increases will exceed price increases by 2% a year and that the rate of investment return will exceed average earnings increases by 2%. This section provides some estimates for the effects on the projections of increasing retirement age and making different assumptions for these two economic variables.

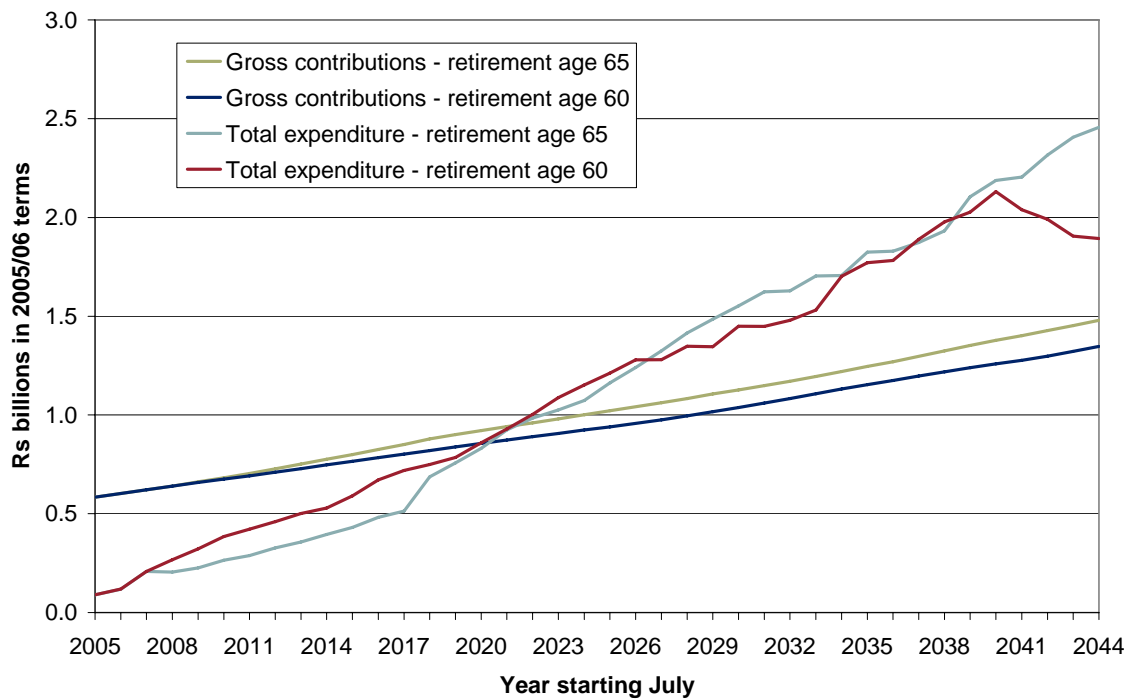
### **Different assumptions for retirement age**

- 8.2 In his 2006/2007 budget speech, the Minister of Finance and Economic Development announced that the normal retirement age would increase from age 60 to 65. This increase is proposed to take place gradually by adding one month to the retirement age every two months, starting in August 2008 and ending in 2018.
- 8.3 This change was not incorporated in the legislation governing the NSF at the effective date of the review, and so the main projections do not allow for this change. However, calculations have been carried out to show the effects of making this change.
- 8.4 The assumptions adopted for this variant projection are the same as those used for the main projection, except that the assumptions for the proportion of accumulated funds being paid out for each reason have been extended from age 60 to 65 and the age at which all remaining members are expected to retire has been moved from age 60 to 65 over the proposed transition period.
- 8.5 More contributions are received under this variant projection since contributions are received in respect of employees aged between 60 and 65. Expenses rise in line with the increase in contributions.
- 8.6 Payment of normal retirement benefits is postponed. During the transition period, approximately half as many people reach normal retirement age, so payments are approximately halved. Once the transition period ends, normal retirement payments are higher than before due to the contributions made from age 60 to 65 and the investment return achieved from age 60 to 65.
- 8.7 More payments are made in respect of early retirement, VRS, ORS, redundancy and medical retirement between ages 60 and 64.
- 8.8 The net effect on expenditure is for it to reduce during the transition period. In the long-term, the expenditure would be higher under the retirement age 65 scenario but it takes until 2039 for this to become clearly apparent due to features in the age structure of the population.
- 8.9 The fund increases in size due to the lower expenditure and higher contributions during the transition period. After the transition period ends, the fund continues to be larger due to the longer period for contributing and gaining investment return.
- 8.10 The two graphs below compare the cashflows and fund sizes under the main projection and this variant.

**Chart 4: Projected balance of the NSF based on different retirement ages**



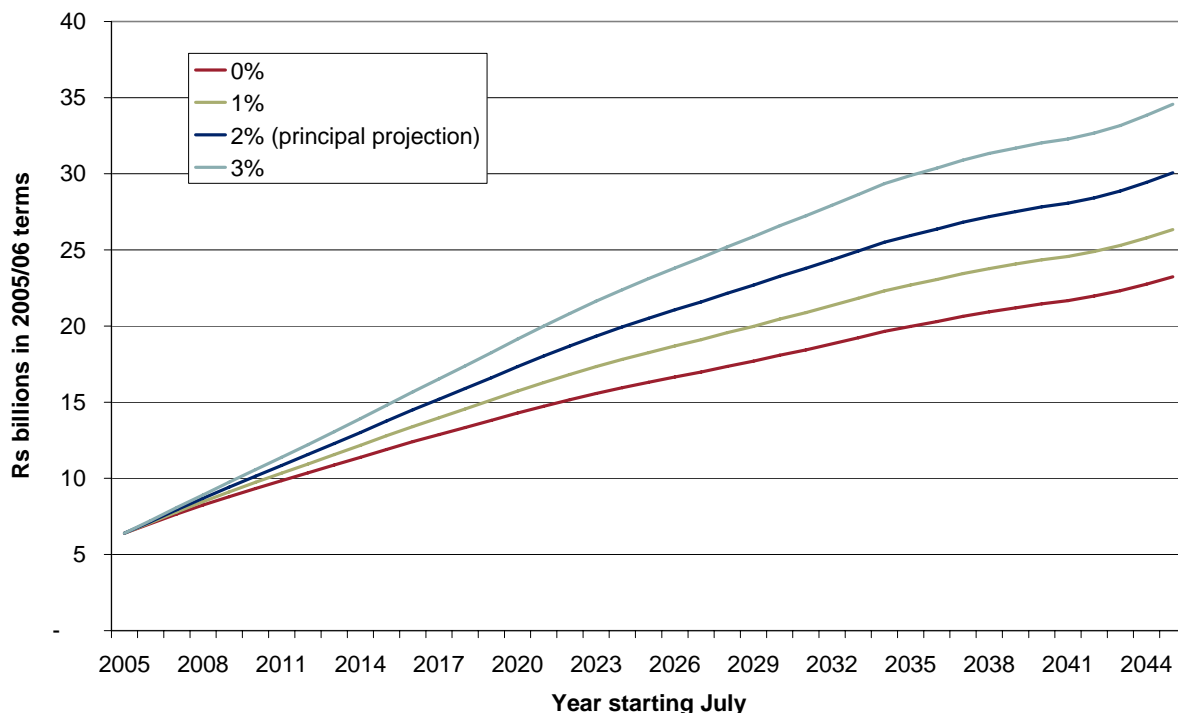
**Chart 5: Projected cashflows of the NSF based on different retirement ages**



### Different assumptions for the rate of investment return

8.11 In order to indicate the sensitivity of the progress of the Fund to the rate of investment return in future, Chart 6 shows the projected balance of the Fund on four different assumptions for the rate of investment return in excess of earnings. For this table, the average real earnings increase is the same for all the different investment assumptions at 2% a year in excess of price increases, the same as was used for the main estimates in Chart 2.

**Chart 6: Projected balance of the NSF based on different rates of investment return in excess of earnings increases**



8.12 Chart 6 shows that the size of the Fund will be sensitive to relatively small variations in the actual rate of return earned on the investments, especially in the longer term. This reflects the compounding effect of even small differences in interest rates.

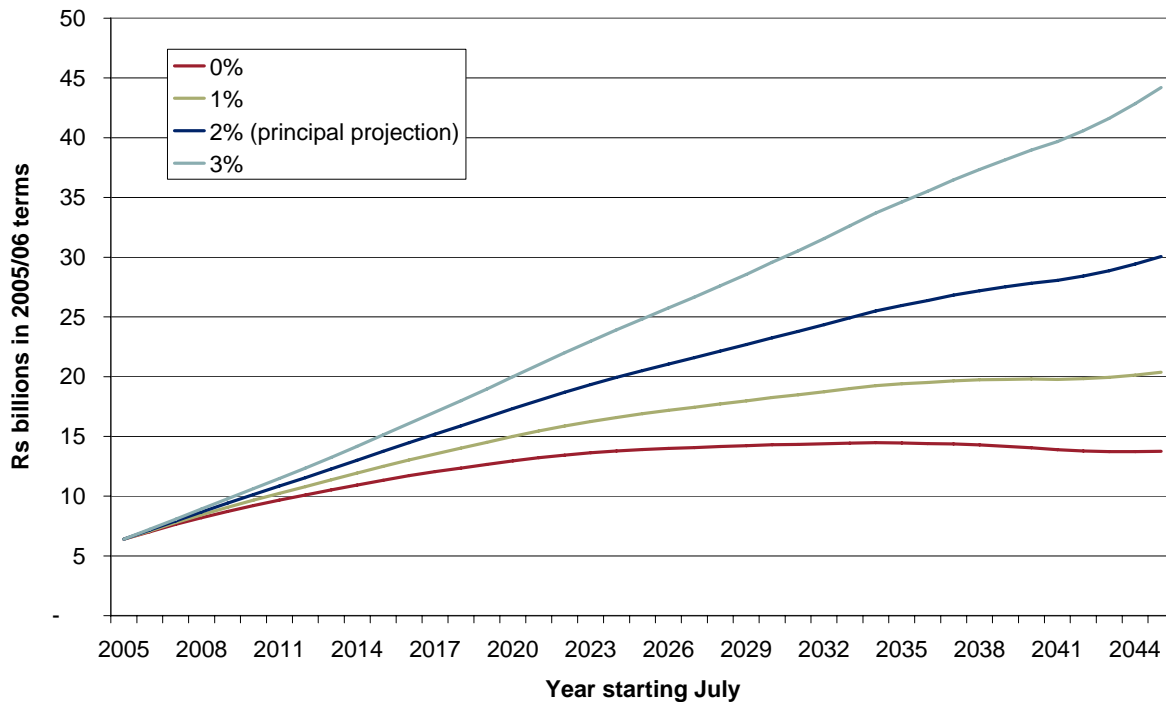
8.13 The higher the rate of investment return actually achieved in future, the earlier is the year when the annual level of lump sum payments exceeds contribution income. This is 2021 under the principal projection, 2019 if investments increase at a rate of 3% a year in excess of increases in earnings, and 2034 if investment returns are equal to earnings increases (i.e. investment return of 0% in excess of earnings increases). This is as might be expected. The lump sum payments will be higher as a result of the higher rate of interest allocated to them due to the higher investment return achieved, whilst the contribution income is unaffected by the level of the investment returns. Of course, as well as there being higher payments, the total income from both contributions and the investment income will be higher as a result of the greater level of the actual investment return.

### Different assumptions for real earnings growth

8.14 Chart 7 shows the projected level of the Fund assuming that increases to average earnings relative to price increases vary while investment returns remain at 2% a year in excess of earnings growth. The chart includes projections for different levels of the

real rate of return on investment income of 0%, 1%, 2% and 3% more than average earnings increases.

**Chart 7: Projected level of the NSF with different real earnings growth assumption**



8.15 The figures in Chart 7 may be compared with those in Chart 6 to show the effect of changing the assumed rate of real earnings growth. The higher assumption for the future real earnings growth in Chart 7 produces significantly larger projected levels for cashflows and the fund balance. However, the year that expenditure exceeds contribution income is the same as in the principal projections.

8.16 In considering the different results based on the different economic assumptions, it is important to emphasize the fundamental point made in earlier sections. For all the assumptions in Charts 6 and 7, the level of the Fund is equal to the accumulated amounts in the individual accounts of all the people who have contributed at some time but not yet been awarded their lump sums. The different sizes of the projected fund do not imply different levels of strength. The value of the assets of the fund should in all cases be equal to the liability represented by the total of these individual account values. Provided the total investment income allocated is in all cases equivalent to the actual investment earnings less the administration charge, the NSF will operate satisfactorily.

**Different demographic assumptions**

8.17 It is assumed that labour market participation rates remain constant. If, for instance, female participation rates increased then initially contributions would increase. Later, payments would also increase as lump sums would be paid in respect of these additional workers. If the average age of entry to the labour market increased (for instance as a result of people spending longer in education) then contributions would decrease by a relatively small amount and ultimately benefits would also be somewhat smaller.

## **9 Appendix A: Summary of relevant provisions of the NSF**

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- 9.1 The NSF was introduced with effect from July 1994 by the National Savings Act 1995 ("the Act"). It provides lump sum payments in return for salary-based contributions.
- 9.2 Section 4 of the Act states:  
"The objects of the Fund shall be -
- a. to provide for the payment of a lump sum to every employee on his retirement at the age of 60 or earlier, or on his or her death;
  - b. to set up and operate for the benefit of employees, such schemes, including loan schemes, as may be prescribed."
- 9.3 The Fund is compulsory in respect of all employees, including public sector employees. Contributions are paid by employers in respect of employees earning over the Lower Earnings Limit and up to an earnings ceiling, the Upper Earnings Limit. The employers' contribution rate is 2.5% at all earnings up to the Upper Earnings Limit. Employees do not contribute.
- 9.4 The Claims and Payment (Amendment) Regulations 2001 clarified the events upon which retirement lump sums are payable into the following categories:
- 9.4.1 Retirement from employment on the grounds of age
  - 9.4.2 Retirement at the age of 45 or over on medical grounds
  - 9.4.3 For a member of the Police Force, after completion of 25 years' pensionable service
  - 9.4.4 On redundancy on after age 45
  - 9.4.5 Under a Voluntary Retirement Scheme (VRS) or Optional Retirement Scheme (ORS) pursuant to the Sugar Industry Efficiency Act 2001
- The last eventuality was added by the Sugar Industry Efficiency Act 2001.
- 9.5 The data showing the payments of lump sums on retirement provided for the review show that the vast bulk of payments made before age 60 were to people in their 50s. However, a number of VRS payments are made to individuals aged under 45.
- 9.6 Lump sums are also payable on the death of a contributor to the surviving spouse or children (if no surviving spouse) or other legal personal representative (if no spouse or children). (Section 14(5) of the Act)
- 9.7 Lump sum payments are equal to the accumulated contributions together with the accrued interest as determined by an actuary. (Claims and Payments Regulations 1997)
- 9.8 The Act and regulations also contain detailed provisions concerning the collection of contributions and various matters to do with the administration and running of the fund.
- 9.9 The interest rate declared for a financial year is equal to
- $$2 \times \text{NI} / (\text{F1} + \text{F2} - \text{NI})$$

Where:

F1 = the Fund at the start of the financial year

F2 = the Fund at the end of the financial year

NI = Investment income receivable in the year + Realised capital gains –  
Administration Fee

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## 10 Appendix B: Summary of revenue accounts of the National Savings Fund

**Table B1: Summary of revenue accounts of the National Savings Fund**

Rs millions	2000-01	2001-02	2002-03	2003-04	2004-05	2000-05
Fund at the start of the period	2,378	3,019	3,735	4,485	5,481	<b>2,378</b>
<b>Income</b>						
Contributions from employers	394	446	453	531	510	<b>2,335</b>
Investment income	290	362	400	435	406	<b>1,894</b>
Capital gains	-	-	-	125	122	<b>247</b>
Other income	3	3	3	2	2	<b>13</b>
<b>Total Income</b>	<b>687</b>	<b>812</b>	<b>856</b>	<b>1,094</b>	<b>1,040</b>	<b>4,489</b>
<b>Expenditure</b>						
Lump sum payments	35	85	93	86	109	<b>408</b>
Administration charge	10	10	11	12	13	<b>56</b>
Other	0	1	1	0	1	<b>4</b>
Total Expenditure	45	97	105	98	123	<b>468</b>
Excess of income over expenditure	641	715	751	995	918	<b>4,022</b>
Fund balance at end of the period	<b>3,019</b>	<b>3,735</b>	<b>4,485</b>	<b>5,481</b>	<b>6,398</b>	<b>6,398</b>
Interest Rate during year	8.5%	10.3%	10.8%	8.5%	7.6%	
Internal Rate of Return (IRR) achieved	11.4%	11.3%	10.2%	11.9%	9.3%	
IRR achieved net of expenses	11.0%	11.0%	9.9%	11.6%	9.1%	
LEL (per month)	800	908	975	1025	1095	
UEL (per month)	5535	6000	6435	6765	7205	

Notes:

1. Figures may not add due to rounding.
2. Capital gains include amounts transferred to the revaluation reserve, exchange gains and penalties received by NSF as a result of early repayment of loans made by NSF.

Source: NSF accounts, NSF legislation; IRR calculated by GAD

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## 11 Appendix C: Summary of data

**Table C1: Numbers of contributors in each year**

<b>Age group</b>	<b>2000-01</b>	<b>2001-02</b>	<b>2002-03</b>	<b>2003-04</b>	<b>2004-05</b>
<b>Males</b>					
<20	6,122	5,558	5,700	5,000	4,831
20-24	29,396	28,903	30,523	28,815	26,538
25-29	27,968	28,574	32,056	32,640	33,024
30-34	28,644	27,462	27,985	28,219	27,804
35-39	31,204	30,181	31,481	30,194	29,242
40-44	29,137	28,230	29,448	29,655	29,511
45-49	26,958	26,806	27,255	27,556	27,775
50-54	21,846	22,318	23,555	24,248	24,192
55-59	12,917	13,222	13,488	14,304	15,531
60+	1,728	1,686	1,478	2,041	2,158
<b>Total</b>	<b>215,920</b>	<b>212,940</b>	<b>222,969</b>	<b>222,672</b>	<b>220,606</b>
<b>Females</b>					
<20	4,259	3,559	3,468	3,305	3,409
20-24	20,554	20,283	21,326	20,043	18,974
25-29	17,893	18,192	20,397	21,157	21,691
30-34	17,044	16,698	17,076	17,410	17,234
35-39	18,575	17,855	19,143	18,524	17,757
40-44	16,795	16,824	17,412	17,409	16,966
45-49	13,843	14,285	14,874	15,011	14,582
50-54	9,739	10,117	10,264	10,677	10,630
55-59	5,139	5,471	5,276	5,494	5,627
60+	621	680	503	707	744
<b>Total</b>	<b>124,462</b>	<b>123,964</b>	<b>129,739</b>	<b>129,737</b>	<b>127,614</b>
<b>Grand Total</b>	<b>340,382</b>	<b>336,904</b>	<b>352,708</b>	<b>352,409</b>	<b>348,220</b>
Annual returns not posted/received	4,747	7,746			
Monthly returns not posted			35,324	23,758	52,152

Note: Returns not posted occur when employers pay contributions to the Ministry but details of the contributions have not yet been entered on to the administrative system. This may occur if the employer does not provide sufficient detail in its return.

Source: Ministry of Social Security

Mauritius National Savings Fund  
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**Table C2: Amounts of contributions paid in each year in Rs millions**

<b>Age group</b>	<b>2000-01</b>	<b>2001-02</b>	<b>2002-03</b>	<b>2003-04</b>	<b>2004-05</b>
<b>Males</b>					
<20	2.5	2.3	2.4	2.3	2.3
20-24	23.0	24.3	26.9	27.2	26.3
25-29	31.2	33.6	38.5	41.9	44.9
30-34	35.3	35.4	37.3	40.3	41.9
35-39	40.0	40.5	43.5	45.0	46.1
40-44	40.2	40.3	42.8	46.0	48.0
45-49	39.2	40.8	42.8	46.1	48.5
50-54	32.0	34.3	37.8	41.6	43.8
55-59	18.8	19.8	21.7	24.5	28.2
60+	1.4	1.4	1.3	2.0	2.1
<b>Total</b>	<b>263.8</b>	<b>272.8</b>	<b>295.0</b>	<b>316.9</b>	<b>332.0</b>
<b>Females</b>					
<20	1.5	1.3	1.4	1.3	1.5
20-24	14.6	15.4	17.3	18.3	18.7
25-29	17.4	18.7	22.3	25.0	27.6
30-34	16.5	17.2	18.7	20.6	22.1
35-39	16.9	17.3	19.4	20.3	21.1
40-44	16.1	16.8	17.8	18.7	19.6
45-49	13.6	14.9	16.3	17.5	18.0
50-54	9.4	9.9	10.7	12.2	13.2
55-59	5.0	5.3	5.6	6.3	6.9
60+	0.4	0.4	0.3	0.5	0.5
<b>Total</b>	<b>111.4</b>	<b>117.3</b>	<b>129.7</b>	<b>140.7</b>	<b>149.3</b>
<b>Grand Total</b>	<b>375.2</b>	<b>390.1</b>	<b>424.7</b>	<b>457.6</b>	<b>481.3</b>

Note: The above Tables C1 and C2 exclude unknown and not yet posted data.

Source: Ministry of Social Security

Mauritius National Savings Fund  
Actuarial review as at 30 June 2005

**Table C3: Accumulated contributions and interest at 30 June 2005**

	Numbers of people ever paid contributions	Accumulated contributions (Rs millions)	Accumulated interest (Rs millions)
<b>Males</b>			
<20	3,120	1.3	0.0
20-24	33,537	66.5	11.8
25-29	49,352	231.3	90.6
30-34	41,998	316.8	184.1
35-39	41,654	377.5	235.8
40-44	42,656	416.6	262.6
45-49	37,689	416.0	262.3
50-54	33,168	381.4	240.3
55-59	25,728	220.7	139.5
60+	3,759	4.1	1.9
<b>Total</b>	<b>312,661</b>	<b>2,432.2</b>	<b>1,428.9</b>
<b>Females</b>			
<20	2,174	0.8	0.0
20-24	25,621	44.3	7.2
25-29	39,085	145.5	56.6
30-34	31,787	175.1	103.8
35-39	30,033	175.6	108.5
40-44	29,641	173.9	107.9
45-49	25,112	158.6	100.6
50-54	20,046	121.2	77.8
55-59	13,536	56.4	37.5
60+	1,764	1.4	0.8
<b>Total</b>	<b>218,799</b>	<b>1,052.7</b>	<b>600.8</b>
<b>Grand Total</b>	<b>531,460</b>	<b>3,485</b>	<b>2,030</b>

Notes:

1. Table C3 excludes unknown and not yet posted contributions.
2. The number of people aged under 20 at 30 June 2005 who had ever contributed is lower than the number of contributions made by people aged under 20 in each year 2000/2001 to 2004/2005. It is assumed that this is because many of the individuals who had made contributions in previous years while aged under 20 were aged over 20 on 30 June 2005.

Source: Ministry of Social Security

Mauritius National Savings Fund  
Actuarial review as at 30 June 2005

**Table C4: Numbers of payments – 2004/2005**

Age group	Normal	Early	Medical	VRS	ORS	Redundancy	Death	Total
<b>Males</b>								
<20	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0
25-29	0	0	0	6	0	0	15	21
30-34	0	0	0	21	0	0	30	51
35-39	0	0	0	86	0	0	56	142
40-44	0	1	0	133	0	0	95	229
45-49	1	33	14	211	0	172	179	610
50-54	1	182	54	471	2	227	269	1,206
55-59	3	385	37	943	0	131	271	1,770
60+	4,566	93	5	190	0	2	118	4,974
<b>Total</b>	<b>4,571</b>	<b>694</b>	<b>110</b>	<b>2,061</b>	<b>2</b>	<b>532</b>	<b>1,033</b>	<b>9,003</b>
<b>Females</b>								
<20	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0
25-29	0	0	0	2	0	0	1	3
30-34	0	0	0	4	0	0	1	5
35-39	0	0	0	16	0	1	6	23
40-44	0	1	0	43	0	1	9	54
45-49	3	6	17	105	0	628	12	771
50-54	4	46	9	571	0	578	19	1,227
55-59	5	64	12	923	1	249	14	1,268
60+	1,692	32	1	94	0	27	6	1,852
<b>Total</b>	<b>1,704</b>	<b>149</b>	<b>39</b>	<b>1,758</b>	<b>1</b>	<b>1,484</b>	<b>68</b>	<b>5,203</b>
<b>Grand Total</b>	<b>6,275</b>	<b>843</b>	<b>149</b>	<b>3,819</b>	<b>3</b>	<b>2,016</b>	<b>1,101</b>	<b>14,206</b>

Note: lump sums paid to policemen with over 25 years' service were not separated from other lump sums

Source: Ministry of Social Security

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Actuarial review as at 30 June 2005

**Table C5: Capital component of lump sum payments – 2004/2005 in Rs millions**

Age group	Normal	Early	Medical	VRS	ORS	Redundancy	Death	All
<b>Males</b>								
<20			0.0	0.0	0.0	0.0	0.0	0.0
20-24			0.0	0.0	0.0	0.0	0.0	0.0
25-29			0.0	0.0	0.0	0.0	0.1	0.1
30-34			0.0	0.0	0.0	0.0	0.2	0.2
35-39			0.0	0.0	0.0	0.0	0.3	0.4
40-44		0.0	0.0	0.0	0.0	0.0	0.6	0.8
45-49	0.0	0.3	0.1	0.0	0.0	1.6	1.2	3.7
50-54	0.0	1.5	0.4	0.7	0.0	2.0	1.7	6.3
55-59	0.0	3.2	0.3	2.2	0.0	1.0	1.7	8.4
60+	30.1	0.4	0.0	0.3	0.0	0.0	0.4	31.2
<b>Total</b>	<b>30.2</b>	<b>5.3</b>	<b>0.8</b>	<b>4.0</b>	<b>0.0</b>	<b>4.6</b>	<b>6.2</b>	<b>51.1</b>
<b>Females</b>								
<20			0.0	0.0	0.0	0.0	0.0	0.0
20-24			0.0	0.0	0.0	0.0	0.0	0.0
25-29			0.0	0.0	0.0	0.0	0.0	0.0
30-34			0.0	0.0	0.0	0.0	0.0	0.0
35-39			0.0	0.0	0.0	0.0	0.0	0.1
40-44		0.0	0.0	0.0	0.0	0.0	0.0	0.1
45-49	0.0	0.1	0.1	0.1	0.0	3.1	0.1	3.5
50-54	0.0	0.4	0.1	0.6	0.0	2.5	0.1	3.7
55-59	0.0	0.5	0.1	0.7	0.0	1.1	0.1	2.5
60+	6.8	0.1	0.0	0.1	0.0	0.1	0.0	7.1
<b>Total</b>	<b>6.9</b>	<b>1.1</b>	<b>0.2</b>	<b>1.6</b>	<b>0.0</b>	<b>6.9</b>	<b>0.3</b>	<b>17.0</b>
<b>Grand Total</b>	<b>37.1</b>	<b>6.4</b>	<b>1</b>	<b>5.6</b>	<b>0</b>	<b>11.5</b>	<b>6.5</b>	<b>68.1</b>

Note: lump sums paid to policemen with over 25 years' service were not separated from other lump sums

Source: Ministry of Social Security

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**Table C6: Interest component of lump sum payments– 2004/2005 in Rs millions**

Age group	Normal	Early	Medical	VRS	ORS	Redundancy	Death	All
<b>Males</b>								
<20	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0.1	0.1
35-39	0	0	0	0	0	0	0.2	0.2
40-44	0	0	0	0.1	0	0	0.3	0.4
45-49	0	0.2	0.1	0.2	0	1.0	0.7	2.2
50-54	0	1.0	0.2	0.3	0	1.2	1.1	3.8
55-59	0	2.1	0.2	1.2	0	0.6	1.1	5.0
60+	18.1	0.2	0.0	0.1	0	0.0	0.3	18.7
<b>Total</b>	<b>18.2</b>	<b>3.4</b>	<b>0.5</b>	<b>2.0</b>	<b>0.0</b>	<b>2.7</b>	<b>3.8</b>	<b>30.5</b>
<b>Females</b>								
<20	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0
35-39	0	0	0	0.02	0	0	0.02	0
40-44	0	0.01	0	0.02	0	0	0.02	0.1
45-49	0.01	0.05	0.05	0.06	0	1.74	0.04	2.0
50-54	0.02	0.31	0.05	0.28	0	1.42	0.03	2.1
55-59	0.03	0.31	0.04	0.28	0.01	0.64	0.04	1.4
60+	4.19	0.07	0	0.03	0	0.05	0.01	4.4
<b>Total</b>	<b>4.25</b>	<b>0.76</b>	<b>0.14</b>	<b>0.69</b>	<b>0.01</b>	<b>3.86</b>	<b>0.16</b>	<b>9.9</b>
<b>Grand Total</b>	<b>22.45</b>	<b>4.16</b>	<b>0.64</b>	<b>2.69</b>	<b>0.01</b>	<b>6.56</b>	<b>3.96</b>	<b>40.4</b>

Note: lump sums paid to policemen with over 25 years' service were not separated from other lump sums

Source: Ministry of Social Security

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**Table C7: Numbers of payments – 2000/2001 to 2004/2005**

	2000-01	2001-02	2002-03	2003-04	2004-05
<b>Males</b>					
Normal	3,148	3,004	4,141	3,619	4,571
Early	618	652	770	548	694
Medical	102	167	183	170	110
VRS	-	2,096	1,732	240	2,061
ORS	-	-	1	-	2
Redundancy	211	205	289	283	532
Death	783	857	1,293	928	1,033
<b>Total</b>	<b>4,862</b>	<b>6,981</b>	<b>8,409</b>	<b>5,788</b>	<b>9,003</b>
<b>Females</b>					
Normal	919	1,097	1,360	1,243	1,704
Early	138	126	157	131	149
Medical	22	100	56	69	39
VRS	-	1,717	1,641	155	1,758
ORS	-	-	4	1	1
Redundancy	11	324	394	1,223	1,484
Death	52	85	86	83	68
<b>Total</b>	<b>1,142</b>	<b>3,449</b>	<b>3,698</b>	<b>2,905</b>	<b>5,203</b>
<b>Grand Total</b>	<b>6,004</b>	<b>10,430</b>	<b>12,107</b>	<b>8,693</b>	<b>14,206</b>

Note: lump sums paid to policemen with over 25 years' service were not separated from other lump sums

Source: Ministry of Social Security

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**Table C8: Capital component of lump sum payments – 2000/2001 to 2004/2005 in Rs millions**

	2000-01	2001-02	2002-03	2003-04	2004-05
<b>Males</b>					
Normal	13.4	15.9	19.8	26.1	30.2
Early	3.0	4.0	3.4	3.8	5.3
Medical	0.6	1.0	1.0	1.3	0.8
VRS	-	16.2	13.5	1.8	4.0
ORS	-	-	0.0	-	0.0
Redundancy	1.0	1.1	2.4	2.4	4.6
Death	3.4	4.5	5.6	6.2	6.2
<b>Total</b>	<b>21.4</b>	<b>42.7</b>	<b>45.6</b>	<b>41.6</b>	<b>51.1</b>
<b>Females</b>					
Normal	2.9	4.0	4.1	5.6	6.9
Early	0.6	0.7	0.7	0.9	1.1
Medical	0.1	0.4	0.2	0.2	0.2
VRS	-	9.0	8.9	0.6	1.6
ORS	-	-	0.0	0.0	0.0
Redundancy	0.0	1.2	1.6	5.7	6.9
Death	0.2	0.3	0.3	0.4	0.3
<b>Total</b>	<b>3.8</b>	<b>15.6</b>	<b>15.8</b>	<b>13.4</b>	<b>17.0</b>
<b>Grand Total</b>	<b>25.2</b>	<b>58.3</b>	<b>61.4</b>	<b>55.1</b>	<b>68.1</b>

Note: lump sums paid to policemen with over 25 years' service were not separated from other lump sums

Source: Ministry of Social Security

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**Table C9: Interest component of lump sum payments – 2000/2001 to 2004/2005 in Rs millions**

	2000-01	2001-02	2002-03	2003-04	2004-05
<b>Males</b>					
Normal	5.4	7.1	9.6	15.3	18.2
Early	1.3	1.8	1.6	2.3	3.4
Medical	0.3	0.5	0.5	0.7	0.5
VRS	-	7.8	7.2	1.1	2.0
ORS	-	-	0.0	-	0.0
Redundancy	0.5	0.6	1.2	1.4	2.7
Death	1.4	2.1	2.8	3.7	3.8
<b>Total</b>	<b>8.9</b>	<b>19.9</b>	<b>22.8</b>	<b>24.4</b>	<b>30.5</b>
<b>Females</b>					
Normal	1.2	1.8	2.0	3.3	4.2
Early	0.2	0.3	0.3	0.5	0.8
Medical	0.0	0.2	0.1	0.2	0.1
VRS	-	4.4	4.7	0.3	0.7
ORS	-	-	0.0	0.0	0.0
Redundancy	0.0	0.5	0.8	3.0	3.9
Death	0.1	0.2	0.1	0.3	0.2
<b>Total</b>	<b>1.6</b>	<b>7.4</b>	<b>8.1</b>	<b>7.6</b>	<b>9.9</b>
<b>Grand Total</b>	<b>10.4</b>	<b>27.3</b>	<b>30.9</b>	<b>31.9</b>	<b>40.4</b>

Note: lump sums paid to policemen with over 25 years' service were not separated from other lump sums

Source: Ministry of Social Security

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## 12 Appendix D: Summary of Mauritius resident population projection 2004-2044

Central Statistical Office 2004-based Medium variant projection

Thousands of people, mid-year

<b>Age group</b>	<b>2004</b>	<b>2009</b>	<b>2014</b>	<b>2019</b>	<b>2024</b>	<b>2029</b>	<b>2034</b>	<b>2039</b>	<b>2044</b>
<b>Males</b>									
0-14	155.4	149.1	147.0	145.5	143.8	142.0	139.7	137.7	135.9
15-19	48.0	55.0	50.2	49.4	48.9	48.3	48.0	47.3	46.5
20-24	54.3	47.4	54.5	49.9	49.2	48.8	48.2	47.9	47.2
25-29	52.8	53.5	46.9	54.1	49.6	49.0	48.6	48.1	47.8
30-34	46.3	52.1	52.9	46.5	53.8	49.4	48.8	48.5	48.0
35-39	50.0	45.6	51.5	52.4	46.1	53.4	49.1	48.6	48.3
40-44	49.9	49.0	44.8	50.6	51.6	45.5	52.7	48.5	48.1
45-49	42.9	48.5	47.7	43.7	49.5	50.6	44.7	52.0	47.9
50-54	36.8	41.0	46.4	45.8	42.1	47.9	49.1	43.5	50.7
55-59	24.0	34.5	38.4	43.7	43.3	40.0	45.9	47.2	41.9
60+	49.8	58.7	76.4	95.7	117.1	134.4	144.2	155.5	164.5
<b>All ages</b>	<b>610.1</b>	<b>634.4</b>	<b>656.7</b>	<b>677.3</b>	<b>695.0</b>	<b>709.2</b>	<b>719.1</b>	<b>724.6</b>	<b>726.7</b>
<b>Females</b>									
0-14	151.0	144.7	142.2	141.0	139.4	137.5	135.4	133.3	131.7
15-19	47.0	53.5	49.1	47.7	47.4	46.8	46.5	45.9	45.1
20-24	53.3	46.5	53.2	48.9	47.6	47.4	46.8	46.5	45.8
25-29	54.0	52.9	46.2	52.9	48.8	47.5	47.3	46.8	46.5
30-34	46.6	53.6	52.6	46.0	52.8	48.7	47.5	47.3	46.7
35-39	50.0	46.3	53.4	52.4	45.9	52.7	48.6	47.4	47.2
40-44	49.1	49.6	46.1	53.1	52.2	45.8	52.5	48.5	47.3
45-49	42.6	48.5	49.1	45.6	52.7	51.8	45.5	52.3	48.3
50-54	37.4	41.7	47.6	48.2	44.9	51.9	51.2	45.0	51.8
55-59	26.5	36.1	40.3	46.1	46.8	43.7	50.7	50.0	44.1
60+	65.9	77.2	95.7	116.1	139.2	159.3	171.9	186.7	197.2
<b>All ages</b>	<b>623.3</b>	<b>650.6</b>	<b>675.5</b>	<b>698.1</b>	<b>717.6</b>	<b>733.1</b>	<b>743.8</b>	<b>749.6</b>	<b>751.5</b>

Source: Central Statistical Office

## 13 Appendix E: Estimating methods

13.1 This Appendix outlines the actuarial methodology and assumptions used in the projections of income and expenditure.

### Contributors and contributions

13.2 The proportions of the population in respect of whom contributions are paid to the NSF were obtained at the 2000 review by comparing the numbers of contributors with the population in each year from 1994/1995 to 1997/1998, with some allowance for smoothing of the proportions calculated from the raw data. The experience from 2000/2001 to 2004/2005 was found to be consistent with this experience, so these assumptions have been retained.

13.3 Table E1 below shows the assumed proportions of the population contributing to the NSF.

**Table E1: Proportions of population contributing to the NSF**

Age group	Males	Females
18-19	0.274	0.211
20-24	0.496	0.352
25-29	0.570	0.362
30-34	0.580	0.347
35-39	0.621	0.381
40-44	0.682	0.382
45-49	0.718	0.331
50-54	0.700	0.266
55-59	0.644	0.223
60	0.560	0.174

13.4 For men, the proportions contributing initially increase steeply with age, then more gradually from around age 40 with a maximum proportion contributing of just over 70% of the population. From age 55 onwards, the proportion then slowly declines. In contrast, for women the proportions remain lower, never exceeding 40% and start to decline from around age 45. Overall around half of the population are contributing at the peak ages.

13.5 These factors represent the proportions which contribute in a particular year. The same individual may or may not contribute in other years. The proportions reaching age 60 who have at some point during their working lives paid contributions are therefore likely to be much higher than the maximum shown in Table E1. Indeed it is likely in the longer term that virtually all men and the majority of women will have contributed at some stage during their working lives, even if in some cases only for a few years.

13.6 To determine future numbers of contributors, the above proportions are applied to the population projection numbers by single age and sex.

13.7 The assumption at the 2000 review for average amounts of contributions paid per contributor on an age and sex specific basis were based on the experience in the

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years 1994/1995 to 1999/2000, with adjustments made to bring the average for each year up to that for 1999/2000.

13.8 The detailed contribution data provided implied lower contributions than those reported in the NSF accounts. It was assumed that the age/sex profile of the detailed contribution data was correct and that the total amount in the accounts was correct. The detailed data were therefore rated up to the accounts total to reflect this.

13.9 The rated-up experience from 2000/2001 to 2004/2005 was consistent with the 2000 assumption for the average contribution once an adjustment had been made for increases in average earnings. Therefore the 2000 assumptions have been used, increased to 2004/2005 terms in line with earnings increases.

13.10 Table E2 shows the average annual amounts of contributions per contributor in 2005/2006 terms:

**Table E2: Average annual amounts of contribution per year per contributor  
Rs 2005/2006 terms**

Age group	Males	Females
18-19	564	492
20-24	1,150	1,045
25-29	1,595	1,368
30-34	1,742	1,312
35-39	1,896	1,325
40-44	2,051	1,375
45-49	2,111	1,369
50-54	2,125	1,407
55-59	2,097	1,378
60	1,117	769

13.11 For men, the average amounts increase with age steeply at the younger ages, and then more gradually and are relatively constant from age 40 onwards. The average amounts for women are considerably lower (overall about 70% that for men) and peak earlier, showing only minor changes from age 25. The amounts are all below the maximum annual contribution for 2005/2006 which, based on the UEL for that year of Rs 7,990 per month and the maximum monthly contribution of Rs 199.50 (rounded to the nearest Rs 0.50), is Rs 2,394.

13.12 To determine the future amounts of contributions, the average amounts shown in Table E2 above are applied to the numbers of contributors (paragraph 13.5) with further adjustments to allow for future increases in average earnings.

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### Accumulated contributions and interest at June 2005

13.13 The total of the data provided on accumulated contributions and interest at June 2005, shown in Appendix C Table C3 was lower than the assets recorded in the NSF accounts. The total value of NSF accounts was assumed to be equal to the amount of assets, and the profile by age and sex was assumed to be the same as the detailed data.

### Payments

13.14 Detailed data on payments made were available. This showed the numbers of lump sum payments and amounts of payments (accumulated contributions and interest) split by sex and single age and between

- > age retirements (the vast majority of whom were 60 or more)
- > early retirements
- > medical retirements
- > VRS
- > ORS
- > redundancy
- > deaths

13.15 The totals of these payments agreed well with the amounts recorded in the NSF accounts.

13.16 At the 2000 review rates of retirement by age and death were derived by comparing the payments with the data on accumulated contributions and interest. These rates were compared with the detailed experience in 2004/2005.

13.17 The rates for deaths of males were consistent with recent experience and have been retained. The rates for deaths of females were revised, based on the experience in 2004/2005.

13.18 The following tables show the assumed rates for accumulated contributions and interest payments by age based on this analysis of the data:

**Table E4: Assumed probability of payment in the next year of a lump sum on death**

Age group	Males	Females
18-19	0.0000	0.0000
20-24	0.0002	0.0000
25-29	0.0002	0.0000
30-34	0.0005	0.0001
35-39	0.0012	0.0002
40-44	0.0019	0.0002
45-49	0.0038	0.0004
50-54	0.0070	0.0006
55-59	0.0087	0.0017

13.19 The rates assumed in the 2000 review for early retirements and age retirements combined were consistent with the number of early, normal and medical retirements

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experienced in 2004/2005. Therefore the assumption has been retained for these types of retirement.

**Table E5: Assumed probability of payment in the next year of a lump sum on normal, early or medical retirement**

Age group	Males	Females
18-34	Nil	Nil
35-39	Nil	Nil
40-44	Nil	Nil
45-49	0.0010	0.0002
50-54	0.0066	0.0038
55-59	0.0135	0.0104
60+	1.0000	1.0000

13.20 The number of redundancy retirements in 2004/2005 was large enough to justify a separate assumption that was derived based on experience in that year. The definition of retirement in 1999/2000 did not explicitly include redundancy, so it may well be that lump sums were not paid on redundancy in that year. Redundancy is only possible from age 45, so the rates are nil below that age.

**Table E6: Assumed probability of payment in the next year of a lump sum on redundancy**

Age group	Males	Females
45-49	0.0042	0.0205
50-54	0.0051	0.0208
55-59	0.0144	0.0322

13.21 Voluntary Retirement Schemes and Optional Retirement Schemes were introduced from 2001/2002 through the Sugar Industry Efficiency Act 2001 and an assumption for the probability of people retiring under these schemes was derived based on experience in 2004/2005.

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**Table E7: Assumed probability of payment in the next year of a lump sum paid under a Voluntary or Optional Retirement Scheme**

Age group	Males	Females
18-19	Nil	Nil
20-24	Nil	Nil
25-29	0.0001	0.0000
30-34	0.0001	0.0001
35-39	0.0003	0.0002
40-44	0.0005	0.0003
45-49	0.0009	0.0009
50-54	0.0024	0.0048
55-59	0.0216	0.0224

13.22 The data used to derive the above factors were based on the experience of the NSF. It should be noted that the above rates are in respect of the *amounts* of lump sum payments, not the numbers of people awarded lump sums. They represent the proportion of the total accumulated account entitlements at each age which will be paid out for the different contingencies rather than the proportion of people who will receive payments.

13.23 The rates of mortality (Table E4) used to estimate the awards of lump sums on death are considerably lower than the actual population mortality at these ages. This is to be expected since all the cases must have been in work and contributing during the last 10 years or so in order to have accumulated any contributions in the Fund. They are therefore likely to have lighter mortality than the general population, which will include those who are so ill that they cannot work or have lower earnings capacity. In addition, those members with larger accumulated accounts are likely to have lower rates of mortality than those with smaller accounts, which will also mean that the mortality rates appropriate to use would be lower than the mortality rates of the general population. It is possible that in the longer term the rates for death might increase and become somewhat closer to the population rates; however it is also likely that there will always be some element of selection in the mortality rates in respect of deaths before age 60 so they will remain somewhat lower than the population mortality rates.

13.24 For age retirements, it is assumed that the majority will take the lump sum payments at 60 and any residual cases (due to contributions paid by people aged 60) will retire by the time they reach 61.

13.25 The factors used in the projections are subject to some uncertainty. However, it remains a fact that the bulk of payments will be made on age retirement at 60. Any difference between the assumed factors and the actual experience in future for deaths and early retirements will be offset by compensatory effects on age retirements at 60 in later years.

### Projections of lump sum payments

13.26 Future estimates of the amounts of payments are determined by applying the rates shown in Tables E4 to E7 to the accumulated amounts of contributions and interest at

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the start of each year plus half the contributions and interest earned in the year of payment.

13.27 The future accumulated contributions at the end of each year are taken as the accumulated contributions at the start, plus contributions accruing in the year less the contributions element of payments made in the year. Similarly future accumulated interest at the end of each year is taken as the accumulated interest at the start, plus a full year's interest earned on the accumulated fund at the start of the year, plus a half year's interest on the contributions paid in the year less the interest element on payments made during the year.

13.28 Table E8 below shows further details of the estimated contributions and payments in future based on the main economic assumption used for the estimates in Section 6. It is not possible to estimate reliably the numbers of payments, only the amounts of accumulated contributions and interest. The numbers of payments in a year are likely to be higher than the average numbers of contributors in past years for the cohort, because some people may not have been contributing in the year they died or retired, but will have been contributing in earlier years. Similarly, it is not possible using this modelling approach to determine the average number of years an individual is likely to have contributed over his or her working life. However, given the proportions contributing (see Table E1 above) it is likely that virtually all men will have paid contributions at some time by the time they reach 60 and similarly the majority of women are likely to have contributed.

**Table E8: Amounts of contributions and analysis of payments**

Rs millions in 05/06 terms

	2005-06	2010-11	2015-16	2020-21	2025-26	2030-31	2035-31	2040-41	2044-45
<b>Contributions</b>	584	675	766	856	940	1,038	1,153	1,258	1,348
<b>Payments</b>									
Retirement age 60 and above	11	215	330	500	747	907	1,134	1,446	1,199
Deaths	16	29	44	59	72	84	96	100	107
Redundancy	24	57	90	126	169	196	222	246	248
VRS and ORS	11	37	60	85	116	134	167	182	175
Early and medical retirement	13	30	47	67	85	102	123	125	131
Administration	15	17	19	21	24	26	29	31	34
<b>Total expenditure</b>	<b>90</b>	<b>384</b>	<b>590</b>	<b>859</b>	<b>1,212</b>	<b>1,450</b>	<b>1,771</b>	<b>2,131</b>	<b>1,893</b>

Note: Individual figures may not add up to subtotals or totals due to rounding

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### **Other assumptions underlying the projected fund balance**

13.29 Chart 1 in Section 6 shows the projected income and expenditure for selected years and the balance of the fund of the NSF.

13.30 As the results in Chart 3 are shown in constant price terms, the investment income was calculated using the assumed real rate of return. For the main projection in Chart 3 the real rate of investment return is 4.04%, derived from the assumed average real earnings increase of 2% and the rate of investment return of 2% in excess of earnings. This rate was applied to the average balance of the fund in the year. The rate of interest allocated to the individual accounts was assumed to be consistent with the investment return earned, so that the total investment income after deduction for administration expenses was allocated to individual accounts.

13.31 Administration expenditure is assumed to be 2.5% of contribution income. See paragraphs 5.18 to 5.20 for further comments on the administration expenses.

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## 14 Appendix F: Projected Cashflows and Fund Balances of the NSF

Rs millions in 05/06 terms

	2005- 06	2010- 11	2015- 16	2020- 21	2025- 26	2030- 31	2035- 36	2040- 41	2044- 45
Fund at the start of year	6,398	10,140	13,760	17,333	20,512	23,265	25,953	27,830	29,434
<b>Income</b>									
Contributions from employers	584	675	766	856	940	1,038	1,153	1,258	1,348
Investment Return	268	415	559	700	823	932	1,036	1,107	1,178
<b>Total income</b>	<b>852</b>	<b>1,091</b>	<b>1,325</b>	<b>1,556</b>	<b>1,763</b>	<b>1,970</b>	<b>2,189</b>	<b>2,365</b>	<b>2,526</b>
<b>Expenditure</b>									
Lump sum payments	75	367	571	837	1,188	1,424	1,742	2,099	1,859
Administration	15	17	19	21	24	26	29	31	34
<b>Total expenditure</b>	<b>90</b>	<b>384</b>	<b>590</b>	<b>859</b>	<b>1,212</b>	<b>1,450</b>	<b>1,771</b>	<b>2,131</b>	<b>1,893</b>
Excess of income over expenditure	763	707	735	697	551	520	418	234	633
Excess of contributions over payments	494	291	176	-3	-272	-411	-618	-873	-545
Fund balance at end of year	7,161	10,847	14,495	18,030	21,064	23,785	26,372	28,064	30,067
<b>Key ratios</b>									
Contributions as % of end of year (EOY) balance	8.2	6.2	5.3	4.7	4.5	4.4	4.4	4.5	4.5
Total expenditure as % of EOY balance	1.3	3.5	4.1	4.8	5.8	6.1	6.7	7.6	6.3