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Republic of Cyprus

Report to the Government

Actuarial valuation of the Social Security Scheme as of 31 December 2003

International Financial and Actuarial Service
Social Protection Sector
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Executive summary

The financial status of the Cyprus Social Insurance Scheme has continued to deteriorate during the last three years. The number of pensioners increases at a fast rate and the expenditure on unemployment benefits has reached levels unsustainable at the present contribution rate for that benefit. In addition, the rate of return of the Fund has decreased following the general reduction of interest rates in the country.

The report proposes three reform packages aimed at restoring the financial status of the scheme and at improving the budgetary situation of the Government, considering its obligations to the various pension provisions in the country.

ES1. Financial status of the different branches of the Social Insurance Scheme

Unemployment benefits

The financial status of the Unemployment Account has continued to deteriorate during the period 2001-2003. The Unemployment Account has accumulated a deficit of £17 672 647 on 31 December 2003. There is an urgent need to restore the financial status of that benefit branch. The contribution rate should be increased from 1.0 per cent to 1.2 percent of the earnings of the employed persons. In addition, it is recommended to transfer funds from the Supplementary Benefit Account to the Unemployment Benefit Account in order to cancel the accumulated deficit identified at the valuation date.

Short-term and employment injury benefits

Short-term and employment injury branches have not experienced major variations of their expenditures since the last review. On the whole, the contributions allocated to these benefits could be reduced to 1.2 per cent (from 1.3 per cent recommended in the last valuation) to absorb some of the increase triggered by the unemployment benefit branch.

Long-term benefits

The cost of long-term benefits is projected to increase in the future as a result of the ageing of the population and the consequent increase of the ratio of pensioners to contributors. For example, the pay-as-you-go (PAYG) cost of the lower band is projected to increase from 9.2 per cent in 2003 to 19.7 per cent in 2050. For the upper band, the PAYG cost is projected to increase from 3.1 per cent in 2003 to 14.4 per cent in 2050. The increasing cost pattern of long-term benefits will eventually require an increase of the contribution rates and/or benefit adjustments.

The period of equilibrium of the lower and upper band has continued to shorten as compared to the last valuation. According to the *status quo* projections, the period of equilibrium of the lower band (the period over which the reserve is at least equal to 1.0 time the annual expenditure) is eight years (until 2011), and the period of equilibrium of the upper band (the period over which the reserve is at least equal to 9.0 times the annual expenditure) is 17 years (until 2020). Measures should be envisaged for a reduction of future costs and precise rules should be enacted for the determination of contribution rates in the future (see point 3 below).

ES2. Rules for the determination of future contribution rates for long-term benefits

The financing of long-term benefits should take into account the nature of the benefit, the demographic environment and the maturing process of this type of benefit. It is thus recommended to adopt rules for the determination of future contribution rates that will take these factors into account. These rules determine the so-called actuarial equilibrium of the scheme. Since the lower band was introduced earlier that the upper band and the benefits are determined by different types of formulas in the two bands, the state of maturity will be reached at different times and the contribution rates should be determined under different rules.

The determination of contribution rates for long-term benefits should be made on the basis of the following rules:

For the lower band, the reserve should be at least equal to 1.0 time the annual expenditure of the lower band.

- Under those rules and the present scheme's provisions, the contribution rate of the lower band (for long-term benefits) would need an immediate increase from 8.7 per cent actually.

- For the upper band, the reserve should be at least equal to 9.0 times the annual expenditure of the upper band. In the long run, when the upper band has reached maturity, the reserve ratio may decrease to 1.0 time the annual expenditure.

If an actuarial valuation reveals that the application of the current contribution rates causes the reserve to decrease below those levels during the ten-year period following the actuarial valuation, the contribution rate will be increased immediately at a level sufficient to meet the reserve-ratio criteria of the band for the next ten years. It is recommended here again that the rules be introduced in the legislation immediately so that the contribution rate of the lower band would be increased from 8.7 per cent to 9.6 per cent for the next ten years. Under the recommended rules, the contribution rate of the upper band would need no increase before 2019.

Should the government not introduce substantial parametric reforms of the pension scheme within the next few years (see below), it is recommended that the contribution rate for long-term benefits be increased during 2005 or as of January 2006. Theoretically this increase of the contribution rate could be postponed by shifting some of the contributions from the upper band to the lower band. This, however, would only postpone the necessary upward adjustment (by a maximum of three years, i.e. to the next valuation) of the contribution rates which would lead to a necessary larger upward correction later on.

ES3. New contribution rate allocation amongst branches

Contributions used for the financing of long-term benefits are in the unusual position of being the residual of contributions not necessary for short-term and employment injury benefits. Consequently, it is recommended to replace the present financing and accounting format separated into a Basic Account, a Supplementary Account and an Unemployment Account, by a financing and accounting practice based on benefit branches (Unemployment benefits, Short-term benefits, Employment injury benefits and Long-term benefits). Specific contribution rates should be allocated to each benefit branch, instead of considering the contribution rate of the long-term branch as being the residual contribution rate not required for the financing of the other benefits on a pay-as-you-go basis.

Under *status quo* conditions, a total contribution rate of 17.60 per cent of insurable earnings (for employed persons) should be allocated as follows between the different benefit branches, starting on 1 January 2005, should no reform on the expenditure side be implemented. This includes an increase of the contribution rate for long-term benefits to 15.2 per cent. The sharing of the additional contribution burden of 1.0 per cent of insured earnings between employees, employers and the government is largely a political decision. However, in view of the rising annual financial commitment of the government to the financing of the national pension system, a sharing of the burden between employers and workers might be preferable for an overall fiscal point of view.

If the reform is implemented with the next two years, the upward adjustment of the contribution rate would not be necessary.

Branch	Contribution rate (%)
Unemployment benefits	1.20 *
Short-term benefits	1.00
Employment injury benefits	0.20
Long-term benefits	15.20
Total	17.60

* Corresponding to 7.2 per cent of total contributions paid on behalf of employed persons.

ES4. Reform options

The report presents a series of modifications to the scheme in order to improve the financial situation of the long-term branch. The modifications are presented in three reform packages.

Reform package No. 1

This scenario introduces three parametric changes to long-term benefits:

- a gradual increase of the normal retirement age from 63 to 65,
- an indexing of pensions in the lower band based on CPI instead of wages, and
- an increase of the number of years of contribution required for eligibility to the old-age pension.

Reform package No. 2

This reform package incorporates all elements of the reform proposal No. 1 and proposes to replace the lower band by a universal flat-rate pension to be paid to all people aged 65 and over and financed by the Consolidated Fund. The SIS pension formula would then be modified by combining the earnings points of the lower band and the upper band, and calculating an integral pension using the present formula of the upper band with an accrual rate of 0.8 per cent instead of 1.5 per cent.

Reform package No. 3

This proposal would:

- combine the earnings points of the lower band and the upper band (in a way similar to the earnings-related component of reform package No. 2) and calculate

an integral pension on the basis of the present formula of the upper band, i.e. with an accrual rate of 1.5 per cent. As under the current upper band provisions, pensions would be adjusted in the future in line with the development of the CPI index,

- the scheme would guarantee a minimum pension of £2600 per annum initially. The minimum pension would be indexed alternatively with a wage or a price index (two sub-scenarios are presented to this regard), and

- the other parametric modifications under reform package No. 1 would also be incorporated (retirement age increase, indexing of the lower band with CPI and new eligibility conditions).

Financial impact of the proposals

All three proposals would reduce the global cost of the Social Insurance Scheme (see Table ES1).

- Reform package No. 1 would significantly reduce the expenditure of the lower band, due mainly to the CPI indexing of the lower band and would most likely render a contribution increase in the lower band unnecessary till about round 2040.

- Reform package No. 2 would reduce the global cost of the SIS since the lower band would be replaced by a universal pension financed directly by the Consolidated Fund. Globally, the financial obligations of the Government would increase in the short-term and decrease in the long-term. The universal pension (demogrant) would be paid to more people in the short-term. However, since the amount would be indexed with CPI, the long-term cost of the demogrant would decrease as a percentage of the total wage bill, which is not the case for the present lower band pension. According to the model calculations, the new earnings-related "upper band" pensions could be financed at a stable contribution rate of 11.6 per cent until after the middle of the century.

- The financial impact of Reform proposal No. 3 is similar to that of Reform proposal No.1, albeit highly dependent on the choice of the indexing mechanism for the minimum pension. With CPI indexing of the minimum pension, the combined PAYG cost (lower and upper band) in 2050 would be 24.0 per cent (as compared to 34.1 per cent under *status quo*). However, the same scenario using a wage indexing of the minimum pension would bring more modest cost savings, with a combined PAYG cost of 28.7 per cent in 2050. Under proposal 3-A, the present contribution rate of 14.3 per cent could possibly kept constant for the next 20 years provided the reserve requirement for the combined scheme would be reduced to a reserve ratio of 4.5.

Table ES1. Financial impact of the reform proposals on the Social Insurance Scheme

	Last year of the period of equilibrium	**General average premium (over the next 50 years)** (as per cent)	**PAYG cost in 2050** (as per cent)
Status quo			
Lower band	2011	14.4	19.7
Upper band	2020	8.5	14.4
Total		22.9	34.1
Reform package No. 1			
Lower band	After 2050	8.7	10.7
Upper band	2023	7.5	13.2
Total		16.2	23.9
Reform package No. 2			
Lower and upper band combined	After 2050*	11.2	13.4
Reform package No. 3A (with CPI indexing of the new minimum pension)			
Lower and upper band combined	2035*	16.7	24.0
Reform package No. 3B (with wage indexing of the new minimum pension)			
Lower and upper band combined	2027*	19.9	28.7

* Under those scenarios, the period of equilibrium is defined as the last year for which the reserve ratio is higher than 1.0.

In addition to the positive impact on the finances of the Social Insurance Scheme, the proposed reforms would also improve the budgetary situation of the Government. Under *status quo*, it is projected that the negative cash flows between the Consolidated Fund and the pension system will be increasing during the next decade, from 7.1 per cent of the total salary base of the SIS in 2004 to 10.7 per cent in 2015. Under the reform package No. 1, the negative cash flows would represent only around 5 per cent of the salary base for the next ten years. Under reform package No. 2, the negative cash flows would be relatively high in the short-term, but would reduce in the long-term because of the gradually reducing impact of the demogrant. Reform package No. 3 would also reduce the projected negative cash flows for the Government, especially the scenario based on the CPI indexing of the minimum pension.

Introduction

The present actuarial valuation of the Cyprus Social Insurance Scheme is carried out in compliance with section 71 of the Social Insurance Law. It presents the financial situation of the scheme as of 31 December 2003.

The ILO appointed Mr. Pierre Plamondon, Actuarial consultant for the Social Protection Sector of the ILO to undertake this assignment. Mr. Plamondon was in Cyprus in April 2004 to collect the statistical information for the valuation. This mission followed a previous mission by Mr. Michael Cichon, Chief of the Financial, Actuarial and Statistical Services of the ILO, in October 2003, aimed at reaching an agreement with the Cyprus authorities on the terms of reference of the valuation and the design of the various reform scenarios.

The terms of reference of the project include:

1. review of the financial situation of the Social Insurance Scheme as of 31 December 2003;

2. long-term projection of revenue and expenditure of the scheme and recommendations on a financing strategy;

3. recommendations concerning the restructuring of the scheme's benefit structure under the reform proposals agreed upon in October 2003;

4. measurement of the impact of the scheme and reform proposals on the government budget.

The compilation of data for the valuation was done under the supervision of Ms. Soula Floridou of the Social Insurance Department. Ms. Rena Georgiou and Ms. Athina Psaras, Statisticians, worked at the collection of data. The Director-General of the ILO wishes to express his sincere thanks to the Minister of Labour and Social Insurance and to the Director of the Social Insurance Department for their invaluable collaboration and assistance during all phases of this project.

1. Review of the recent experience of the scheme

1.1. Amendments since the last review

On 6 October 2001, four modifications relating to the equality of treatment of men and women came into force:

– the possibility for self-employed women in agriculture to be insured;

– the marriage grant is now based on the insurance record of any of the spouse instead of the insurance record of the woman;

– dependants' supplements are paid to female beneficiaries for short-term benefits, on behalf of spouse and children;

– dependants' supplements are paid to female beneficiaries for pensions, on behalf of children.

In addition, it is now possible for a person receiving a widow's pension to receive also an old-age pension based on her own contribution record.

1.2. Experience of the scheme since the last review

1.2.1. Evolution of the accounts

Annex 3 present the financial results of the three accounts (General, Supplementary and Unemployment) for the period 2001-2003. The reserve of the General Benefit Account has increased from £351 millions at the end of 2000 to £407 millions at the end of 2003, representing 1.6 times the annual expenditure of the General Account on 31 December 2003. The reserve of the Supplementary Benefit Account has increased from £1639 millions on 31 December 2000 to £2131 millions on 31 December 2003. The reserve ratio of the Supplementary Benefit Account has decreased slightly from 32 to 28 times the annual expenditure during the last three years.

The Unemployment Benefit Account has continued to experience annual deficits over the last three years. Expenditures have been higher than revenues every year since 1998 and the account has accumulated a negative reserve of £17 672 647 at the end of 2003. There is an urgent need to restore the financing of that benefit branch. As a first measure, it is recommended to transfer funds from the Supplementary Benefit Account to the Unemployment Benefit Account in order to cancel the accumulated deficit of that branch. It will also be necessary to increase the contribution rate of that branch (recommendations are detailed in Section 3.2).

1.2.2. Rate of return of the Fund

The rate of return of the Social Insurance Fund has decreased over the last three years, following the general reduction of interest rates in Cyprus and, in particular, the decrease of the Lombard rate on which the interest rate of the Social Insurance Fund is based. The real rate of return of the Fund (net of inflation) has been 1.9 per cent in 2002 and - 0.5 per cent in 2003 (see Table 1.1).

The Social Insurance Scheme does not have an investment policy. On 31 December 2003, 97 per cent of the reserves of the scheme were invested in Treasury bills. A diversification of the investment portfolio of the scheme should thus be contemplated in order to increase the rate of return of the fund.

Table 1.1. Rate of return of the Social Insurance Fund (as per cent)

Year	Average rate of return of the Social Insurance Fund	Inflation rate in Cyprus	Real rate of return
2001	6.0	2.0	4.0
2002	4.7	2.8	1.9
2003	3.7	4.1	- 0.4

1.2.3. Number of contributors

The compliance level of the scheme might require an extraordinary check. Based on a comparison of the estimated number of full-time equivalent employees in the labour market statistics and the calculated number of full-time contributors in the scheme's own membership statistics, the Social Insurance Department estimates that there might be a non-compliance problem in the order of magnitude of 10,000 missing full-time equivalent contributors. This could theoretically cause a short fall of contributions of between 5 and 10 million pounds annually. The cost of a special survey and - depending on its findings - an increase of the number of inspectors might possibly appear justified in the future.

1.2.4. Number of pensioners

The number of pensions-in-payment increased steadily during the period 1997-2003. The number of widows' pensions increased by 12.4 per cent between 2001 and 2002. This is principally the result of the new practice of paying a double pension to widows who are also entitled to their own old-age pension.

Table 1.2. Number of pensions-in-payment, by sex and type of pension (1997-2003)

Year	Old-age pension		Invalidity pension		Widow's pension		Orphans' pension	
	Male	Female	Male	Female	Male	Female	Male	Female
1997	38 710	13 626	3 129	1 239	-	20 426	344	426
1998	39 713	14 220	3 249	1 318	-	20 558	373	462
1999	40 917	14 765	3 208	1 321	-	20 595	488	604
2000	41 643	16 006	3 524	1 490	-	21 396	490	630
2001	43 215	16 806	3 772	1 591	-	21 841	447	568
2002	44 056	18 903	3 963	1 746	-	24 553	542	720
2003	45 500	20 524	4 116	1 879	-	25 272	559	739

1.2.5. Average pensions

The increase of the minimum pension in the lower band (10 per cent in 1999 and 10 per cent in 2000) has caused an important increase of the average pension, because:

– it has caused *ad hoc* increases of the pension of those already at the minimum pension, and

– it has increased the number of persons eligible to the minimum pension.

Following the *ad hoc* adjustments in 1999 and 2000, the average pension expressed as a percentage of the average insurable earnings of contributors has been relatively stable over the last three years.

Table 1.3. Average annual pensions in the lower band (1998-2000)

Year	Old-age pension		Invalidity pension		Widow's pension	
	Amount	As % of insured earnings	Amount	As % of insured earnings	Amount	As % of insured earnings
1998	1877	29.5	1725	27.1	1684	26.5
1999	1988	30.2	1844	28.0	1810	27.5
2000	2142	31.4	2004	29.4	1908	28.0
2001	2195	30.9	2077	29.2	1992	28.0
2002	2330	31.5	2164	29.2	n.a.	n.a.
2003	2390	31.1	2242	29.1	2180	28.3

1.3. Cash transfers between the Consolidated Fund and the Social Insurance Scheme

The evolution of the net cash flows between the Consolidated Fund and the Social Insurance Scheme is particularly interesting in the context of the government's finances. The scheme invests its reserve in Treasury bills. This represents a positive cash flow for the Government, providing government an access to capital funds. However, the Government must pay interest on the money borrowed from the scheme, which represents a negative cash flow. Other negative cash flows result from the fact that the Government must contribute to the scheme by way of its general subsidy and by way of its contribution as employer. The Government also pays a special contribution to the SIS for financing the increases of the minimum pension granted in 1999 and 2000. The net cash flow has become negative in 1989 and the size of the negative cash flows has increased each year as shown in Table 1.4. The decrease of the interest payments between 2002 and 2003 is fully explained by the drop of the rate of return during the same period (see Table 1.1).

Table 1.4. Net cash transfers between Consolidated Fund and the Social Insurance Fund (in thousand £)

Year	Positive cash flow	Negative cash flows				Net cash flow to Government[2]
	New loans to Government by SIF[1]	General government subsidy	Contribution of government as employer	Interest payments/ borrowed money	Special contribution/ financing increases of minimum pension	
1988	64 969	26 417	16 174	21 889	-	489
1989	72 488	29 005	17 406	26 390	-	-313
1990	82 628	32 548	19 295	31 273	-	-488
1991	86 324	34 950	20 891	36 651	-	-6 168
1992	104 747	39 453	22 001	42 912	-	381
1993	123 247	49 634	26 163	52 337	-	-4 887
1994	141 643	56 204	31 918	61 239	-	-7 718
1995	146 213	59 108	30 683	70 736	-	-14 314
1996	155 067	63 826	34 340	80 934	-	-24 033
1997	160 816	67 393	38 970	91 899	-	-37 446
1998	177 134	71 758	39 620	102 190	-	-36 434
1999	178 908	74 392	41 727	113 189	-	-50 400
2000	181 275	80 176	44 990	118 153	-	-62 044
2001	213 855	90 114	47 631	121 730	4 707	-50 327
2002	165 144	91 971	50 905	105 233	4 952	- 87 917
2003	160 744	102 080	53 757	89 480	5 199	- 89 772

[1] Equal to total income of the scheme minus scheme's expenditure. [2] Equal to income from private sector contributors (plus some other income) minus scheme's expenditure.

2. The projected demographic and economic environments

The actuarial valuation of the Social Insurance Scheme must be positioned in the specific demographic and economic context of Cyprus. The valuation starts with a projection of the general population of Cyprus and a projection of the economic variables that will influence the number of contributors and the number of persons who will receive benefits from the scheme, as well as the level of their wages, the rate of inflation and the interest rates. This is the aim of the present section.

It should be noted that the demographic and economic framework used as a basis for the present valuation is limited to the government-controlled area of Cyprus, as the Social Insurance Scheme covers almost exclusively persons in that area. The general methodology of the actuarial valuation is described in Annex 2.

2.1. Future development of the population of Cyprus

The general population of the country is projected using as a starting point the data of the 2001 Census. The assumptions on the future development of fertility, mortality and migration were chosen in order to generally reproduce the population projections published by the Statistical Service of Cyprus in 2002.

The total fertility rate has decreased sharply over the last decade in Cyprus. It was 2.4 in 1990 and decreased continuously to 1.5 in 2002. In the present valuation, we assume a total fertility rate of 1.45 in 2002, decreasing gradually to 1.3 in 2017 and remaining constant at this level for the rest of the projection period.

As regards mortality, the life expectancy at birth observed in 2001/2002 was 76.4 for males and 81.3 for females. For the present valuation, mortality rates are determined with the methodology used for the development of United Nations life tables. For the determination of future mortality rates, the currently observed life expectancies are gradually increased to 79.3 for males and 84.2 for females in 2050. Sample mortality rates can be found in Annex 4.

Net migration has been positive in Cyprus since 1990, fluctuating between 4 000 and 8 000 net migrants per year. It is projected that net migration will continue to be positive in the future. Net migration is projected according to Table 2.1.

Table 2.1. Projected net migration per year for the period 2002-2050

Period	Number of new migrants per year
2002-2006	6 000
2007-2011	5 000
2012-2016	4 000
2017 +	3 000

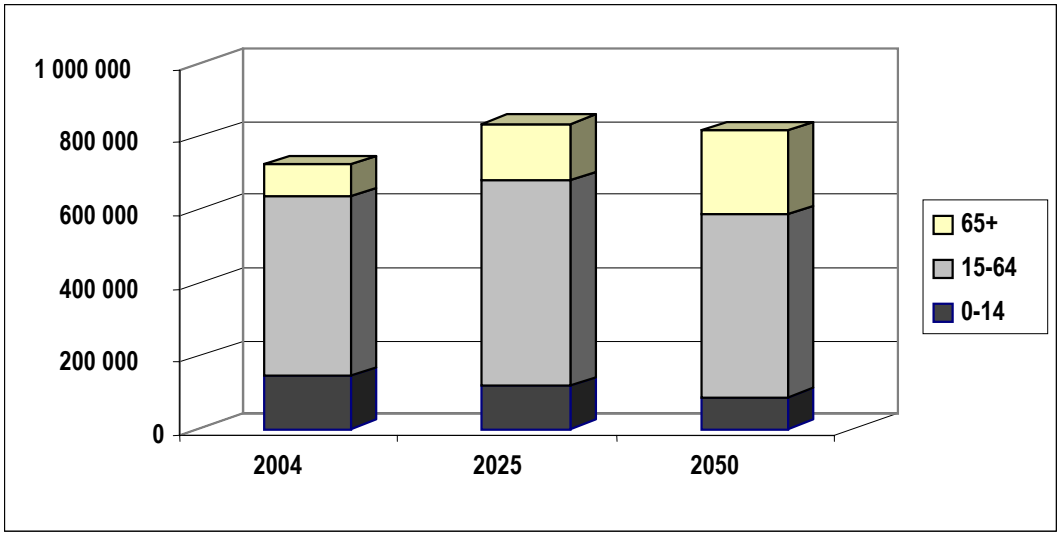
According to the above assumptions, the population of Cyprus is projected to increase from its present level of 705 539 persons in 2002 to 843 485 in 2030 and decreasing to 816 406 in 2050. The increase in the dependency ratio is illustrated by Figure 2.1. The ratio of the population aged 65 and over to the population aged 15-64 is projected to increase continuously from 17.4 per cent in 2002 to 46.1 per cent in 2050. The increase in the dependency ratio of the general population will affect the demographic ratio of the Social Insurance Scheme, as will be seen in Section 3.

Table 2.2. Projection of the population of Cyprus (2002-2050)

Number of persons by age groups				
Year	Age group			Total
	0-14	15-64	65 and over	
2002	151 745	471 531	82 263	705 539
2010	131 498	536 817	101 295	769 610
2020	120 934	564 841	135 432	821 208
2030	111 704	556 287	175 493	843 485
2040	97 104	539 776	202 449	839 329
2050	88 359	498 264	229 783	816 406

Percentage distribution by age				
Year	0-14 Total	15-64 Total	65 and over Total	65 and over 15-64
2002	21.5	66.8	11.7	17.4
2010	17.1	69.8	13.2	18.9
2020	14.7	68.8	16.5	24.0
2030	13.2	66.0	20.8	31.5
2040	11.6	64.3	24.1	37.5
2050	10.8	61.0	28.1	46.1

Figure 2.1. Projection of the population of Cyprus



2.2. Economic and labour market projections

The general economic developments and the evolution of the labour market directly influence the financial development of the Social Insurance Scheme. The evolution of the gross domestic product, its primary factor income distribution, labour productivity, employment and unemployment, wages, inflation and interest rates have direct and indirect impacts on the projected revenue and expenditure of the scheme.

2.2.1. Economic growth

During the 1980s, the Cyprus economy grew at an average annual (real) rate of 6.2 per cent, which has slowed down over the 1990s. Real GDP grew at a rate of 2.0 per cent in 2002 and 2003. The Ministry of Finance of Cyprus projects a real GDP growth of 3.7 per cent in 2004, 4.3 per cent in 2005 and 4.4 per cent in 2006.

Under the given population projections and the assumptions regarding labour market participation, Cyprus will enter a period of growing labour supply shortages. Further economic growth will then only be possible if fuelled out of labour productivity growth. Productivity and GDP growth rates should therefore gradually converge. We expect GDP real growth rates to gradually slow down to levels around 3.5 per cent in 2015, to continue decreasing to 3.0 per cent in 2030 and staying at that level until 2050. Thus, until about 2020 the driving forces behind growth will be additional employment and an increase of labour productivity. After 2020, GDP growth and productivity growth converge, implying no further substantial increases in employment.

Table 2.3. Annual growth of GDP, productivity and employment

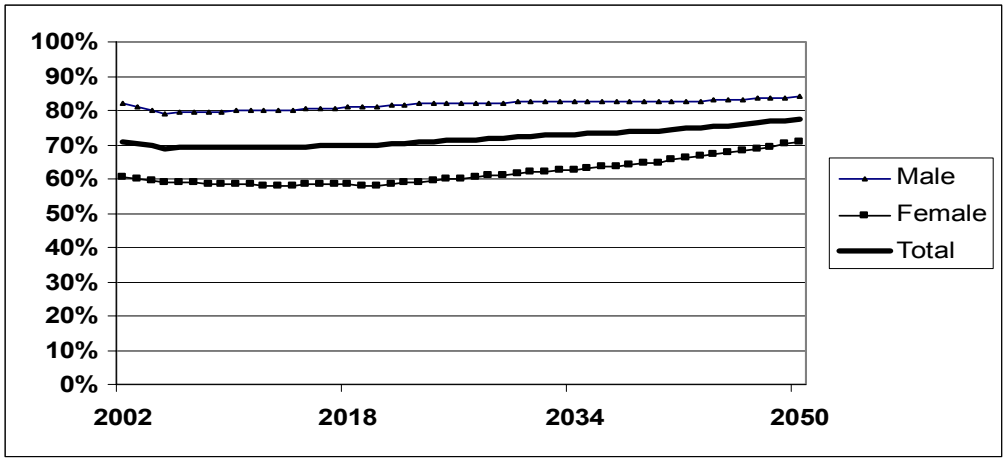
Year	Real GDP growth (%)	Increase of productivity per worker (%)	Increase of the number of workers (%)
2004	3.7	2.5	1.2
2005	4.3	2.8	1.4
2006	4.4	3.3	1.1
2010	4.0	3.0	1.0
2020	3.2	3.0	0.2
2030	3.0	3.0	0.0
2040	3.0	3.0	0.0
2050	3.0	3.0	0.0

2.2.2. Labour force, employment and unemployment

In the long run, labour supply is basically determined by the development of the population and its structure, and by changes in labour market behaviour of private households.

Over the period 2004-2050, for the male population, we assume slightly increasing participation rates for the age groups below 25 and over 45 so that participation rates for males between 15 and 64 reach almost 100 per cent. For the female population, age-specific participation rates grow significantly. In other words, changes in the male average participation rate result mainly from changes in the structure of the active population over time (changing weight of different age groups in the total population) and thus reflect the general ageing process of the male Cypriot population. For females, the decreasing average participation rate tendency is reversed by the needs of the continuously growing economy.

Figure 2.2. Projected labour force participation rates (2002 to 2050)



Note: The labour force participation rate is defined here as the labour force aged 15 to 64 divided by the population aged 15 to 64.

Table 2.4. Labour market balance

	2002	2010	2020	2030	2040	2050
Population						
Male	346 178	380 149	407 233	419 132	417 730	407 518
Female	359 361	389 461	413 975	424 353	421 599	408 888
Total	705 539	769 610	821 208	843 485	839 329	816 406
Population 15 to 64						
Male	231 587	267 993	284 810	283 584	278 800	258 015
Female	239 944	268 824	280 032	272 703	260 976	240 250
Total	471 531	536 817	564 841	556 287	539 776	498 264
Labour force						
Male	189 591	213 885	231 192	233 434	230 082	216 489
Female	144 801	156 929	162 621	167 709	169 282	169 826
Total	334 391	370 814	393 814	401 143	399 363	386 315
Labour force participation rate						
Male	81.9%	79.8%	81.2%	82.3%	82.5%	83.9%
Female	60.3%	58.4%	58.1%	61.5%	64.9%	70.7%
Total	70.9%	69.1%	69.7%	72.1%	74.0%	77.5%
Employed persons						
Male	183 813	204 707	219 327	219 866	217 675	211 733
Female	140 387	150 194	154 275	157 961	160 153	166 095
Total	324 200	354 901	373 602	377 827	377 827	377 827
Unemployment rate	3.0%	4.3%	5.1%	5.8%	5.4%	2.2%

2.2.3. Inflation, wages, and interest rates

Since the beginning of the 1980s, inflation can be considered under control in Cyprus. The increase of the consumer price index has been 4.1 per cent in 2003, but this was mainly due to the introduction of the value added tax. The inflation rate is anticipated to revert back to levels around 2.0 per cent in the future. In line with the forecasts of the Ministry of Finance, we assume that the inflation rate will be constant at 2.0 per cent in the future.

The real increase of the average wage is projected at the same level as the productivity of labour: 2.5 per cent in 2004, 3.0 per cent in 2005 and 3.2 per cent in 2006. It is assumed that the rate of growth will reach 3.0 per cent in 2018 and will stay constant thereafter.

The interest rate of the Social Insurance Fund on funds borrowed by the Government is presently calculated as the Lombard rate less 0.5 per cent. For 2004, the rate of return of the Social Insurance Fund is estimated at 4.75 per cent. It is assumed that interest rates will remain stable after 2007.

Table 2.5. Inflation rate, increase of nominal average wage and interest rate for selected years

Year	Inflation rate (%)	Annual nominal increase of the average wage (%)	Rate of return of the Social Insurance Fund (%)
2004	2.0	4.5	4.75
2005	2.0	5.0	5.0
2006	2.0	5.2	4.5
2007	2.0	5.2	4.0
2010	2.0	5.2	4.0
2015	2.0	5.1	4.0
2020+	2.0	5.0	4.0

3. Actuarial projections under *status quo* provisions

This valuation deals with the ability of the Social Insurance Scheme to meet its future obligations at the time they fall due. This is done under an open-group approach. It is assumed that working persons will continue to be insured under the SIS indefinitely, thus paying contributions and accruing benefit entitlements, and later receive benefits in accordance with the legal provisions of the schemes. Future contributions and benefits are calculated according to the demographic and economic assumptions presented in the Section 2 and on the basis of the database presented in Annex 4.

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

This review deals with the expenditure and revenue of all branches of the SIS: unemployment benefits, short-term benefits, employment injury benefits and long-term benefits. The key area of concern will be the long-term branch, since it counts for the largest proportion of future expenditure. In addition, it is certain that this proportion will grow significantly in the future due to the current immature state of the upper band. Long-term benefits will attain a mature state only after the youngest persons of the first generation of contributors will have died as pensioners. This requires that the situation of the scheme be analysed over the next 50 years.

Considering the present financing arrangement of the scheme, this section first presents the cost of the unemployment, short-term and employment injury benefits, in order to establish the residual contribution rate available for long-term benefits. For long-term benefits, the projection of revenue and expenditure is presented for the lower and the upper band separately, for the purpose of showing the period over which these respective contribution rates are sufficient to support benefits. As mentioned in the previous actuarial review, there is a need to isolate the financing of the long-term branch from the experience under the short-term benefits. For the analysis, benefits have been grouped as follows:

- Unemployment benefits.
- Short-term benefits: Sickness benefit, Maternity allowance, Maternity grant, Marriage grant, Funeral grant.
- Employment injury benefits: Injury benefit, Disablement pension, Disablement grant, Death benefit.
- Long-term benefits: Old-age pension, Invalidity pension, Widow's pension, Orphan's benefit.

3.1. Financing provisions

The Social insurance budget is separated into three accounts:

- the General Account records operations of the scheme concerning income and expenditures in the lower band;

– the Supplementary Account records operations of the scheme concerning income and expenditures in the upper band,

– the Unemployment Account records operations concerning unemployment benefits.

Contributions are first allocated to the Unemployment Account in the amount of 6 per cent of total contributions paid on behalf of employed persons. The remaining part of the contribution income for employed persons plus the totality of contributions of self-employed persons and voluntary insured persons are then allocated as follows:

– a share of 9.5 / 15.5 is allocated to the General Account, and

– a share of 6.0 / 15.5 is allocated to the Supplementary Account.

In addition to these contributions, the General and Supplementary Accounts are credited with investment income and charged with short-term and long-term benefits of the respective band. All grants and administrative expenses are debited from the General Account. The annual net balances of the accounts serve to increase the reserves in the respective band.

Unemployment benefits are hence financed on a pay-as-you-go basis under a separate accounting. Short-term and employment injury benefits are also, while implicitly, financed on a pay-as-you-go basis as the benefit expenditure is simply debited from the General and Supplementary Accounts. No specific contingency reserves are kept for these benefits.

Consequently, contributions used for the financing of long-term benefits are in the unusual position of being the residual of contributions not necessary for short-term and employment injury benefits. Such a procedure could be justified if the contribution rate calculated for short-term and employment injury benefits could be assumed to be stable over time. But this assumption cannot be made as demonstrated by past experience. It is thus recommended to allocate fixed contribution rates to each type of benefits, and to keep separate accounting of each benefit branch.

3.2. Unemployment benefits

Unemployment benefits have experienced important variations over recent years. Total annual expenditure is shown in Table 3.1.

Table 3.1. Expenditure on unemployment benefits for the period 1998-2003

Year	Annual expenditure on benefits	Expenditure as % of insurable earnings of employed persons
1998	18 971 764	1.2
1999	22 851 680	1.3
2000	23 604 708	1.3
2001	19 973 230	1.0
2002	23 631 403	1.1
2003	27 804 102	1.3

The Unemployment Account presents an accumulated deficit of £17 672 647 on 31 December 2003. The annual deficit (the excess of expenditure over revenue) has been £283 730 in 2001, £2 997 870 in 2002 and £5 290 526 in 2003. Two events have affected the total amount of expenditure in recent years:

– from October 2001, the payment of dependent supplements has been extended to female beneficiaries,

– in November 2003, the special employer-paid layoff payments to the hotel industry has been terminated and caused a structural increase in expenditure (in 2003 and 2004 and in all following years). However, this structural impact was compensated in the first semester of 2004 by a decrease in the number of beneficiaries.

Given the risk of future fluctuations in the expenditure on unemployment benefits, it is recommended to increase the contribution rate from 1.0 per cent to 1.2 per cent of the insurable earnings of employed persons (or 7.2 per cent of the contributions of employed persons instead of 6.0 per cent). In addition, an amount of £17 672 647 should be transferred from the Supplementary Account to the Unemployment Account to cover the negative accumulated reserve.

3.3. Short-term benefits

The experience on short-term benefits for the years 2002 and 2003 appears in Table 10. The experience of these two years is relatively stable. The total cost of short-term benefits (including Sickness benefit, Maternity allowance, Maternity grant, Marriage grant, Funeral grant and Missing person's allowance) is estimated at 0.65 per cent of insurable earnings in the lower band and 0.35 per cent of insurable earnings in the upper band.

Table 3.2. Expenditure on short-term benefits for the period 2002-2003

Year 2002				
	Annual expenditure		**Expenditure as % of total insurable earnings**	
	Lower band	**Upper band**	**Lower band**	**Upper band**
Sickness benefit	7 706 544	4 893 581	0.33	0.21
Maternity allowance	3 696 849	3 136 269	0.16	0.13
Other benefits	3 196 389	-	0.14	-
Total	14 599 782	8 029 850	0.63	0.34
Year 2003				
	Annual expenditure		**Expenditure as % of total insurable earnings**	
	Lower band	**Upper band**	**Lower band**	**Upper band**
Sickness benefit	8 942 690	5 812 512	0.36	0.24
Maternity allowance	3 994 253	3 593 182	0.16	0.15
Other benefits	3 599 052	-	0.15	-
Total	16 535 995	9 405 694	0.67	0.39

3.4. Employment injury benefits

Employment injury benefits include short-term and long-term components. The projected cost of each component appears in Table 3.3. The total cost of employment injury benefits is estimated at 0.15 per cent of insurable earnings in the lower band and 0.05 per cent of insurable earnings in the upper band.

Table 3.3. Estimated cost of employment injury benefits

Type of benefit	Cost as % of insurable earnings of employed persons	
	Lower band	Upper band
Injury benefit	0.03	0.02
Disablement pension	0.07	0.02
Death benefit	0.05	0.01
Disablement grant	-	-
Total	0.15	0.05

3.5. Long-term benefits

3.5.1. Contribution rate available for financing long-term benefits

Under the present financial arrangement of the SIS, the contribution rate available for long-term benefits is the residual contribution rate that is not required for financing short-term and employment injury benefits, on a pay-as-you-go basis.

Tables 3.4 and 3.5 present the calculation of the residual contribution rate for pensions, separately for the lower and the upper band, under two methods. Under method 1, the residual contribution rate for pensions is calculated under a pure accounting basis. Under method 2, the contribution rate for long-term benefits is determined as the total contribution rate presently paid (excluding the Unemployment Account), minus the cost determined in Sections 3.2 and 3.3 for Short-term and Employment injury benefits. The residual contribution rate under method 2 is approximately equal to the average of the rates calculated under method 1 for 2002 and 2003 and will thus be used for the financial projections of the following sections.

Table 3.4. Calculation of the contribution rate available for financing long-term benefits (method No. 1)

General Account		
	2002	**2003**
Revenue available for financing expenditure on a PAYG basis (total revenue less investment earnings)	226 816 755	251 285 132
Expenditure other than pensions		
Benefits	17 434 306	19 447 788
Administration	2 692 482	3 467 401
Revenue available for financing long-term benefits	206 689 967	228 369 943
Contribution rate available for long-term benefits*	8.82%	8.98%
Supplementary Account		
Revenue available for financing expenditure on a PAYG basis (total revenue less investment earnings)	139 603 291	154 937 414
Expenditure other than pensions		
Benefits	8 939 250	10 420 604
Administration	-	-
Revenue available for financing long-term benefits	130 664 041	144 516 810
Contribution rate available for long-term benefits*	5.58%	5.68%

* On the basis of total insurable earnings of £2 140 million in 2001, £2 342 million in 2002 and £2 544 million in 2003.

Table 3.5. Calculation of the contribution rate available for financing long-term benefits (method No. 2)

	General Account (%)	Supplementary Account (%)
Theoretical contribution rates for financing the General Account and the Supplementary Account	9.50	6.00
Estimated cost of Short-term benefits	0.65	0.35
Estimated cost of Employment injury benefits	0.15	0.05
Residual contribution rate for financing Long-term benefits	8.70	5.60

3.5.2. Lower band – demographic projections

The lower band has reached maturity. Most workers attaining the retirement age normally have a full record of contributions and are thus eligible for the old-age pension. Any future increase of the ratio of pensioners to contributors will thus be the effect of the increase of the dependency ratio of the total population of Cyprus. It has been seen in Section 2.1 that the ratio of the population aged 65 and over to the population aged 15 to 64 will be multiplied by a factor of 2.6 over the period 2004-2050. The same will happen to the ratio of pensioners to contributors under the Social Insurance Scheme.

Table 3.6 shows that the ratio of pensioners to contributors in the lower band is projected to increase from 30 per cent in 2004 to 78 per cent in 2050. The number of male old-age pensioners is projected to grow from 44 878 in 2001 to 95 471 in 2050, while the number of female pensioners in 2050 will be around five times the number observed in 2004. The important increase of the number of female pensioners is one effect of the increased participation of women in the labour force projected under the macro-economic frame of the valuation.

3.5.3. Lower band – financial projections

The future evolution of the average pension under the SIS may be analysed through the evolution of the average replacement ratio. For the lower band, the ratio of the average pension to the average earnings of the active contributors is presently 29 per cent for males and 31 per cent for females (see Table 3.7). It must be mentioned that, after the modifications of 1999 and 2000 that raised the level of the minimum pension, the minimum pension is now equal to 85 per cent of the full basic pension. Hence the range between the minimum and the maximum pension is quite narrow. In addition, these modifications have caused an increase of the replacement rate of female pensioners who generally have earnings lower than those of male insured persons.

The financial ratios shown in Table 3.7 will continue around those levels in the future given the state of maturity of the scheme and the presence of the minimum pension.

Table 3.6. Demographic projections for long-term benefits – Lower band

Year	Contributors	Pensioners							Ratio of pensioners to contributors
		Old age		Invalidity					
		Males	Females	Males	Females	Widows	Orphans	Total	
2004	335 444	44 878	20 694	4 502	2 086	26 614	661	99 434	30%
2005	341 387	44 659	21 379	4 919	2 311	27 459	718	101 445	30%
2006	343 491	44 721	22 236	5 341	2 536	28 248	777	103 859	30%
2007	346 916	45 495	23 498	5 756	2 759	29 016	837	107 361	31%
2008	349 681	46 469	24 877	6 163	2 982	29 752	898	111 141	32%
2009	353 218	47 586	26 385	6 561	3 205	30 473	951	115 161	33%
2010	356 330	48 931	28 155	6 950	3 428	31 180	995	119 638	34%
2011	359 250	50 390	29 986	7 329	3 651	31 888	1 035	124 279	35%
2012	362 202	51 607	31 718	7 697	3 875	32 612	1 057	128 566	35%
2013	364 892	52 627	33 500	8 055	4 098	33 357	1 078	132 715	36%
2014	367 370	53 832	35 389	8 405	4 321	34 116	1 087	137 150	37%
2015	369 644	55 124	37 294	8 747	4 545	34 907	1 085	141 701	38%
2020	375 894	62 320	48 573	10 360	5 644	39 304	985	167 186	44%
2025	376 878	71 559	63 153	11 664	6 655	44 449	828	198 308	53%
2030	377 627	78 640	77 399	12 580	7 500	50 096	706	226 920	60%
2035	377 026	81 381	88 006	13 273	8 135	55 548	699	247 042	66%
2040	375 932	83 853	94 936	13 942	8 608	59 977	695	262 011	70%
2045	373 152	89 052	99 846	14 605	8 949	62 884	675	276 011	74%
2050	370 409	95 471	103 726	15 195	9 216	64 289	637	288 533	78%

Note:

1. For the purpose of the actuarial projections, the orphans aged 21 and over have been considered as widows' pensions recipients
2. Concerning invalidity pensioners, the projection model assumes that the invalidity pension is paid for life. However, the global expenditure of the scheme has been adjusted to consider pensioners with partial invalidity who have their pension adjusted upward when they reach age 63.

Table 3.7. Average replacement ratios – Lower band

Year	Old age		Invalidity		Widows
	Males	Females	Males	Females	
2004	29%	31%	26%	27%	25%
2005	29%	31%	26%	28%	25%
2006	29%	31%	26%	28%	25%
2007	28%	31%	25%	28%	25%
2008	28%	31%	25%	28%	25%
2009	28%	31%	25%	28%	25%
2010	27%	31%	25%	28%	25%

The projection of the revenue and expenditure components and the evolution of the reserve of the lower band are presented in Table 3.8. In the present valuation, the long-term pay-as-you-go cost of the lower band is projected to reach 19.7 per cent in 2050 as compared to 18.4 per cent in the last review. The variation is mainly due to the new demographic projections that determine the future ratio of pensioners to contributors. The dependency ratio of the total population, in 2050, has increased from 39.4 per cent in the last valuation to 46.1 per cent in the present one.

From Table 3.8, we can identify some critical years in the future financial evolution of the lower band:

– until 2007, the sum of contributions and investment earnings is larger than expenditure and the reserve is increasing;

– from 2008, the total of contributions and investment earnings is no more sufficient to meet the scheme's expenditure and the reserve starts decreasing;

– the reserve continues to be greater than 1.0 time the annual expenditure until 2011;

– the reserve is exhausted in 2017.

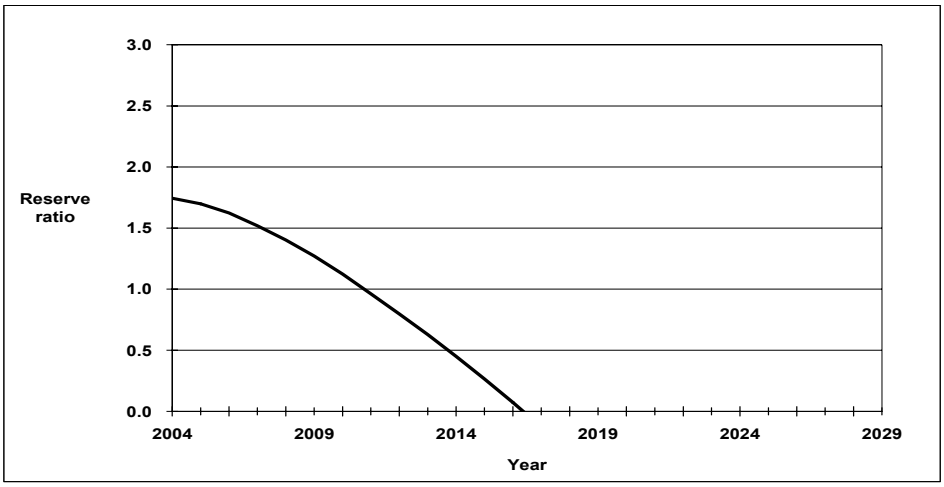
The previous actuarial reports were defining the period of equilibrium of the lower band as the number of years during which the ratio of the reserve to the annual expenditure is at least equal to 1.0. Compared to the last valuation, the period of equilibrium in the lower band has shortened from 2013 to 2011. The reasons are:

– the interest rate credited to the reserve in the last 3 years has been lower than projected;

– salary increases in the last three years have been lower than anticipated, thus reducing the initial salary base;

– the starting number of pensioners in 2004 is higher than projected.

Figure 3.2. Projection of the reserve ratio in the lower band – *Status quo*



The general average premium of the lower band (the level contribution rate sufficient to finance the scheme's expenditure over the next 50 years) is 14.4 per cent. When compared to the present contribution rate allocated to the lower band (8.7 per cent), it shows that the contribution rate would have to be increase at some point in the future to support the scheme, under *status quo* conditions.

Table 3.8. Financial projections (*status quo*) – Lower band (in million pounds where applicable)

Year	Contribution rate	Total insurable earnings	Revenue: Contri-butions	Revenue: Transfer Cons Fund*	Revenue: Investment earnings	Revenue: Total	Expenditure	Reserve (end of year)	Reserve ratio	PAYG cost
2004	8.7%	2 634	229	6	19	254	241	420	1.7	9.2%
2005	8.7%	2 822	246	6	21	273	257	436	1.7	9.1%
2006	8.7%	3 001	261	7	19	287	276	448	1.6	9.2%
2007	8.7%	3 194	278	7	18	303	298	453	1.5	9.3%
2008	8.7%	3 393	295	8	18	321	322	452	1.4	9.5%
2009	8.7%	3 602	313	9	17	340	348	443	1.3	9.7%
2010	8.7%	3 818	332	10	17	359	378	424	1.1	9.9%
2011	8.7%	4 048	352	11	16	379	409	394	1.0	10.1%
2012	8.7%	4 292	373	11	14	399	441	352	0.8	10.3%
2013	8.7%	4 546	396	12	13	421	474	298	0.6	10.4%
2014	8.7%	4 813	419	13	10	442	511	230	0.4	10.6%
2015	8.7%	5 092	443	15	7	465	549	146	0.3	10.8%
2020	8.7%	6 658	579	22	-21	580	798	-639	-0.8	12.0%
2025	8.7%	8 542	743	33	-87	690	1 165	-2 435	-2.1	13.6%
2030	8.7%	10 939	952	49	-217	783	1 659	-5 953	-3.6	15.2%
2035	8.7%	13 949	1 214	68	-441	840	2 277	-11 938	-5.2	16.3%
2040	8.7%	17 744	1 544	92	-798	837	3 093	-21 454	-6.9	17.4%
2045	8.7%	22 420	1 951	123	-1 349	724	4 155	-36 078	-8.7	18.5%
2050	8.7%	28 332	2 465	164	-2 180	449	5 574	-58 100	-10.4	19.7%

* For financing the increase of the minimum pension

3.5.4. *Upper band – demographic projections*

In the upper band, the ratio of pensioners to contributors is 27 per cent in 2004. This ratio is projected to increase to 75 per cent in 2050. The future evolution of the demographic ratios in the upper band is similar to the one projected for the lower band (see Table 3.10).

3.5.5. *Upper band – financial projections*

The upper band has not reached the state of maturity. This part of the scheme was introduced only in 1980. It will thus take another 20 years before a worker will have contributed to the upper band during most of its career.

Unlike the situation in the lower band, the average replacement ratios in the upper band are increasing with time for all types of pensions. In the upper band, the pension is directly proportional to the period of contribution. As shown in Table 3.9, a relative state of stability of the average replacement ratios will be reached around 2025, after 45 years of existence of the upper band.

Table 3.9. Average replacement ratios – Upper band

	Old age		Invalidity		Widows
Year	Males	Females	Males	Females	
2004	16%	13%	19%	18%	8%
2005	16%	13%	20%	19%	8%
2006	17%	13%	20%	20%	8%
2007	17%	13%	21%	21%	8%
2008	18%	14%	21%	21%	9%
2009	19%	15%	22%	22%	9%
2010	20%	16%	22%	22%	9%
2015	22%	20%	22%	24%	10%
2020	24%	23%	22%	24%	10%
2025	25%	25%	22%	24%	11%
2030	25%	25%	22%	25%	11%
2035	26%	26%	22%	25%	11%
2040	26%	26%	23%	25%	11%
2045	26%	27%	23%	26%	11%
2050	26%	27%	23%	26%	11%

Table 3.10. Demographic projections for long-term benefits – Upper band (in million pounds where applicable)

Year	Contributors	Pensioners							Ratio of pensioners to contributors
		Old age		Invalidity					
		Males	Females	Males	Females	Widows	Orphans	Total	
2004	252 292	37 283	11 341	3 762	1 477	13 393	71	67 328	27%
2005	258 361	38 006	12 397	4 136	1 641	14 625	115	70 919	27%
2006	261 348	38 514	13 410	4 505	1 804	15 839	159	74 231	28%
2007	265 354	39 503	14 594	4 867	1 967	17 027	202	78 161	29%
2008	268 874	40 505	15 751	5 226	2 132	18 183	246	82 043	31%
2009	271 840	41 621	16 970	5 584	2 298	19 307	286	86 066	32%
2010	274 488	42 997	18 243	5 942	2 466	20 398	324	90 370	33%
2011	277 212	44 422	19 488	6 300	2 635	21 457	354	94 657	34%
2012	279 984	45 852	20 660	6 655	2 806	22 486	377	98 836	35%
2013	282 563	47 362	21 855	7 008	2 976	23 486	394	103 082	36%
2014	284 978	48 903	23 116	7 356	3 146	24 465	405	107 391	38%
2015	287 237	50 375	24 380	7 697	3 315	25 421	416	111 605	39%
2020	294 900	57 561	31 439	9 282	4 144	30 004	445	132 876	45%
2025	296 875	65 543	39 660	10 538	4 898	34 526	450	155 616	52%
2030	298 194	71 086	46 835	11 390	5 526	38 979	448	174 264	58%
2035	298 170	73 689	52 206	12 007	5 988	42 982	457	187 329	63%
2040	297 353	76 303	56 606	12 577	6 318	46 079	465	198 348	67%
2045	294 461	81 198	60 270	13 120	6 533	48 064	453	209 637	71%
2050	291 614	86 991	63 183	13 600	6 666	49 029	424	219 894	75%

Note:

1. For the purpose of the actuarial projections, the orphans aged 21 and over have been considered as widows' pensions recipients
2. Concerning invalidity pensioners, the projection model assumes that the invalidity pension is paid for life. However, the global expenditure of the scheme has been adjusted to consider pensioners with partial invalidity who have their pension adjusted upward when they reach age 63.

The projection of the revenue and expenditure components and the evolution of the reserve of the upper band are presented in Table 3.11. The pay-as-you-go cost of the upper band increases from 3.1 per cent in 2004 to 14.4 per cent in 2050.

From Table 3.11, we can identify some critical years in the future financial evolution of the upper band:

– contributions alone are sufficient to meet the total expenditure of the upper band until 2013;

– from 2014 to 2021, part of the investment earnings are used, in addition to contributions, to meet the annual expenditure;

– from 2022, the total of contributions and investment earnings is no more sufficient to meet the scheme's expenditure and the reserve starts decreasing;

– the reserve continues to be greater than 9.0 times the annual expenditure until 2020;

– the reserve is exhausted in 2035.

The previous actuarial reports were defining the period of equilibrium of the upper band as the number of years during which the ratio of the reserve to the annual expenditure is at least equal to 9.0. Under the new projections, the period of equilibrium of the upper band is one year shorter than the one determined in the previous valuation. The last year of the period of equilibrium is 2020, as compared to 2021 in the previous valuation. The reduction of the period of equilibrium is mainly due to the lower rate of return assumed for the future.

The general average premium of the upper band (the level contribution rate sufficient to finance the scheme's expenditure over the next 50 years) is 8.5 per cent.

Figure 3.3. Projection of the reserve ratio in the upper band – *Status quo*

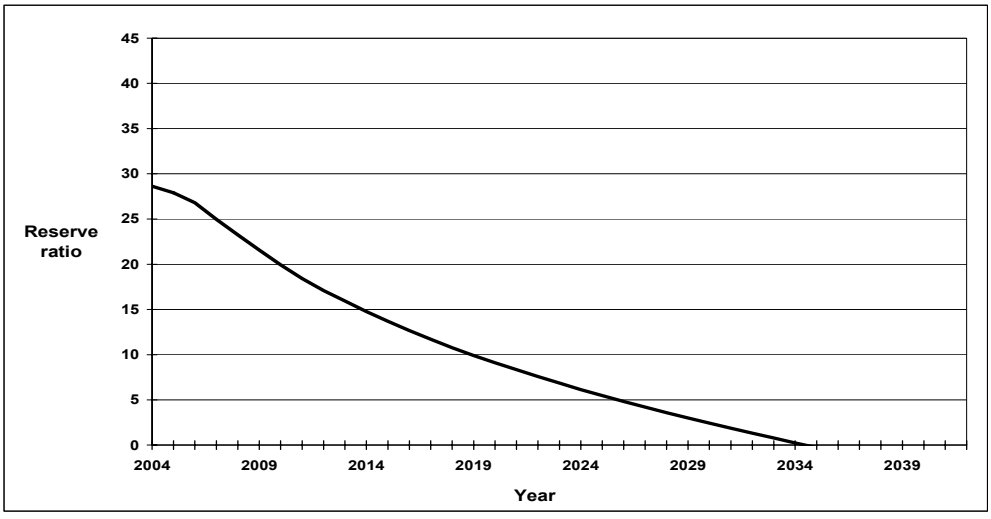


Table 3.11. Financial projections (*status quo*) – Upper band

Year	Contribution rate	Total insurable earnings	Revenue			Expenditure	Reserve (end of year)	Reserve ratio	PAYG cost
			Contributions	Investment earnings	Total				
2004	5.6%	2 634	147	103	250	80	2 301	28.6	3.1%
2005	5.6%	2 822	158	117	275	89	2 487	27.9	3.2%
2006	5.6%	3 001	168	113	281	100	2 669	26.8	3.3%
2007	5.6%	3 194	179	108	287	114	2 842	25.0	3.6%
2008	5.6%	3 393	190	115	305	130	3 017	23.2	3.8%
2009	5.6%	3 602	202	122	323	148	3 192	21.6	4.1%
2010	5.6%	3 818	214	129	342	169	3 366	19.9	4.4%
2011	5.6%	4 048	227	135	362	192	3 536	18.4	4.7%
2012	5.6%	4 292	240	142	382	216	3 701	17.1	5.0%
2013	5.6%	4 546	255	148	403	242	3 862	15.9	5.3%
2014	5.6%	4 813	270	154	424	272	4 014	14.8	5.6%
2015	5.6%	5 092	285	160	445	304	4 156	13.7	6.0%
2020	5.6%	6 658	373	180	553	506	4 607	9.1	7.6%
2025	5.6%	8 542	478	172	651	791	4 325	5.5	9.3%
2030	5.6%	10 939	613	119	731	1 154	2 808	2.4	10.6%
2035	5.6%	13 949	781	-2	779	1 603	-459	-0.3	11.5%
2040	5.6%	17 744	994	-218	775	2 200	-6 282	-2.9	12.4%
2045	5.6%	22 420	1 256	-581	674	3 010	-15 994	-5.3	13.4%
2050	5.6%	28 332	1 587	-1 163	424	4 089	-31 490	-7.7	14.4%

3.6. Recommended contribution rates

3.6.1. Proposed rules for the determination of future contribution rates for long-term benefits

The financing of long-term benefits should take into account the nature of the benefit, the demographic environment and the maturing process of this type of benefit. It is thus recommended to adopt rules for the determination of future contribution rates that will take into account these factors. Since the lower band was introduced earlier than the upper band and the benefits are determined according to different types of formulas in the two parts of the scheme, the state of maturity will be reached at different times and the contribution rates should be determined under different rules.

The determination of contribution rates for long-term benefits should be made under the following rules:

– for the lower band, the reserve should be at least equal to 1.0 time the annual expenditure of the lower band.

– for the upper band, the reserve should be at least equal to 9.0 times the annual expenditure of the upper band. in the long run, when the upper band has reached maturity, the reserve ratio may decrease to 1.0 time the annual expenditure.

If an actuarial valuation reveals that the application of the current contribution rates causes the reserve to decrease below those levels during the ten-year period following the actuarial valuation, the contribution rate will be increased immediately at a level sufficient to meet the reserve-ratio criteria of the band for the next ten years.

Under those rules, the lower band would be in equilibrium until 2011 and the upper band until 2020. Consequently, the present contribution rates available for financing long-term benefits in the lower band would have to be increased immediately from 8.7 per cent to 9.6 per cent to respect the rule. According to the above rules, the contribution rate of 5.6 per cent attributed to the upper band could be kept unchanged until the next actuarial review.

3.6.2. Recommended contribution rates under status quo

Should the government not introduce substantial parametric reforms of the pension scheme within the next few years, it is recommended that the contribution rate for long-term benefits be increased during 2005 or as of January 2006. Theoretically this increase of the contribution rate could be postponed by shifting some of the contributions form the upper band to the lower band. This, however, would only postpone the necessary upward adjustment (by a maximum of three years, i.e. to the next valuation) of the contribution rates which would lead to a necessary larger upward correction later on.

Starting on 1 January 2005, a total contribution rate of 17.60 per cent of insurable earnings should be allocated as follows between the different benefit branches and the contribution revenue should be separated amongst the four benefit branches based on the application of those contribution rates to the appropriate insured earnings.

Branch	Contribution rate		
	Lower band	Upper band	Total (%)
Unemployment benefits	-	-	1.20 *
Short-term benefits	0.65%	0.35%	1.00
Employment injury benefits	0.15%	0.05%	0.20
Long-term benefits	9.60%	5.60%	15.20
Total			17.60

* Corresponding to 7.2 per cent of total contributions paid on behalf of employed persons.

The total contribution rate for long-term benefits should increase to 15.2 per cent and that of the unemployment branch to 1.2 per cent. The increase of the contribution rate of the unemployment branch by 0.2 per cent-points is compensated in part by a reduction of the contribution rate for the other short-term benefits by 0.1 per cent points. The sharing of the additional contribution burden of 1.0 per cent of insured earnings between employees, employers and the government is largely a political decision. However, in view of the rising annual financial commitment of the government to the financing of the national pension system, the VAT allowance and the social pension, and the expected additional burden for the contribution to the new National Health Insurance, the sharing of the burden between employers and workers might be preferable from an overall fiscal point of view.

These contribution rates include implicit margins to cover the cost of administration. These contribution rates may be maintained until the next actuarial review.

4. Reform scenarios

This section presents a series of modifications to the scheme aimed at improving its financial position and ensuring its long-term sustainability. It is supposed that the reforms would be introduced on 1 January 2005. An illustration of the impact of the reform proposals on individual cases is presented in Annex 5. Detailed financial projections of revenue and expenditure of the scheme under the various reform proposals are presented in Annex 6.

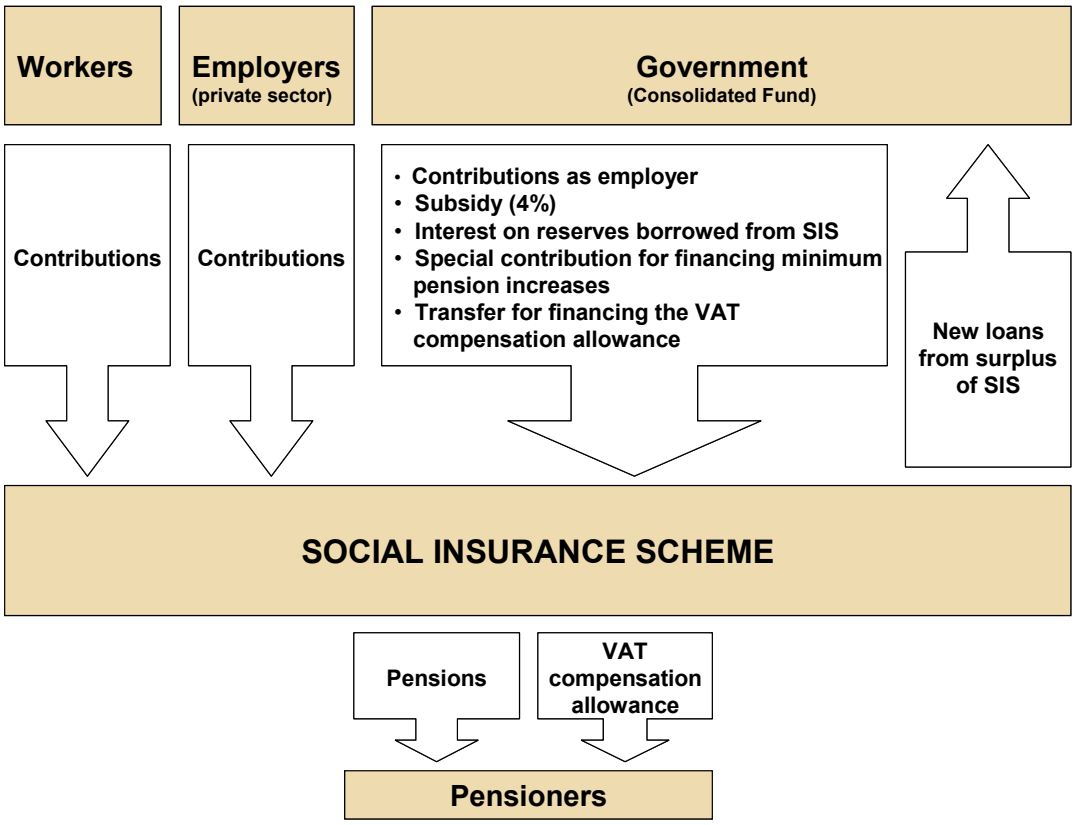
4.1. Background

4.1.1. Cash flows between the Government and the Social Insurance Scheme

For the analysis of the different reform proposals, it will be useful to remember here all transfers that take place between the Consolidated Fund and the Social Insurance Scheme. Notably, reform proposal No. 2 below would considerably modify the picture by eliminating most of these transfers and define new financial arrangements between the Government and the SIS.

Presently, the Government pays contributions as an employer, it pays to the SIS a subsidy equal to 4 per cent of insured earnings and it must pay interest on reserves invested in Treasury bills by the scheme. The Consolidated Fund also finances the increases of the minimum pension granted in 1999 and 2000 and the VAT compensation allowance (directly transferred to the pensioners). On the other hand, the Consolidated Fund benefits from new loans equal to the excess of revenue over expenditure of the SIS (the annual surplus of the scheme, or the increase of its reserves).

Figure 4.1. Cash flows between the Social Insurance Scheme and its financiers and pensioners



As shown in Section 1, the size of the negative cash flow has increased every year since 1993. Under *status quo* projections, the negative cash flows to the Government will continue to increase in the future, as shown in Table 4.1, because:

– the new loans granted to the Government (the SIS surplus) will decrease after 2005 because of the incapacity of current contributions and investment earnings to face the increasing scheme's expenditure;

– the government subsidy and the government contribution as employer are increasing at the rate of increase of the national wage,

– the interest that the Government has to pay to the scheme on its past borrowings increases continuously until the Government has repaid all borrowed funds to the SIS.

Table 4.1. Projected cash flows between the Consolidated Fund and the national pension system (including the Social Insurance Scheme) under *status quo* (in million £)

	Social Insurance Scheme									
Year	New loans granted to the government by the scheme*	General government subsidy	Contribution of the government as an employer	Interest payments on borrowed money	Cost of the increase of the min. pension	Total	VAT compensation allowance	Social pension	Total cash flow to the government	As a % of insurable earnings
2004	183	(105)	(57)	(122)	(6)	(107)	(50)	(29)	(186)	-7.1%
2005	202	(113)	(61)	(138)	(6)	(116)	(55)	(32)	(203)	-7.2%
2006	193	(120)	(65)	(133)	(7)	(131)	(58)	(35)	(225)	-7.5%
2007	178	(128)	(69)	(126)	(7)	(152)	(60)	(36)	(248)	-7.8%
2008	174	(136)	(73)	(133)	(8)	(176)	(60)	(37)	(273)	-8.1%
2009	167	(144)	(78)	(139)	(9)	(203)	(60)	(38)	(301)	-8.4%
2010	155	(153)	(83)	(145)	(10)	(236)	(58)	(38)	(332)	-8.7%
2011	139	(162)	(88)	(151)	(11)	(272)	(57)	(38)	(367)	-9.1%
2012	124	(172)	(93)	(156)	(11)	(309)	(57)	(39)	(405)	-9.4%
2013	107	(182)	(98)	(161)	(12)	(347)	(59)	(40)	(446)	-9.8%
2014	84	(193)	(104)	(165)	(13)	(391)	(60)	(42)	(493)	-10.2%
2015	57	(204)	(110)	(167)	(15)	(438)	(61)	(44)	(544)	-10.7%
2016	26	(215)	(116)	(169)	(16)	(490)	(63)	(46)	(599)	-11.1%
2017	(11)	(227)	(123)	(169)	(17)	(548)	(63)	(47)	(658)	-11.6%
2018	(62)	(240)	(130)	(168)	(19)	(619)	(62)	(47)	(728)	-12.1%
2019	(114)	(253)	(137)	(164)	(20)	(689)	(61)	(47)	(797)	-12.6%
2020	(171)	(266)	(144)	(159)	(22)	(762)	(59)	(47)	(868)	-13.0%
2030	-	(438)	(418)	-	(49)	(905)	(47)	(45)	(997)	-9.1%
2040	-	(710)	(787)	-	(92)	(1 589)	(57)	(67)	(1 713)	-9.7%
2050	-	(1 133)	(1 438)	-	(164)	(2 735)	(74)	(106)	(2 915)	-10.3%

* It is assumed that when the scheme becomes in deficit, the government must repay the borrowed capital to the scheme and when the reserve is exhausted, the contribution rate of the scheme is immediately increased to the PAYG cost rate.

4.1.2. VAT Compensation Allowance

The reform scenarios described in the following sections will consider, as was requested in the terms of reference, in addition to a revision the Social Insurance provisions, the possibility to maintain or abolish a special allowance introduced in 2002 to compensate SIS pensioners for the additional expenses that resulted from the implementation of the value-added tax.

The Ministry of Finance transfers funds every month to the SIS for the payment of the VAT compensation allowance, and the allowance is paid to pensioners by the SIS. The amount of the global monthly transfer from the Ministry of Finance to the SIS was £3.86 million in March 2004. The amount of the allowance depends on the amount of the pension received by the pensioner from the SIS, as appearing in Table 4.2.

The actuarial calculation of the overall financial burden of the government for all pensions except civil servants pensions (see table 4.1) is based on the assumption that the special allowance is frozen (in order be risk averse), i.e. paid to individuals at the given nominal rate envisaged for the respective pension bracket, without been adjusted for inflation or wages. The real purchasing power effect of the allowance thus deteriorates over time, even if the deterioration effect is slow. This gradual deterioration of the purchasing power of the

allowance is however compensated by the annual adjustment of Social Insurance pensions as explained below.

Table 4.2. VAT compensation allowance

Amount of the monthly pension (in £)	**VAT Compensation Allowance** (£ per month)
Between 0 and 148,20	54,17
Between 148,21 and 158,49	51,67
Between 158,50 and 174,31	40,00
174,32 – 500,00	38,00
Beneficiaries of the Social pension	45,00
Beneficiaries of orphan's benefit	54,17
Beneficiaries of double pensions	38,00

It is obvious that the benefit was designed without a proper analysis of its re-distributive effects. The benefit has a number of systemic problems. The aim was obviously to provide advantages for low income pensioners. The indiscriminate payment of the allowance to double pension beneficiaries however may lead to the payment of the allowance to persons with high combined pension income. People close to the income brackets in a given year, for example, receive lower amounts in the following year when they cross the upper limit of their income class.

It is strongly recommended that the allowance be interpreted as an advance for future pension adjustments which was made necessary due to the effect of the increase of the VAT and be phased out within a few years. Under both bands, the price increases triggered by the VAT increase in 2002 would be compensated automatically through the normal pension adjustment process. Continuing the payment of the allowance would lead to a double compensation for the VAT increase.

Incorporating the amount of the allowance into the pension amount would automatically lead to a continuous adjustment of pensions and thus an increase of pension costs in the order of 1.9 per cent (in 2004) to 1.7 percent (in 2050) of total insurable earnings, provided the allowance would be incorporated into the basic pension. This is counterproductive at a time when all options are explored to reduce the relative cost of the pension scheme in the short and long-run.

It is thus recommended to subtract the annual regular increase of pensions from the allowance each year until such time that the allowance has been consummated fully. In case of a minimum pensioner who receives an allowance of £54.17 per month, it would take approximately 7 years until the allowance would be fully consummated by the pension increases (assume 5 per cent per annum). In all other case, the tapering off of the allowance would be faster than 7 years. Due to inevitable equal treatment of old and new pensioners, new pensioners should receive the same residual allowance amounts as existing pensioners at equivalent pension income levels.

This procedure is recommended for adoption in case no structural reform would be adopted. Another option would be to incorporate the amount of the VAT allowance in a newly defined minimum pension (see reform proposal No.3) or a universal basic pension (see reform proposal No.2) and to phase out all allowance amounts to pensioners with higher pensions than the minimum or new universal pension through the above phasing out procedure (possible in combination with a pro-rata temporis transitional arrangements in case of reform proposal No.2).

4.1.3. Social pension

In addition to these obligations of the Government, the Consolidated Fund finances the Social pension that is paid to elderly citizens who have low income at retirement. The pension is paid under the following conditions:

– Age requirement: 65 and over (the age of eligibility was decreased from 68 to 66 in January 1999 and from 66 to 65 in January 2000).

– Residency requirement: 20 years of residence after the age of 40, or 35 years of residence after the age of 18.

– Income test: the full Social Pension is paid to persons not entitled to a pension or similar payment from any other source; the amount of the Social Pension is reduced by the amount of any other pension received.

The monthly pension amount is £142.84 in 2004. The number of beneficiaries of the Social pension is presently 15 500. The total annual expenditure supported by the Consolidated Fund is estimated at £28.8 million in 2004.

4.2. Reform package No. 1 - Parametric reforms

This scenario introduces three parametric changes to long-term benefits: an increase of the normal retirement age, a different pension indexing in the lower band and an increase of the number of years of contribution required for eligibility to the old-age pension.

4.2.1. Increase of the age of entitlement to a full old-age pension

The first proposal calls for a gradual increase of the normal retirement age. The modification would apply to both the lower and the upper band. Increasing the retirement age reduces the average duration of pension payment. An increase of the retirement age would be justified considering the projected increase of the life expectancy in Cyprus and the consequent increase of the dependency ratios presented in Section 2. A higher retirement age would also be justified in the context of a labour market characterized by nearly full employment.

The proposed option is an increase of the normal retirement age (NRA) starting in 2005. The NRA would increase by three months per year according to the following schedule.

Year	Normal retirement age
2005	63 years and 3 months
2006	63 years and 6 months
2007	63 years and 9 months
2008	64 years
2009	64 years and 3 months
2010	64 years and 6 months
2011	64 years and 9 months
2012 and after	65 years

The increase of the retirement age could alternatively proceed faster, for example by step increases every 6 months. This would halve the transition period.

Even with this proposed increase of the normal retirement age, it would be advisable to maintain the possibility for insured persons to start drawing their pension from age 63 as

presently, but at a reduced rate (for example, a 6 per cent lifetime reduction of the pension for each year of anticipation applied to both the lower and the upper band), thus adding some flexibility to the measure. This would be particularly appreciated by people who receive a pension from an occupational scheme (including government employees) that allows retirement at an earlier age. Under that measure, with a normal retirement age of 65, if a person actually retires at age 63, the pension would be reduced by 12 per cent for life and any future benefit derived from the old-age pension (e.g. a widow's pension) would be based on the reduced amount.

This increase of retirement age would benefit to future generations of contributors. It would limit future contribution rate increases and would increase the benefit/contribution ratio that these future contributors may expect from the scheme. The persons negatively affected by the measure are those presently near the retirement age who would have to wait for some additional months before drawing their pension at full rate. However, these older workers have benefited since the inception of the scheme of advantageous contribution rates well below the real long-term cost of the scheme and would nevertheless receive a very good return on their contributions, even with a delayed retirement.

4.2.2. Indexing of lower band pensions based on a price index

Presently, pensions-in-payment are adjusted periodically using a wage index in the lower band and a price index in the upper band. It is proposed to index pensions in the lower band on the basis of a price index instead of a wage index. The present earnings-related pension formula of the lower band would remain unchanged, but pensions-in-payment and the minimum pension would be indexed in the future on the basis of the increase of the Consumer Price Index.

Concerning more specifically the minimum pension, this means that the present formula under which the minimum pension is established at 85 per cent of the full basic pension would no longer apply. New pensioners at the minimum would receive the same minimum pension as the one received by previous year's pensioners, taking into account the new recommended CPI indexing mechanism. It must be noted that the indexing mechanism of pensions-in-payment in the lower band has only a limited effect if not combined with the adjustment of the minimum pension also on the basis of a price index. The reason is that a large proportion of pensioners in the lower band receive the minimum pension. Hence if the amount of the minimum pension continues to be determined in the future as a percentage of the maximum basic pension (which increases with wages), the minimum pension will gradually catch up pensions-in-payment that were initially fixed above the minimum.

4.2.3. Increase of the number of years of contribution required for eligibility to the old-age pension

Two conditions are presently required for eligibility conditions to the old-age pension:

– contributions must have been paid in at least three years and insurable earnings in the lower band should not be less than 156 times the weekly basic earnings;

– weekly average insurable earnings (paid or credited) in the lower band from 5 October 1964 (or the year of attainment of age 16) to the date of retirement, must be equal to at least ¼ of basic earnings.

Considering that the total period of contribution may actually reach 40 years (from 1964 to 2004), the second condition is equivalent to requiring ten years of insurance. Only three of those years must have been contributed, while the others may have been credited. At

maturity, the maximum required period of contribution could – without a change in the law - reach 47 years (from age 16 to age 63), and then second condition will be equivalent to requiring approximately 12 years of contribution. It is proposed, in this scenario, to increase the minimum contribution requirement to 15 years in the future, with at least 10 years of paid contributions.

4.3. Reform package No. 2 – Replacement of the lower band by a universal pension, with a modified earnings-related pension

This proposal incorporates all elements of reform proposal No. 1, replaces the lower band by a universal flat-rate pension to be paid to all people aged 65 and over and financed by the Consolidated Fund, and combines the earnings points of the lower band and the upper band to calculate an integral pension on the basis of the present formula of the upper band, but with an accrual rate of 0.8 per cent instead of 1.5 per cent.

4.3.1. Universal pension (demogrant)

Under this proposal, a universal pension (demogrant) of £2275 per annum (in 2005) will be paid to all citizens aged 65 or over. Concerning invalids and widows below the age of 65, the intention will be to preserve their present income level when considering the sum of the demogrant and the Social Insurance Scheme. Consequently, invalids and widows who meet the eligibility conditions of the Social Insurance Scheme will receive 60 per cent of the demogrant. Orphans will receive 20 per cent of the demogrant. Widows over the age of 65 will receive 100 per cent of the demogrant like all other elderly citizens.

The amount of the demogrant will be adjusted annually in line with the CPI index. The present Social pension will be abolished.

Table 4.3. Projected cost of the proposed universal pension (demogrant)

Year	Annual expenditure (in million £)	As a percentage of SIS total insurable earnings	As a percentage of GDP
2005	228	8.2	3.1
2006	239	8.1	3.0
2007	251	7.9	3.0
2008	263	7.8	2.9
2009	276	7.7	2.9
2010	289	7.6	2.9
2015	370	7.4	2.8
2020	469	7.2	2.7
2025	587	7.0	2.6
2030	723	6.8	2.5
2035	860	6.3	2.3
2040	1 006	5.8	2.1
2045	1 177	5.3	1.9
2050	1 378	4.9	1.8

* For all citizens of the country.

4.3.2. Modified SIS earnings-related pension

A new earnings-related pension will be calculated on the basis of the complete contribution record in the lower and the upper band of the present system. The accrual rate will be 0.8

per cent per annum (as compared to 1.5 per cent presently). There will be no special credits except for unemployment, sickness and maternity (as they are deemed to be honoured by the demogrant) and no minimum pension. Survivors' pensions will be granted under the same conditions as under the current upper band (i.e. 60 per cent of the new earnings-related pension of the deceased). Pensions-in-payment will be increased in the future in line with the CPI index. Retirement age will be increased to 65 within 7 years after the introduction of the new scheme.

4.3.3. Financial arrangements

The government subsidy of 4 per cent to the SIS will be abolished. The total contribution rate for financing long-term benefits of the SIS could be reduced from 14.3 per cent to 11.6 per cent (starting in 2005).

Most of the existing reserve (which is a debt of the Government) will be cancelled, except for an amount corresponding to one year of pension expenditure of the new scheme. That amount will be converted into government bonds and will function as an initial reserve for the scheme. Most of the present interest payments of the Government will also be waived and the freed resources will help to finance the demogrant in the future. The Government furthermore saves by a discontinuation of the special contribution related to the minimum pension increases and the VAT compensation allowance (after the period of transition). In effect, the government's obligations to the present social insurance scheme (i.e. the payment of the general subsidy, the payment of interests on the reserve, the special contribution for the financing of the minimum pension increases of 1999 and 2000 and the VAT compensation allowance), as well as the obligation to finance the Social pension, are consolidated into a single obligation to finance the demogrant.

4.3.4. Transitional provisions

It is suggested that the transition phase would be identical to the period envisaged under the proposal parametric reforms, i.e. the period 2005 to 2013. During this phase, the new retirement age and the new minimum insurance requirements will be introduced.

As of 1 January 2005, the Government will pay the demogrant to all existing old-age pensioners (as well as the chosen proportion of the demogrant to other types of pensioners) under the social insurance scheme, and to all people aged 65 or over who are not covered by the scheme. The scheme will continue to pay pensions-in-payment at the present level but the lower band component will be increased in line with prices.

New pensions will be calculated during the transition period on a pro-rata-temporis basis, as described in Box 4.1. This transitional calculation makes sure that everybody is entitled initially to a pension amount that reflects exactly the sum of the entitlements earned under the different legal provisions. It is assumed that this transitional calculation will be done for a period of 20 years. This probably curtails the recognition of acquired rights for some people but the losses should be marginal. This is due to the fact that, at the maximum, only the first 25 years of the career of new pensioners after 2026 would generate potential losses. Since these include the generally low-income years at the beginning of a typical career, these losses should not be important.

Box 4.1. Calculation of pensions during the transition phase

For each new entrant, the pension will be calculated considering both the old law (amount "A") and the new law (amount "B"). The amounts A and B are calculated on the basis of the two different pension formulae. The amount B would include the demogrant.

If B > A, the pension is equal to B;

If A < B, the pension is equal to: $((y_o / y_t * A) + (y_n / y_t * B)$

Where:

y_o = number of years contributed/credited under the old law,

y_n = number of years contributed/credited under the new law,

$y_t = (y_o + y_n)$ = total number of year contributed/credited during the individual's career

4.3.5. Effect on individuals

The minimum total pension income of an individual under the envisaged minimum contribution condition of 15 years and minimum earnings of one basic point would amount to £2733, composed of the demogrant of £2275 plus a Social Insurance pension of £458 (see Table A5.3 of Annex 5). Such an individual receives £2653 under the present law. People with short contribution histories in the upper band would see an increase of the pension under this proposal since the demogrant provides more than the actual lower band pension. The losers are people with substantial contributions in the upper band. For example, a person with 35 years of contribution out of which 25 years attracted 2 points in the upper band would see his/her pension reduced from £5365 to £4873 under this proposal.

4.4. Reform package No. 3 – Combination of the lower and upper bands and increase of the minimum pension

This proposal would modify the existing social insurance pension scheme without affecting the old-age provisions of the people not covered by the scheme. It would combine the earnings points of the lower band and the upper band (in a way similar to the earnings-related component of reform package No. 2) and calculate an integral pension on the basis of the present formula of the upper band, i.e. with an accrual rate of 1.5 per cent. As under the current legislation, pensions will be adjusted in the future in line with the development of the CPI index. In addition, the scheme will guarantee a minimum pension of £2600 per annum initially (in 2005). The minimum pension will be indexed alternatively with a wage or a price index (two sub-scenarios are presented to this regard). It should be noted, however, that the wage indexing of the minimum pension would lead to the anomaly that an increasing number of pensioners would be "absorbed" in the group of minimum pensioners each year. The results of proposal 3B are thus included only to comply with the terms of reference of the valuation.

The other parametric modifications of the reform package No. 1 are also incorporated (retirement age increase, indexing of the lower band with CPI and new eligibility conditions). The present total contribution rate of 14.3 per cent will be maintained initially. All other provisions of the existing social insurance pension scheme will remain in force, notably all credits as well as the dependants' allowance for dependants under age 65. The Social pension would be maintained as presently.

4.4.1. Transitional provisions

The minimum pension will be paid from 1 January 2005. Other transitional arrangements are the same as under reform package No. 1. The VAT compensation allowance would be gradually abolished. Further general transitional arrangements do not appear necessary.

The maintenance of acquired rights by civil servants deserves special attention. Public employees will continue to contribute to the scheme under the present conditions (3.2 per cent to finance the basic pension plus full contributions after 400 months). Their pensions will be calculated in the same way as for any other employees. Their civil servants' pension will be reduced by an amount D. The amount D is equal to the product of the following three elements:

– the accrual rate of 1.5 per cent;

– the total number of points earned during a maximum of 400 months of recognised service in the public service minus the number of months of service,

– the value of the monthly insurance point.

That way, civil servants should receive basically the same pension as under present law. The minimum pension will in theory also apply to civil servants, but will apply to very few cases.

4.4.2. Effect on individuals

On the whole, initial pensions should remain identical for people with longer employment histories since the transitional pro-rata-temporis calculation of a full basic pension, which was designed on the basis of a 40-year period of contribution, expires in 2004 (40 years after the introduction of the basic scheme). From then on, the pension formulae of the lower band and the upper band should become virtually identical. However, the latter is not reflected in the present formulation of the law. The law is formulated in such a way that only people with a full density of contributions can reach an accrual arte of 1.5 per cent per annum. Combining the two bands would abolish that anomaly and compensate in part for the lower annual adjustment.

Real gains will be experienced by low-income earners, or by people with relatively short insurance histories due to the generous minimum pension (see Table A5.4 of Annex 5). For example, the Social Insurance pension of a contributor with 15 years of contribution in the lower band but no contributions in the upper band would go from £1949 under the current law to £2600 under the proposal. People with at least 20 years of contribution in the upper band (at a level of two points) would receive the same pension amount as provided under the current law.

4.5. Financial implications of the reform proposals

4.5.1. Impact on the financial status of the Social Insurance Scheme

Table 20 presents the financial impact of the reform proposals by using three indicators: the last year of the period of equilibrium, the general average premium and the PAYG cost in 2050. All reform proposals would cause a decrease of the long-term costs of both the lower and the upper band. The reform options would also extend the period of equilibrium in all cases.

Reform proposal No. 1 brings important savings in the lower band (because of the new CPI indexing) but modest savings in the upper band.

Reform proposal No. 2 (demogrant and new earnings-related pension) brings the largest savings for the Social Insurance Scheme. Under the proposal, the total GAP (lower and upper band) would decrease from 22.9 per cent to 11.2 per cent. It must be remembered, however, that the cost of the demogrant, which is financed from the Consolidated Fund, does not appear as a SIS cost. Section 4.5.2 will show the global impact on government finance.

The financial impact of Reform proposal No. 3 is highly dependant on the choice of the indexing mechanism for the minimum pension. With CPI indexing, the total GAP (lower and upper band) is 16.7 per cent, while under a wage indexing of the minimum pension, the total GAP becomes 19.9 per cent.

Depending on the reform scenario retained, future contribution rates will have to be determined according to specific rules. Under reform package No. 1, the same rules as those presented in Section 3.6 could be maintained, since the structure of the scheme, with its lower and upper band, is kept unchanged. Under those rules, the contribution rates of 8.7 per cent in the lower band and 5.6 per cent in the upper band could be kept unchanged at least for the next 20 years. Under reform packages No. 2 and No. 3, a new rule will have to be determined since the lower and upper band would now be combined. For example, with a minimum reserve objective of 1.0 time the annual expenditure, reform package No. 2 would be in equilibrium at least until 2050 with a contribution rate of 11.6 per cent. With the same rule, reform package No. 3A, with a contribution rate of 14.3 per cent, would be in equilibrium until 2035 and reform package No. 3B would be in equilibrium until 2027.

Table 4.4. Financial impact of the reform proposals on the Social Insurance Scheme

	Last year of the period of equilibrium	General average premium (over the next 50 years)	PAYG cost in 2050
Status quo			
Lower band	2011	14.4 %	19.7 %
Upper band	2020	8.5 %	14.4 %
Total		22.9 %	34.1 %
Reform package No. 1			
Lower band	After 2050	8.7 %	10.7 %
Upper band	2023	7.5 %	13.2 %
Total		16.2 %	23.9 %
Reform package No. 2			
Lower and upper band combined	After 2050*	11.2 %	13.4 %
Reform package No. 3A (with CPI indexing of the new minimum pension)			
Lower and upper band combined	2035*	16.7 %	24.0 %
Reform package No. 3B (with wage indexing of the new minimum pension)			
Lower and upper band combined	2027*	19.9 %	28.7 %

* Under those scenarios, the period of equilibrium is defined as the last year for which the reserve ratio is higher than 1.0.

4.5.2. *Impact on government finance*

Reform proposal No. 1 reduces the size of the negative cash flow of the Government to more acceptable levels (around 5 per cent of total insured earnings) as seen in Tables 4.5.

Under reform proposal No. 2, most financial obligations of the Government towards the Social Insurance Scheme (the payment of the general subsidy, the payment of interests on the reserve, the special contribution for the financing of the minimum pension increases of 1999 and 2000 and the VAT compensation allowance) are consolidated into a single obligation to finance the demogrant. Reform proposal No. 2 starts with a higher negative cash flow for the Government around 11 per cent of insured earnings. However the negative cash flow is stabilized and will continue to decrease thereafter because of the CPI indexing of the demogrant. Reform proposal No. 3A improves the situation compared to the *status quo* by linking the future increases of the minimum pension to the CPI index. Reform proposal No. 3B also improves the situation, but to a lesser extent, because of the indexing of the minimum pension on the basis of the wage index.

Table 4.5. Reform proposal No. 1 - Projected cash flow from the Consolidated Fund to the pension system (in million £)

	Social Insurance Scheme							
Year	New loans granted to the government by the scheme*	General government subsidy	Contribution of the government as an employer	Interest payments on borrowed money	VAT compensation allowance	**Social pension**	**Cash flow to the government**	**As a % of insurable earnings**
2005	213	(113)	(61)	(138)	(55)	(32)	(186)	-6.6%
2006	224	(120)	(65)	(134)	(46)	(35)	(176)	-5.9%
2007	232	(128)	(69)	(128)	(38)	(36)	(168)	-5.3%
2008	241	(136)	(73)	(137)	(30)	(37)	(173)	-5.1%
2009	248	(144)	(78)	(147)	(22)	(38)	(181)	-5.0%
2010	270	(153)	(83)	(157)	(14)	(38)	(174)	-4.5%
2011	292	(162)	(88)	(168)	(5)	(38)	(169)	-4.2%
2012	297	(172)	(93)	(180)	-	(39)	(187)	-4.3%
2013	300	(182)	(98)	(192)	-	(40)	(213)	-4.7%
2014	303	(193)	(104)	(203)	-	(42)	(239)	-5.0%
2015	305	(204)	(110)	(215)	-	(44)	(268)	-5.3%
2016	303	(215)	(116)	(227)	-	(46)	(302)	-5.6%
2017	300	(227)	(123)	(239)	-	(47)	(337)	-5.9%
2018	280	(240)	(130)	(250)	-	(47)	(388)	-6.5%
2019	270	(253)	(137)	(261)	-	(47)	(428)	-6.8%
2020	257	(266)	(144)	(271)	-	(47)	(472)	-7.1%
2030	(184)	(438)	(237)	(306)	-	(45)	(1 209)	-11.0%
2040	(1 101)	(710)	(384)	(77)	-	(67)	(2 339)	-13.2%
2050	-	(1 133)	(1 022)	-	-	(106)	(2 261)	-8.0%

* It is assumed that when the scheme becomes in deficit, the government must repay the borrowed capital to the scheme and when the reserve is exhausted, the contribution rate of the scheme is immediately increased to the PAYG cost rate.

Table 4.6. Reform proposal No. 2 - Projected cash flow from the Consolidated Fund to the pension system (in million £)

	Social Insurance Scheme				
Year	Contribution of the government as an employer	Demogrant's annual expenditure	VAT compensation allowance	**Cash flow to the government**	**As a % of insurable earnings**
2005	(50)	(228)	(55)	(332)	-11.8%
2006	(53)	(239)	(46)	(339)	-11.3%
2007	(56)	(251)	(38)	(346)	-10.8%
2008	(60)	(263)	(30)	(353)	-10.4%
2009	(63)	(276)	(22)	(361)	-10.0%
2010	(67)	(289)	(14)	(370)	-9.7%
2011	(71)	(303)	(5)	(379)	-9.4%
2012	(75)	(318)	-	(393)	-9.2%
2013	(80)	(334)	-	(414)	-9.1%
2014	(84)	(352)	-	(436)	-9.1%
2015	(89)	(370)	-	(460)	-9.0%
2016	(94)	(390)	-	(484)	-9.0%
2017	(100)	(409)	-	(509)	-8.9%
2018	(105)	(429)	-	(534)	-8.9%
2019	(111)	(449)	-	(560)	-8.9%
2020	(117)	(469)	-	(586)	-8.8%
2030	(192)	(723)	-	(915)	-8.4%
2040	(311)	(1 006)	-	(1 317)	-7.4%
2050	(497)	(1 378)	-	(1 875)	-6.6%

Table 4.7. Reform proposal No. 3A - Projected cash flow from the Consolidated Fund to the pension system (in million £)

	Social Insurance Scheme							
Year	New loans granted to the government by the scheme*	General government subsidy	Contribution of the government as an employer	Interest payments on borrowed money	VAT compensation allowance	**Social pension**	**Cash flow to the government**	**As a % of insurable earnings**
2005	199	(113)	(61)	(137)	(55)	(32)	(199)	-7.1%
2006	208	(120)	(65)	(133)	(46)	(35)	(192)	-6.4%
2007	212	(128)	(69)	(127)	(38)	(36)	(187)	-5.8%
2008	215	(136)	(73)	(135)	(30)	(37)	(196)	-5.8%
2009	217	(144)	(78)	(143)	(22)	(38)	(208)	-5.8%
2010	234	(153)	(83)	(152)	(14)	(38)	(205)	-5.4%
2011	250	(162)	(88)	(162)	(5)	(38)	(204)	-5.1%
2012	247	(172)	(93)	(172)	-	(39)	(228)	-5.3%
2013	242	(182)	(98)	(181)	-	(40)	(260)	-5.7%
2014	240	(193)	(104)	(191)	-	(42)	(290)	-6.0%
2015	237	(204)	(110)	(200)	-	(44)	(321)	-6.3%
2016	230	(215)	(116)	(209)	-	(46)	(356)	-6.6%
2017	223	(227)	(123)	(218)	-	(47)	(392)	-6.9%
2018	198	(240)	(130)	(226)	-	(47)	(445)	-7.4%
2019	184	(253)	(137)	(234)	-	(47)	(487)	-7.7%
2020	165	(266)	(144)	(241)	-	(47)	(533)	-8.0%
2030	(326)	(438)	(237)	(229)	-	(45)	(1 274)	-11.6%
2040	-	(710)	(570)	-	-	(67)	(1 347)	-7.6%
2050	-	(1 133)	(1 027)	-	-	(106)	(2 266)	-8.0%

* It is assumed that when the scheme becomes in deficit, the government must repay the borrowed capital to the scheme and when the reserve is exhausted, the contribution rate of the scheme is immediately increased to the PAYG cost rate.

Table 4.8. Reform proposal No. 3B - Projected cash flow from the Consolidated Fund to the pension system (in million £)

	Social Insurance Scheme							
Year	New loans granted to the government by the scheme*	General government subsidy	Contribution of the government as an employer	Interest payments on borrowed money	VAT compensation allowance	**Social pension**	**Cash flow to the government**	**As a % of insurable earnings**
2005	199	(113)	(61)	(137)	(55)	(32)	(199)	-7.1%
2006	202	(120)	(65)	(133)	(46)	(35)	(197)	-6.6%
2007	200	(128)	(69)	(126)	(38)	(36)	(198)	-6.2%
2008	196	(136)	(73)	(134)	(30)	(37)	(214)	-6.3%
2009	190	(144)	(78)	(142)	(22)	(38)	(234)	-6.5%
2010	199	(153)	(83)	(149)	(14)	(38)	(237)	-6.2%
2011	206	(162)	(88)	(157)	(5)	(38)	(244)	-6.0%
2012	191	(172)	(93)	(165)	-	(39)	(277)	-6.5%
2013	173	(182)	(98)	(172)	-	(40)	(320)	-7.0%
2014	157	(193)	(104)	(179)	-	(42)	(361)	-7.5%
2015	139	(204)	(110)	(184)	-	(44)	(403)	-7.9%
2016	114	(215)	(116)	(189)	-	(46)	(452)	-8.4%
2017	88	(227)	(123)	(193)	-	(47)	(503)	-8.8%
2018	42	(240)	(130)	(196)	-	(47)	(571)	-9.5%
2019	4	(253)	(137)	(197)	-	(47)	(629)	-10.0%
2020	(40)	(266)	(144)	(196)	-	(47)	(694)	-10.4%
2030	(924)	(438)	(237)	(35)	-	(45)	(1 679)	-15.3%
2040	-	(710)	(686)	-	-	(67)	(1 463)	-8.2%
2050	-	(1 133)	(1 233)	-	-	(106)	(2 472)	-8.7%

* It is assumed that when the scheme becomes in deficit, the government must repay the borrowed capital to the scheme and when the reserve is exhausted, the contribution rate of the scheme is immediately increased to the PAYG cost rate.

Figure 4.2. Projected total pension expenditure under the various reform proposals (in percentage of GDP)

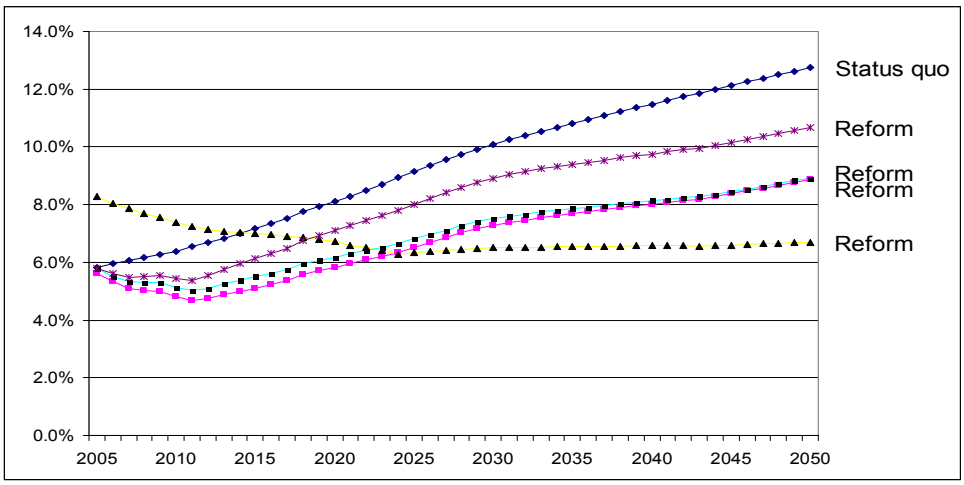
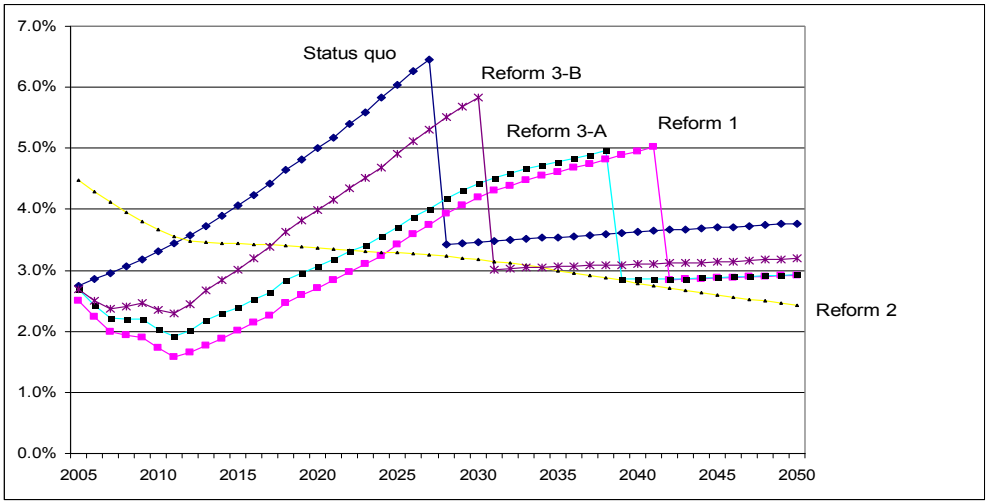


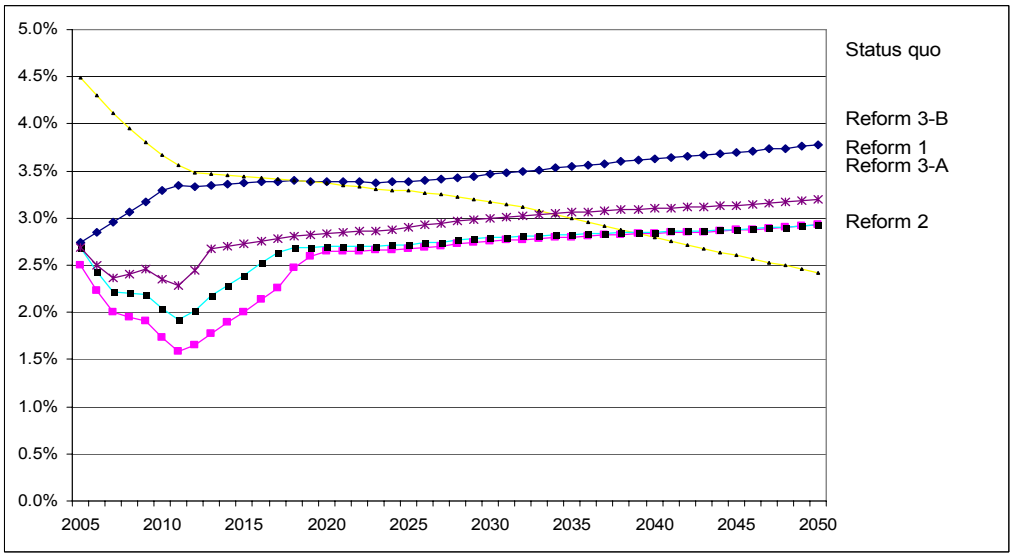
Figure 4.3. Projected cash flow from the Consolidated Fund to the pension system under the various reform proposals (in percentage of GDP)



In Figure 4.3, the projected cost for the government decreases abruptly under *status quo* and reform proposals No.1 and No.3 when the government has completely reimbursed its debt to the Social Insurance Scheme and the contribution rate of the SIS is then immediately increased to the PAYG. No more interest payments or capital reimbursement is due thereafter from the government, its obligations being limited to the general 4 per cent subsidy and its contributions as employer.

Figure 4.4 represents a situation where the contribution rate of the SIS is increased to the PAYG rate at an earlier stage, i.e. when the PAYG rate becomes higher than the present contribution rate of the scheme. The government thus has no further obligation to reimburse the capital borrowed from the scheme. The reserve, which is frozen at the date of the contribution rate shift, continues however to generate investment earnings and there is no sudden downwards shift of the government commitment to the scheme as in figure 4.3.

Figure 4.4. Projected cash flow from the Consolidated Fund to the pension system under the various reform proposals – alternative long-term financing approach (in percentage of GDP)



5. Conclusion

The financial status of the Cyprus Social Insurance Scheme requires short-term action. The report proposes three reform packages aimed at restoring the financial status of the scheme and at improving the budgetary situation of the Government.

Reform package No. 1 appears as a minimal approach that does not change drastically the present structure of the Social Insurance Scheme. It reduces the global cost of the scheme by paying pensions from a later age and by reducing the indexing of the lower band. Reform package No. 2 introduces a new concept of universal pension. It addresses the pension needs of workers and non-workers, increases the financial burden of the Government in the short-term, but reduces the long-term pressure on the Consolidated Fund. Reform package No. 3 guarantees a higher minimum pension to those who have sufficiently contributed to the Social Insurance Scheme, while reducing the global cost of the scheme and consolidating the structure of the scheme. It permits a return to a systematic relationship between minimum pensions and regular pensions. The model calculations show that all reform options (except possible option 3A) lead to substantial reduction of the overall cost of the scheme. The major contributor to the economies is the reduction of the adjustment from wage to inflation indexing.

These reform proposals should be discussed among the various stakeholders (government, workers' organisations and employers' organisations) in order to reach an agreement on the design of the pension system, a cost that would be affordable to all parties involved, and a sustainable financial burden for the Government.

In any case the government should proceed as suggested in previous actuarial reports to introduce:

a) an explicit allocation of contribution rates to the different benefits, and

b) an explicit rule about the actuarial equilibrium of the scheme.

The latter two measures are a *sine qua non* condition for the sound financial governance of the scheme.

Annex 1. Overview of the legal provisions of the Cyprus Social Insurance Scheme

A1.1. Historical context

The first Social Insurance Scheme in Cyprus was introduced in January 1957. It covered compulsorily the employed persons, with the exception of certain agricultural workers. The self-employed persons and employed workers excepted from compulsory insurance were given the right to be insured voluntarily. The benefits of the 1957 scheme were: marriage grant, maternity grant, funeral grant, sickness benefits, unemployment benefits, old-age pension, widow's pension and orphan's benefits.

In October 1964, compulsory insurance was extended to every person gainfully employed in Cyprus, including the self-employed, and the material scope was expanded to include the maternity allowance and employment injury benefits.

In January 1973, invalidity pension was introduced for persons permanently incapable of work. Sickness benefits were extended to self-employed persons and married women, and unemployment benefits were extended to married women.

The invasion of Cyprus by Turkey in July 1974 made necessary certain restrictive measures for safeguarding the scheme against the risk of bankruptcy. Such measures included the reduction of pension rates and the suspension of the rights to unemployment and certain other benefits. The July 1974 levels were restored in 1977. Thereafter, the rates of benefit were increased from time to time since 1978 and a new benefit was introduced, the missing person's allowance, for families of persons missing as a result of the Turkish invasion.

A supplementary scheme (the upper band) was introduced on 6 October 1980. This new scheme is earnings-related.

A1.2. Coverage

The scheme covers compulsorily every person gainfully occupied in Cyprus, either employed or self-employed. Employed persons are entitled to all benefits. Self-employed persons are not entitled to unemployment benefit and employment injury benefits.

Voluntary contributors working abroad for Cypriot employers are not entitled to employment injury benefits. Other voluntary contributors are entitled only to marriage grant, maternity grant, funeral grant, old-age pension and survivors' benefits.

A1.2.1. Voluntary insurance

Voluntary insurance is allowed to persons who wish to continue insurance after a prescribed period of compulsory insurance or to persons who work abroad in the service of Cypriot employers.

The conditions for continuation of insurance on a voluntary basis are that the person concerned:

– if ordinarily resident in Cyprus [1], has paid contributions to the basic part of the scheme on earnings which are not less than 52 times the basic insurable earnings; or

– if not ordinarily resident in Cyprus, has paid contributions to the basic part of the scheme on earnings which are not less than 156 times the basic insurable earnings.

Persons working abroad in the service of Cypriot employers are allowed to be insured without any condition as to previous insurance. The application for voluntary insurance must be submitted within 12 months from the end of the contribution year for which voluntary contributions are to be paid.

A1.3. Contributions

A1.3.1. Age conditions

Liability for the payment of contributions starts at 16 and ceases at the pensionable age. However, an insured person who attains the pensionable age and does not satisfy the contribution conditions for old-age pension must continue to pay contributions until satisfaction of the contribution conditions. In no case can contributions be paid after the age of 68.

A1.3.2. Insurable earnings

Insurable earnings are the gross earnings up to a maximum of six times the basic insurable earnings. In 2003, basic insurable earnings are fixed at £70.83 per week (or £3 683 per year). The maximum insurable earnings for 2003 are £22 100.

The total annual insurable earnings of every insured person are divided into two bands: the "lower band" includes insurable earnings up to the basic insurable earnings, and the "upper band" includes earnings above the basic insurable earnings. Insured persons are credited each year with "insurance points". One insurance point is credited for each multiple of the yearly amount of basic earnings of the following year (in 2003, one point is credited for every £3 820 of earnings) [2]. The first insurance point is assigned to the lower band and insurance points in excess of one are assigned to the upper band.

For self-employed persons, insurable earnings are fixed by regulations according to occupational category. For each category of self-employed persons, a compulsory minimum insurable income is prescribed, but the individual self-employed person has the right to opt for a higher income up to the maximum insurable earnings.

[1] From 1 May 2004, the condition of residence is removed.

[2] The conversion of earnings into insurance points is done by dividing the earnings of a given year by the basic insurable earnings of the following year. Accordingly, the maximum number of points that can be credited in the upper band for a year is normally around 4.7 instead of 5.0.

A1.3.3. Contribution rates

Employed persons	12.6 per cent of insurable earnings, shared equally between the employer and the employee
Self-employed persons	11.6 per cent of insurable income
Voluntary contributors working abroad for a Cypriot employer	12.6 per cent of either the basic insurable earnings or their normal earnings, as agreed in the contract of employment
Other voluntary contributors	10.0 per cent of an amount of earnings they fix, not exceeding insurable earnings in the last year (or last 3 years if higher)
National guard	Flat rate per week
State contribution	4.0 per cent of the insurable earnings of employed persons, self-employed and voluntary contributors working abroad, and 3.5 per cent of insurable earnings of other voluntary contributors

In case of delay in the payment of contributions by an employer or a self-employed person, there is an automatic payment of a charge calculated as a percentage of the contribution due and rising progressively with the time of delay.

A1.3.4. Financial provisions

The Social Insurance Fund maintains three separate accounts: The General Benefit Account, the Supplementary Benefit Account and the Unemployment Benefit Account. The Unemployment Benefit Account is credited with 6 per cent of the amount of contributions payable in respect of employed persons, and is charged with the payment of unemployment benefit and the related administration expenses. After calculations are made for the Unemployment Account,

– the General Benefit Account is credited with 9.5/15.5 of the total remaining contributions and charged with the payment of all basic periodical benefits, grants and with the administration expenses of the whole scheme (except unemployment benefits), and

– the Supplementary Benefit Account is credited with 6/15.5 of the total remaining contributions and is charged with all payments of the supplementary earnings related benefits (except unemployment benefits).

A1.3.5. Crediting of contributions

Normal credits

Contributions are credited to an insured person for:

– any period of full time education or approved training after the age of 16;

– any period of service in the National guard;

– the period preceding the day the person first becomes insured up to the first day of the preceding contribution year;

– any period of unemployment for which unemployment benefit is paid and, in addition, any period of unemployment (up to 26 weeks) for which no entitlement to benefit exists;

– any period of incapacity for work due to sickness, injury, maternity or invalidity for which benefit is payable. For employed persons, a period of incapacity without benefit entitlement gives right to credits up to 26 weeks. For self-employed persons, such period gives right to credits if it is preceded by a period for which benefit was payable.

Credits to insured women for childhood

Credits up to 156 weeks are granted to women entitled to pension after 31 December 1992, in respect of each child, for the period preceding the 12th birthday of the child.

Special credits

Every insured person who was over the age of 50 and under the age of 63 on 6 October 1980 is credited with insurable earnings for every weekly contribution paid or credited under the repealed flat-rate scheme between his 50th birthday and 6 October 1980. The amount of earnings credited for each week is equal to the average weekly amount of insurable earnings of the person in the upper band during the period from 6 October 1980 to his 65th birthday, but the amount credited cannot exceed two times the basic insurable earnings.

In case of invalidity or death of an insured person under the age of 63, the time between the date of invalidation (or death) and the age of 63 is deemed to be a period of insurance. The earnings to be credited for that period are based on the average insurable earnings in the upper band for the period most favourable between (1) the last five years, (2) the period from October 1980 up to the relevant date, or (3) the period from age 16 up to the relevant date.

The condition for the award of special credits is that the person qualifies for the basic pension.

Value of credits

Credits awarded for periods of unemployment or incapacity for work due to maternity, sickness, injury or invalidity have the value of the earnings on which the benefit payable has been assessed. Other credits have the value of the basic insurable earnings.

Contributions under the repealed scheme

Contributions paid or credited before 6 October 1980 are converted into insurance points. Each weekly contribution paid or credited has a value of 1.04 times the basic insurable earnings, provided that the total value of such contributions in a given year does not exceed the equivalent of one insurance point.

A1.4. Benefits

A1.4.1. Benefit structure

The basic benefit is related to insurable earnings in the lower band. It includes increases for dependants. The supplementary benefit is related to insurable earnings in the upper band. No increases for dependants are payable on the supplementary benefit.

The lower band provides for the payment of a minimum pension equal to a percentage of the full basic pension. This percentage was 65 per cent before 1999. It has been increased to 75 per cent of the full basic pension in 1999 and to 85 per cent in 2000. The minimum pension is £148.18 per month (paid for 13 month) in 2003 for a person with no dependants.

These increases of the minimum pension (adopted in 1999 and 2000) are financed directly from the Consolidated Fund. Every year, funds are transferred from the Consolidated Fund to the Social Insurance Scheme for the financing of these increases.

A1.4.2. Marriage grant

The contribution conditions are that the husband or the wife:

– has been insured for 26 weeks and has paid contributions on insurable earnings not lower than 26 times the weekly amount of basic insurable earnings; and

– has paid or been credited, in the previous year, with contributions on insurable earnings not lower than 20 times the weekly amount of basic insurable earnings

The amount of the marriage grant is £292 in 2003. It is divided between both spouses.

A1.4.3. Maternity grant

The contribution conditions for the maternity grant are the same as for the marriage grant (by either the woman or her husband). The amount of the maternity grant is £215 in 2003.

A1.4.4. Funeral grant

Persons eligible to the funeral grant are:

1. persons in receipt of old-age, invalidity, widow's pension, death benefit or missing person's allowance;

2. orphans receiving the orphan's benefit;

3. persons whose death is caused by work injury;

4. persons who satisfies the contribution conditions for the marriage grant;

5. dependants of persons specified in (1) and (4) above.

In 2003, the amount of the funeral grant is £292 for cases (1) to (4) above and £146 for dependants.

A1.4.5. Maternity allowance

The contribution conditions are that a person:

– has been insured for 26 weeks and has paid contributions on insurable earnings not lower than 26 times the weekly amount of basic insurable earnings; and

– has paid or been credited, in the previous year, with contributions on insurable earnings not lower than 20 times the weekly amount of basic insurable earnings.

The amount of the maternity allowance is 75 per cent of the earnings on which contributions were paid or credited in the previous year. The benefit is not payable in the case of a woman who receives full wages during the maternity allowance period. If reduced wages are paid, the amount of such wages and the benefit payable cannot exceed full wages.

The allowance is payable for a period of 16 weeks beginning between the 2nd and the 6th week preceding the expected week of confinement.

A1.4.6. Sickness benefit

Sickness benefit is payable between the ages of 16 and 63 to insured persons incapable of work. Persons who do not satisfy the contribution conditions for old-age pension at 63 are allowed to draw benefit up to the date on which they satisfy the relevant contribution conditions but in no case after the age of 65.

The contribution conditions are that a person:

– has been insured for 26 weeks and has paid contributions on insurable earnings not lower than 26 times the weekly amount of basic insurable earnings; and

– has paid or been credited, in the previous year, with contributions on insurable earnings not lower than 20 times the weekly amount of basic insurable earnings.

In order to re-qualify for benefit, the person must have paid contributions on earnings not lower than 26 times the weekly basic insurable earnings after the beginning of the period for which the right has been exhausted, and in addition a period of 13 weeks must have elapsed since the date of exhaustion.

The amount of the sickness benefit is:

– per cent of insurable earnings up to the basic earnings, increased by 1/3 for the first dependant and 1/6 for each of the second and third dependants, plus

– per cent of insurable earnings in excess of the basic earnings up to a maximum of two times the basic earnings.

The benefit is not payable in the case the person receives full wages. If reduced wages are paid, the amount of such wages and the benefit payable cannot exceed full wages.

The waiting period before the commencement of the benefit is 3 days for employed persons and 18 days for self-employed persons. The benefit is payable for a maximum duration of one year in each period of interruption of employment.

A1.4.7. Unemployment benefit

Unemployment benefit is payable between the ages of 16 and 63. Persons who do not satisfy the contribution conditions for old-age pension at 63 are allowed to draw benefit up to the date on which they satisfy the relevant contribution conditions but in no case after the age of 65.

The contribution conditions are that a person:

– has been insured for 26 weeks and has paid contributions on insurable earnings not lower than 26 times the weekly amount of basic insurable earnings; and

– has paid or been credited, in the previous year, with contributions on insurable earnings not lower than 20 times the weekly amount of basic insurable earnings.

Exceptionally, persons over the age of 60 who do not receive any pension under any occupational scheme or a lump sum from a Provident Fund, re-qualify for unemployment benefit under the same conditions as for sickness benefit.

The amount of the unemployment benefit is the same as the sickness benefit. The benefit is payable for a maximum of 156 days.

A1.4.8. Invalidity pension

An invalidity pension is payable to a person who has been incapable of work for at least 156 days and who is expected to remain permanently incapable for work, i.e. unable to earn from work more the 1/3 of the sum usually earned by a healthy person of the same occupation or category and education in the same area or, in the case of persons between the ages of 60 and 63, more than ½ of the aforesaid sum.

Contribution conditions are:

– contributions paid in at least three years and insurable earnings in the lower band are not less than 156 times the weekly basic earnings;

– contributions paid or credited, in the last year, corresponding to insurable earnings not lower than 20 times the weekly basic earnings. This condition is also satisfied if the average of the last two years is not lower than 20 times the basic earnings;

– weekly average insurable earnings (paid or credited) in the lower band from 5 October 1964 (or the year of attainment of age 16) to the week of invalidation, equal to at least ¼ of basic earnings.

In the case of invalidity caused by any accident, contribution conditions are those of the sickness benefit.

The amount of the pension is equal to the old-age pension. When the loss of earnings is partial, the following percentages are payable:

Loss of earning capacity	Percentage of the full pension
50 % to 66 2/3 %	60 %
66 2/3 % to 75 %	75 %
75 % to 99 %	85 %

A1.4.9. Old-age pension

As a general rule, the old-age pension is payable at the age of 65 for men and women. But it may be payable at an earlier age on certain conditions:

– at age 63 for women born before 1 January 1935;

– at age 63 if the person satisfies the contribution conditions and has weekly average insurable earnings at least equal to 70 per cent of the weekly amount of basic earnings,

– miners are entitled to the old-age pension one month earlier than the normal pensionable age for every 5 months of work in a mine, but in no case before the age of 58.

Contribution conditions are the same as conditions (1) and (3) under the invalidity pension. A person in receipt of the invalidity pension immediately before reaching the age of 63 is eligible to the old-age pension. Also eligible to the old-age pension is the person between the ages of 63 and 65 who would be entitled to the invalidity pension if under the age of 63. Eligibility to the old-age pension is not conditional on retirement from regular employment.

The amount of the weekly pension is composed of:

– Basic pension: 60 per cent multiplied by the number of insurance points in the lower band, multiplied by the amount of the basic insurable earnings at the time the payment starts, divided by the number of weeks since 5 October 1964; this amount is increased by 1/3 for the first dependant and by 1/6 for each of the second and third dependants [3], plus

– Supplementary pension: 1.5 per cent multiplied by the number of insurance points in the upper band, multiplied by the amount of the basic insurable earnings at the time the payment starts, divided by 52.

A person who at pensionable age satisfies condition (i) of invalidity pension but not condition (iii) of the invalidity pension is entitled to a lump sum at age 68 equal to 15 per cent of the total amount of his insurable earnings (paid and credited).

A person may ask for postponement of the payment of the pension until the age of 68. In this case, the amount of the pension is increased by 0.5 per cent for each month of postponement.

An old-age pensioner who has paid contributions on insurable earnings between the date of entitlement to the pension and the age of 65 is entitled to a weekly increase of the pension equal to 1/52 of 1.5 per cent of these insurable earnings.

A widow is entitled to make use of her husband's insurance record for the period before his death, if this is more favourable.

A1.4.10. Widow's pension

The widow's pension is payable to the widow (or widower under certain conditions of dependence) of a person who satisfied the contribution conditions for the old-age pension or was in receipt of old-age pension. In the case of death caused by any accident, there is entitlement to the widow's pension if the contribution conditions for the funeral grant are satisfied.

The basic pension is assessed in the same way as the basic old-age pension.

The supplementary pension is equal to:

– if the husband was not in receipt of an old-age pension, 60 per cent of the supplementary invalidity pension to which the deceased would have been entitled on his death;

[3] Before October 2001, the supplement for dependants (for spouse and children) is paid only to male pensioners. From October 2001, female pensioners will be eligible to the supplement, but only on behalf of the children (1/6th for each child).

– if the husband was in receipt of an old-age pension, 60 per cent of the supplementary old-age pension which was payable.

A lump sum is payable to a widow whose husband satisfies the first but not the third contribution condition of the invalidity pension. This lump sum is equal to 15 per cent of the total amount of his insurable earnings in the lower band plus 9 per cent of his total amount of insurable earnings in the upper band.

In case of remarriage, the widow is entitled to a gratuity equal to one year's pension, excluding any increases for dependants.

Following a recent decision of the court, new cases since 1999 are entitled to receive the total of the two pensions without limits. For old cases, double pensions are payable from 2001 onwards.

A1.4.11. Orphan's benefit

The orphan's benefit is payable for a minor:

1. whose both parents are dead or whose parents were separated and the one under whose care he was is dead; and one of the parents was an insured person; or

2. whose one of the parents died and the surviving parent is not entitled to widow's pension; and the deceased parent fulfils the contribution conditions for widow's pension; or

3. whose widowed mother, who was in receipt of widow's pension, remarried.

The amount of the benefit for case (1) is composed of:

– Basic benefit: 40 per cent of basic earnings;

– Supplementary benefit: 50 per cent of the widow's pension which was or would have been payable (calculated for a maximum of two orphans).

The amount of the benefit for cases (2) and (3) is equal to 20 per cent of the basic earnings for one orphan, 30 per cent for two orphans and 40 per cent for three or more orphans.

The orphan's benefit is payable until the orphan attains age 15, or age 23 for a female in full-time education and 25 for male in full time education or in military service. There is no age limit for orphans permanently incapable of self-support. A gratuity of one year's benefit is payable, in case (1), on termination of his entitlement other than by death before the age of 17.

A1.4.12. Missing person's allowance

The amount of benefit is the same as the basic widow's pension or the basic orphan's benefit as the case may be.

A1.4.13. Employment injury benefits

Temporary incapacity (injury benefit)

The injury benefit is payable to an employed person incapable of work as a result of an industrial accident or occupational disease. The benefit is payable for a maximum of 12

months. The amount of the benefit is the same as the sickness benefit, except that the minimum benefit for persons with earnings below the basic earnings is the benefit corresponding to such earnings.

Disablement benefit

The disablement benefit is payable to an employed person who, as a result of a work injury, suffers a loss of physical or mental faculty of a degree of not less than 10 per cent, with the exception of disablement due to pneumoconiosis which is compensated from 1 per cent.

The amount of the benefit is:

- for an incapacity between 10 per cent and 19 per cent, a disablement grant is paid, equal to £1547 (in 2003) for 10 per cent disablement, increasing proportionately to £2939 (in 2003) for 19 per cent disablement;

- for an incapacity of 20 per cent and above, a disablement pension is payable. For a 100 per cent incapacity, the pension consists of:

  - basic pension: 60 per cent of the weekly basic insurable earnings, increased by 1/3 for the first dependant and 1/6 for each of the second and third dependants;

  - supplementary pension: 60 per cent of the weekly average insurable earnings above the basic earnings, in the period beginning with the first day of the second year before the year in which the accident occurred and ending with the day of accident.

For a degree of disablement below 100 per cent, the pension is proportional to the actual degree.

A constant attendance allowance of £23.11 per week (in 2003) is payable for disablement *pensioners needing constant care*.

Death benefits

The widow's pension is composed of:

- Basic pension: Same as basic disablement pension for 100 per cent disablement.

- Supplementary pension: 60 per cent of the supplementary disablement pension the deceased was entitled to, for a 100 per cent disablement.

The pension ceases on remarriage with the payment of a lump sum equal to one year's pension excluding increases for dependants.

The orphan's benefit is composed of:

- Basic benefit: Same as for the ordinary orphan's benefit.

- Supplementary benefit: 50 per cent of the supplementary death benefit, for a maximum of two orphans.

Parent's allowance

A parent's allowance is payable when the deceased is not survived by a spouse or by orphans. The allowance is composed of:

– Basic allowance: 40 per cent of basic earnings per parent

– Supplementary allowance: 30 per cent of the supplementary disablement pension payable for a 10 per cent disablement.

A1.5. General provisions

A1.5.1. Revision of insurable earnings

The amount of the basic insurable earnings as well as the ceiling on such earnings is adjusted to the movement of the general level of insurable earnings every year. The adjustment is mandatory if the level of this increase is 5 per cent or more. The adjustment also applies to past insurable earnings, which are thus re-valued to the prevailing level of earnings.

A1.5.2. Revision of benefit rates after award

The rates of basic pensions are reviewed at the beginning of each year in accordance with the percentage of revision of the basic insurable earnings. The rates of the supplementary pensions are reviewed in accordance with the increase in the cost of living.

Furthermore, the rates of pensions are increased every July in accordance with the increase in the cost of living, if the increase is higher than 1 per cent. This July increase is taken into account when determining the increase of the rates of pension at the beginning of the following year.

A1.5.3. Beneficiaries under the repealed scheme

Beneficiaries in respect of pension payable before the introduction of the new scheme are receiving benefits corresponding to the basic benefits under the new scheme.

Annex 2. Methodology of the actuarial valuation

This actuarial review makes use of the new comprehensive methodology developed at the Financial and Actuarial Service of the ILO (ILO-FACTS) for reviewing the long-term actuarial and financial status of national pension schemes. The review has been undertaken by modifying the generic version of the ILO modelling tools in order to fit the situation of Cyprus and of the Social Insurance Scheme in particular. These modelling tools include a population model, an economic model, a labour force model, a wage model, a long-term benefits model and a short-term benefits model.

The actuarial valuation starts with a projection of the future demographic and economic environment of Cyprus. Next, projection factors specifically related to the Social Insurance Scheme are determined and used in combination with the demographic/economic framework.

A2.1. Modelling the demographic and economic developments

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

The selection of projection assumptions takes into account the recent experience of Cyprus to the extent this information was available. The assumptions are selected to reflect long-term trends rather than giving undue weight to recent experience.

A2.1.1. General population

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

A2.1.2. Economic growth

Real rates of economic growth, labour productivity increases and inflation rates are exogenous inputs to the economic model.

A2.1.3. Labour force, employment and insured population

The projection of the labour force, i.e. the number of persons available for work, is obtained by applying assumed labour force participation rates to the projected number of persons in the general population. Aggregate employment is projected by dividing the real GDP (total output) by the average labour productivity (output per worker). Unemployment is then measured as the difference between the projected labour force and the total employment.

The model assumes movement of participants between the groups of active and inactive insured persons.

A2.1.4. Wages

Based on an allocation of total GDP to capital income and to labour income, a starting average wage is calculated by dividing the wage share of GDP by the total number of employed persons.

In the medium term, real wage development is checked against the labour productivity growth. In specific labour market situations, wages might grow at a pace faster or slower than productivity. However, due to the long-term perspective of the present study, the real wage increase is assumed equal to the increase in real labour productivity. It is expected that wages will adjust to efficiency levels over time. Wage growth is also influenced by an assumed gradual annual increase of the total labour income share of GDP over the projection period, which is concomitant with the assumed GDP growth.

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

A2.2. Modelling the financial development of the Social Insurance Scheme

The present actuarial review addresses all revenue and expenditure items of the Social Insurance Scheme. The most important components of this budget concern long-term pension benefits. This section focuses on them.

For short-term benefits, income and expenditures are projected using simple projection methods based on recent experience.

Projections for pensions are done collectively for all groups of insured, hence not separating workers of the private sector, workers of the public sector, self-employed persons and voluntarily insured persons.

A2.2.1. Purpose of pension projections

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

– assessing the options to build up a contingency or a technical reserve;

– proposing schedules of contribution rates consistent with the funding objective; and

– testing how the system reacts to changing economic and demographic conditions.

A2.2.2. Pension data and assumptions

Pension projections require the demographic and macro-economic frame already described and, in addition, a set of assumptions specific to the social insurance scheme.

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

Scheme-specific assumptions such as the disability incidence rates and the distribution of retirement by age are determined with reference to the scheme provisions and the historical experience under the scheme.

The projection of the annual investment income requires information on the existing assets on the valuation date. An interest rate assumption is formulated on the basis of the nature of the scheme's assets, the past performance of the fund, the scheme's investment policy and assumptions on future economic growth and wage development.

A2.2.3. Pension projection approach

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

Pensions are long-term benefits. Hence the financial obligations that a society accepts when adopting financing provisions and benefit provisions for them are also of a long-term nature: participation in a pension scheme extends over the whole adult life, either as contributor or beneficiary, i.e. up to 70 years for someone entering the scheme at the age of 16, retiring at the age of 65 and dying some 20 or so years later. During their working years, contributors gradually build entitlement to pensions that will be paid even after their death, to their survivors. The objective of pension projections is not to forecast the exact development of income and expenditures of the scheme, but to check its financial viability. This entails evaluating the scheme with regard to the relative balance between future income and expenditures. This type of evaluation is crucial, especially in the case of the Cyprus scheme, which has not yet reached its mature stage.

Annex 3. Financial results of the Social Insurance Scheme (2001-2003)

Table A3.1. General account

	2001	2002	2003
RESERVE at 1 January	351 132 629	385 992 570	393 501 235
Revenue			
Contributions	215 450 040	219 889 530	244 062 756
Receipt from Consol. Fund	4 707 000	4 952 234	5 199 000
Interest earnings	21 982 451	18 422 204	14 988 741
Other income	2 038 413	1 974 991	2 023 376
Total revenue	244 177 904	245 238 959	266 273 873
Expenditure			
Benefits			
Pensions	189 811 632	217 603 506	229 652 629
Short-term benefits	14 275 002	14 599 389	16 535 995
Employment injury benefits	2 570 126	2 834 917	2 911 793
Administrative expenses	2 661 203	2 692 482	3 467 401
Total expenditure	209 317 963	237 730 294	252 567 818
RESERVE at 31 December	385 992 570	393 501 235	407 207 290

Table A3.2. Supplementary account

	2001	2002	2003
RESERVE at 1 January	**1638 979 726**	**1818 258 015**	**1978 891 146**
Revenue			
Contributions	136 073 709	138 877 599	154 144 897
Interest earnings	100 095 347	86 633 195	74 636 456
Other income	752 683	725 692	792 517
Total revenue	**236 921 739**	**226 236 486**	**229 573 870**
Expenditure			
Benefits			
Pensions	49 145 985	56 664 105	66 825 122
Short-term benefits	7 650 234	8 029 850	9 421 713
Employment injury benefits	847 231	909 400	998 891
Administrative expenses	-	-	-
Total expenditure	**57 643 450**	**65 603 355**	**77 245 726**
RESERVE at 31 December	**1818 258 015**	**1978 891 146**	**2131 219 290**

Table A3.3. Unemployment account

	2001	2002	2003
RESERVE at 1 January	**-9 100 521**	**-9 384 251**	**-12 382 121**
Revenue			
Contributions	20 617 799	21 046 642	23 427 307
Interest earnings	- 347 902	177 315	- 145 059
Other income	75 099	77 597	83 473
Total revenue	**20 344 996**	**21 301 554**	**23 365 721**
Expenditure			
Benefits	19 973 230	23 631 403	27 804 102
Administrative expenses	655 496	668 021	852 145
Total expenditure	**20 628 726**	**24 299 424**	**28 656 247**
RESERVE at 31 December	**-9 384 251**	**-12 382 121**	**-17 672 647**

Annex 4. Scheme-specific data and assumptions

In addition to the demographic and economic assumptions presented in the Section 2, the projection of the future financial development of the Social Insurance Scheme requires a data base specific to the scheme (characteristics of insured persons and pensions-in-payment) and some particular actuarial assumptions. For the present valuation, projections have been performed separately for the lower band and for the upper band. In addition, basic data and assumptions have been divided according to the sex of insured persons. The model provides separate projections for these four sub-groups.

A4.1. Data and assumption on the insured population

A4.1.1. Number of insured persons

Data on the insured population were obtained from the Social Insurance Department. The data base presents a population of 330761 active insured persons having contributed in 2003. Out of these persons, 247258 had annual earnings over £3820 and have thus been credited with insurance points in the upper band. The distribution of these populations by age and sex is presented in Table A4.1.

Table A4.1. Active insured persons (2003)

	Lower band contributors		Upper band contributors	
Age group	Males	Females	Males	Females
16-19	3080	3288	280	388
20-24	15581	16294	9022	8208
25-29	22238	22938	17367	15326
30-34	22950	22992	19238	14907
35-39	23635	21255	20562	13861
40-44	24774	20934	21991	14073
45-49	22970	17209	20524	12327
50-54	18940	12308	17262	9378
55-59	16976	8447	15378	6582
60-64	8809	3543	7503	2440
65+	1159	441	475	119
Total	181112	149649	149602	97609

In addition to the persons who have contributed in 2000, the scheme covers another 144565 persons who have contributed to the scheme in the past, but not in 2003. Their characteristics are presented in Table A4.2. These persons still have the status of insured persons and may re-enter the scheme at some point in the future. A part of that population has been considered in the present valuation: 62994 persons who have contributed to the upper band in the past and who are now below the age of 63. Those former contributors are considered to have a greater probability to claim an old-age pension in the future.

Table A4.2. Inactive insured persons (2003)

	Total inactive insured persons		Inactive insured persons who have insurance points in the upper band	
Age group	Males	Females	Males	Females
16-19	2155	1051	89	8
20-24	4271	4598	541	456
25-29	6047	8074	2211	2163
30-34	9034	13892	4642	4523
35-39	9020	13878	5208	5548
40-44	7627	13214	4847	5856
45-49	5985	10146	4011	4573
50-54	4282	7631	2933	3940
55-59	3877	7217	3000	4557
60-64	2645	4868	2142	3200
65+	1419	3634	854	928
Total	56362	88203	30478	35752

A4.1.2. Insurable earnings

Credits under the Social Insurance Scheme are computed in terms of points. For the year 2000, one insurance point is equivalent to annual earnings of £3398. The first insurance point is credited to the lower band and annual earnings in excess of £3398 and up to £19764 are converted into insurance points in the upper band. Table A4.3 presents average annual insurable earnings of active contributors for specific ages.

Table A4.3. Average annual insurable earnings of active contributors (2003)

	Total average earnings		Average earnings in the upper band	
Age	Males	Females	Males	Females
17	2148	2242	1472	1054
22	5396	4478	2980	2429
27	7268	6256	4471	4234
32	8730	6757	5912	5130
37	9470	6996	6611	5374
42	10322	7500	7424	5873
47	10711	8187	7810	6505
52	11305	8711	8293	6848
57	11404	8697	8569	6743
62	8184	5513	5355	3622
Total	8762	6399	6589	5271

In order to reflect the dispersion of earnings and, consequently, the distribution of earnings in the lower and the upper band, a coefficient of variation has been applied to average earnings by age groups and for each year of projection. In addition, the average earnings of

the insured population have been separated into three sub-groups of earnings: the lowest 30 per cent, a medium range of 40 per cent and the highest 30 per cent.

A4.1.3. Accrued past credits

Accrued insurance points in the upper band, for the active and inactive insured populations, were obtained from the administrative file of the Social Insurance Department. Average data are presented in Table A4.4. For the lower band, data are not available. However, given the way the pension is calculated, we have assumed a plausible number of years of past service by age that we have used for both active and inactive insured persons. For each age and sex group, the average number of contribution years (or insurance points) has been distributed over a range of possible values (using a normal distribution) in order to better reflect the effect of eligibility conditions on the number of emerging pensions and grants.

Table A4.4. Past contribution credits of active and inactive insured persons as of 31 December 2003

Age	Lower band (number of years of past contribution)		Upper band (number of past insurance points)			
			Active		Inactive	
	Males	Females	Males	Females	Males	Females
17	0.7	0.7	0.6	0.4	0.3	0.2
22	1.5	1.5	1.6	1.4	0.6	0.5
27	3.5	3.5	4.6	4.4	1.1	1.0
32	6.0	6.0	10.2	9.1	1.8	1.6
37	11.0	11.0	16.7	12.3	2.8	2.0
42	16.0	16.0	25.1	16.9	4.1	2.7
47	21.0	21.0	32.9	23.2	5.9	3.6
52	26.0	26.0	40.6	28.3	9.0	4.8
57	30.0	30.0	45.7	31.6	27.7	8.5
62	30.0	30.0	31.9	16.0	30.0	12.0

A4.2. Demographic assumptions related to the scheme

A4.2.1. Mortality of insured persons

Mortality rates for the insured population have been assumed equal to the mortality rates of the general population (sample mortality rates are presented in Table A4.5). This mortality pattern is also used to project survivors' benefits payable on the death of insured persons or pensioners. Mortality rates are assumed to decline continuously during the projection period.

For invalidity pensioners, in the absence of statistics on the experience under the Cyprus scheme, mortality rates have been set so as to reflect the level of the Swiss EVK Table. Mortality rates for males and females were fixed, at age 20, at 25 times the mortality rate applicable to active insured persons and this ratio was linearly reduced to one at age 60.

Table A4.5. Sample mortality rates applied to the insured population

Age	Males		Females	
	2004	2050	2004	2050
0	0.00492	0.00368	0.00488	0.00322
5	0.00028	0.00006	0.00026	0.00009
10	0.00004	0.00005	0.00006	0.00003
15	0.00035	0.00016	0.00019	0.00010
20	0.00077	0.00057	0.00029	0.00021
25	0.00101	0.00084	0.00037	0.00030
30	0.00095	0.00078	0.00044	0.00035
35	0.00101	0.00078	0.00059	0.00043
40	0.00151	0.00117	0.00090	0.00066
45	0.00230	0.00171	0.00140	0.00097
50	0.00418	0.00349	0.00226	0.00176
55	0.00624	0.00480	0.00332	0.00237
60	0.00973	0.00723	0.00513	0.00356
65	0.01545	0.01098	0.00798	0.00522
70	0.02450	0.01694	0.01365	0.00862
75	0.04368	0.03233	0.02578	0.01744
80	0.07577	0.06071	0.05033	0.03755
85	0.12420	0.10607	0.09244	0.07518
90	0.19314	0.17436	0.15789	0.13802
95	0.28161	0.26412	0.24637	0.22677
100	1.00000	1.00000	1.00000	1.00000

4.2.2. Invalidity incidence

Rates of entry into invalidity have been calculated from the scheme's experience over the years 1996 and 1997. Invalidity incidence rates are kept constant for the whole projection period. The rates are presented in Table A4.6.

Table A4.6. Rates of entry into invalidity

Age	Males	Females
22	0.00027	0.00003
27	0.00049	0.00013
32	0.00051	0.00014
37	0.00102	0.00049
42	0.00175	0.00115
47	0.00250	0.00184
52	0.00494	0.00424
57	0.00916	0.00797
62	0.01206	0.01188

A4.2.3. Retirement

The actuarial model used for the present actuarial review considers retirement as the residual element of a series of factors. The macro-economic frame described in the previous section provides the number of persons employed each year. For a given age (at which retirement is possible under the Social Security scheme), the difference between the

number of insured persons in two consecutive years is considered to be new retirees. Consistency checks are performed to reproduce the retirement pattern observed under the scheme.

A4.2.4. Family structure

Information on the family structure of the insured persons is necessary for the projection of survivors' benefits. In the case of the Cyprus scheme, these data are also used to project the dependents' supplement paid in the lower band. Assumptions have to be established on the probability of being married at death, the age difference between spouses, the average number or children possibly eligible to an orphan's benefit and the average age of orphans. Due to the fact that widowers' pensions are paid only in exceptional cases, projections are made only for widows' pensions.

Data on the percentage of persons married were obtained from tables of the 1992 Census. The age differential between spouses was calculated from data of the 1996 Demographic Report of the Department of Statistics and Research. The average number of children has been assumed equal to 0.2, considering the stringent eligibility conditions for this benefit and the observed number of orphans' benefits in payment. The average age of orphans has been set with regard to age of the mother at first birth and with some margin for conservatism at older ages. These assumptions are presented in Table A4.7.

Table A4.7. Assumptions on the family structure (for male insured persons)

Age	Probability to be married at death	Average age of the spouse	Average age of orphans
17	.01	17	1
22	.18	20	1
27	.58	24	2
32	.83	29	4
37	.92	34	7
42	.95	39	10
47	.95	44	13
52	.96	49	16
57	.96	54	17
62	.95	59	18
67	.91	64	19
72	.86	69	20
77	.78	74	20
82	.67	80	20
87	.49	85	20

A4.3. Economic assumptions

Economic assumptions have been determined as part of the macro-economic framework presented in Section 2. Inflation is assumed constant at 2 per cent per year. The rate of growth of earnings fluctuates around 5 per cent as shown in Table A4.8. The rate of return of the Social Security Fund is assumed constant at 4 per cent per year (real rate of return of 2 per cent per year), in line with the interest rate presently credited to the Social Insurance Fund.

Table A4.8. Projected inflation rate, wage increase and rate of return (as percent)

Year	Inflation rate	Annual nominal increase of the average wage	Rate of return of the Social Insurance Fund
2004	2.0	4.5	4.0
2005	2.0	5.0	4.0
2006	2.0	5.2	4.0
2010	2.0	5.2	4.0
2015	2.0	5.1	4.0
2020+	2.0	5.0	4.0

A4.4. Other assumptions

A4.4.1. Special credits

An additional seven years of credit was assumed for female participants to take into account the provisions of the scheme providing for a 3 year of credit per child under 12.

An additional one year of credit was assumed for male participants to take into account the compulsory service for the National Guard.

A4.4.2. Indexing of scheme's parameters and pensions-in-payment

We have assumed that the basic insurable earnings and the minimum pension are indexed annually in line with the wage growth assumption. Under the base scenario, pensions-in-payment are assumed to be indexed in the future in line with the wage index in the lower band and with the price index in the upper band.

A4.4.3. Administrative expenses

Administrative expenses are totally affected to the lower band and are determined as the amount paid in 2003 indexed with the assumed nominal rate of increase of wages determined for the economic framework of the valuation.

A4.5. Pensions-in-payment, July 2003 [4]

Old-age pensions

	Lower band				Upper band			
	Males		Females		Males		Females	
Age group	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
55-59	4	3098	-	-	4	3135	-	-
60-64	4226	2607	1562	1890	4095	2259	1511	1464
65-69	13493	2492	7102	1925	11711	1790	4528	877
70-74	10259	2458	5081	1959	8251	1158	2018	618
75-79	7863	2476	2937	1923	6357	815	1133	444
80-84	5015	2488	1713	1955	4011	630	645	375
85-89	2784	2463	1032	1989	1463	297	210	189
90-94	1049	2440	395	2051	-	-	-	-
95-99	210	2385	97	2118	-	-	-	-
Total	44903	2489	19919	1940	35892	1335	10045	818

Invalidity pensions

	Lower band				Upper band			
	Males		Females		Males		Females	
Age group	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
20-24	7	1798	1	1612	6	334	1	257
25-29	34	1944	12	2026	23	392	12	494
30-34	96	2149	31	1967	81	878	22	498
35-39	170	2284	85	1888	143	1093	69	172
40-44	319	2377	163	1875	283	1318	131	840
45-49	535	2274	215	1752	465	1403	150	926
50-54	734	2198	342	1648	600	1612	244	1138
55-59	1270	2183	563	1621	1020	1752	375	1210
60-64	924	2139	448	1593	761	1549	310	959
Total	4089	2203	1860	1677	3382	1537	1314	1010

[4] In the tables of this section, the annual pensions are equal to 13 times the monthly pension.

Widows' pensions

Age group	Lower band				Upper band			
	Males		Females		Males		Females	
	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
20-24	7	2386			6	1425	2	104
25-29	30	2524			24	742	6	159
30-34	83	2683	13	940	66	1141	12	212
35-39	122	2928	14	1350	108	1316	19	100
40-44	209	2680	25	1444	187	1542	22	113
45-49	449	2402	38	1454	386	1581	23	121
50-54	679	2239	91	1473	531	1442	16	102
55-59	1288	2095	125	1473	927	1270	6	87
60-64	1934	2084	137	1473	1252	940	1	22
65-69	3112	2080	111	1473	1929	641	1	4
70-74	4207	2090	80	1473	2475	467	-	-
75-79	4910	2122	32	1473	2367	368	-	-
80-84	3841	2134	11	1473	1247	296	-	-
85-89	2794	2160	2	1473	428	221	-	-
90-94	1094	2167			83	351	-	-
95-99	270	1695			-	-	-	-
Total	25029	2135	679	1458	12016	667	108	121

Note: For the purpose of actuarial projections, orphans aged 25 and over were classified as widowers.

Orphans' pensions

Age group	Lower band				Upper band			
	Males		Females		Males		Females	
	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
0-4	103	628	85	616	2	553	2	351
5-9	109	587	99	567	4	484	2	643
10-14	74	631	72	649	4	462	7	546
15-19	36	737	27	659	6	617	1	32
Total	322	627	283	611	16	537	12	487

Note: For the purpose of actuarial projections, orphans aged 20 and over were classified as widowers.

Annex 5. Illustration of the impact of the reform proposals on individual cases

Table A5.1. Current law

History of insurance points						Social Insurance pension				
Lower band		Upper band		Total number of points	Average number of points per year	Lower band	Upper band	Total pension	VAT compensation allowance	Grand total
Number of years	Number of points	Number of years	Number of points							
40	1	25	2	90	2.25	2292	2865	5157	494	5651
40	1	20	2	80	2.00	2292	2292	4584	494	5078
40	1	15	2	70	1.75	2292	1719	4011	494	4505
40	1	10	2	60	1.50	2292	1146	3438	494	3932
40	1	5	2	50	1.25	2292	573	2865	494	3359
40	1	0	0	40	1.00	2292	0	2292	494	2786
35	1	25	2	85	2.43	2006	2865	4871	494	5365
35	1	20	2	75	2.14	2006	2292	4298	494	4792
35	1	15	2	65	1.86	2006	1719	3725	494	4219
35	1	10	2	55	1.57	2006	1146	3152	494	3646
35	1	5	2	45	1.29	2006	573	2579	494	3073
35	1	0	0	35	1.00	2006	0	2006	704	2710
30	1	25	2	80	2.67	1719	2865	4584	494	5078
30	1	20	2	70	2.33	1719	2292	4011	494	4505
30	1	15	2	60	2.00	1719	1719	3438	494	3932
30	1	10	2	50	1.67	1719	1146	2865	494	3359
30	1	5	2	40	1.33	1719	573	2292	494	2786
30	1	0	0	30	1.00	1719	0	1949	704	2653
25	1	25	2	75	3.00	1433	2865	4298	494	4792
25	1	20	2	65	2.60	1433	2292	3725	494	4219
25	1	15	2	55	2.20	1433	1719	3152	494	3646
25	1	10	2	45	1.80	1433	1146	2579	494	3073
25	1	5	2	35	1.40	1433	573	2006	672	2678
25	1	0	0	25	1.00	1433	0	1949	704	2653
20	1	20	2	60	3.00	1146	2292	3438	494	3932
20	1	15	2	50	2.50	1146	1719	2865	494	3359
20	1	10	2	40	2.00	1146	1146	2292	494	2786
20	1	5	2	30	1.50	1146	573	1949	704	2653
20	1	0	0	20	1.00	1146	0	1949	704	2653
15	1	15	2	45	3.00	860	1719	2579	494	3073
15	1	10	2	35	2.33	860	1146	2006	672	2678
15	1	5	2	25	1.67	860	573	1949	704	2653
15	1	0	0	15	1.00	860	0	1949	704	2653

Table A5.2. Reform package No. 1 - Parametric reform

History of insurance points						Social Insurance pension				
Lower band		Upper band		Total number of points	Average number of points per year	Lower band	Upper band	Total pension	VAT compensation allowance	Grand total
Number of years	Number of points	Number of years	Number of points							
40	1	25	2	90	2.25	2292	2865	5157	494	5651
40	1	20	2	80	2.00	2292	2292	4584	494	5078
40	1	15	2	70	1.75	2292	1719	4011	494	4505
40	1	10	2	60	1.50	2292	1146	3438	494	3932
40	1	5	2	50	1.25	2292	573	2865	494	3359
40	1	0	0	40	1.00	2292	0	2292	494	2786
35	1	25	2	85	2.43	2006	2865	4871	494	5365
35	1	20	2	75	2.14	2006	2292	4298	494	4792
35	1	15	2	65	1.86	2006	1719	3725	494	4219
35	1	10	2	55	1.57	2006	1146	3152	494	3646
35	1	5	2	45	1.29	2006	573	2579	494	3073
35	1	0	0	35	1.00	2006	0	2006	704	2710
30	1	25	2	80	2.67	1719	2865	4584	494	5078
30	1	20	2	70	2.33	1719	2292	4011	494	4505
30	1	15	2	60	2.00	1719	1719	3438	494	3932
30	1	10	2	50	1.67	1719	1146	2865	494	3359
30	1	5	2	40	1.33	1719	573	2292	494	2786
30	1	0	0	30	1.00	1719	0	1949	704	2653
25	1	25	2	75	3.00	1433	2865	4298	494	4792
25	1	20	2	65	2.60	1433	2292	3725	494	4219
25	1	15	2	55	2.20	1433	1719	3152	494	3646
25	1	10	2	45	1.80	1433	1146	2579	494	3073
25	1	5	2	35	1.40	1433	573	2006	672	2678
25	1	0	0	25	1.00	1433	0	1949	704	2653
20	1	20	2	60	3.00	1146	2292	3438	494	3932
20	1	15	2	50	2.50	1146	1719	2865	494	3359
20	1	10	2	40	2.00	1146	1146	2292	494	2786
20	1	5	2	30	1.50	1146	573	1949	704	2653
20	1	0	0	20	1.00	1146	0	1949	704	2653
15	1	15	2	45	3.00	860	1719	2579	494	3073
15	1	10	2	35	2.33	860	1146	2006	672	2678
15	1	5	2	25	1.67	860	573	1949	704	2653
15	1	0	0	15	1.00	860	0	1949	704	2653

Table A5.3. Reform package No. 2 – Replacement of the lower band by a universal pension, with a modified earnings-related scheme

History of insurance points				Total number of points	Average number of points per year	Universal pension	Social insurance pension	Total
Lower band		Upper band						
Number of years	Number of points	Number of years	Number of points					
40	1	25	2	90	2.25	2275	2750	5025
40	1	20	2	80	2.00	2275	2445	4720
40	1	15	2	70	1.75	2275	2139	4414
40	1	10	2	60	1.50	2275	1834	4109
40	1	5	2	50	1.25	2275	1528	3803
40	1	0	0	40	1.00	2275	1222	3497
35	1	25	2	85	2.43	2275	2598	4873
35	1	20	2	75	2.14	2275	2292	4567
35	1	15	2	65	1.86	2275	1986	4261
35	1	10	2	55	1.57	2275	1681	3956
35	1	5	2	45	1.29	2275	1375	3650
35	1	0	0	35	1.00	2275	1070	3345
30	1	25	2	80	2.67	2275	2445	4720
30	1	20	2	70	2.33	2275	2139	4414
30	1	15	2	60	2.00	2275	1834	4109
30	1	10	2	50	1.67	2275	1528	3803
30	1	5	2	40	1.33	2275	1222	3497
30	1	0	0	30	1.00	2275	917	3192
25	1	25	2	75	3.00	2275	2292	4567
25	1	20	2	65	2.60	2275	1986	4261
25	1	15	2	55	2.20	2275	1681	3956
25	1	10	2	45	1.80	2275	1375	3650
25	1	5	2	35	1.40	2275	1070	3345
25	1	0	0	25	1.00	2275	764	3039
20	1	20	2	60	3.00	2275	1834	4109
20	1	15	2	50	2.50	2275	1528	3803
20	1	10	2	40	2.00	2275	1222	3497
20	1	5	2	30	1.50	2275	917	3192
20	1	0	0	20	1.00	2275	611	2886
15	1	15	2	45	3.00	2275	1375	3650
15	1	10	2	35	2.33	2275	1070	3345
15	1	5	2	25	1.67	2275	764	3039
15	1	0	0	15	1.00	2275	458	2733

Table A5.4. Reform package No. 3 – Combination of the lower and upper band with a higher minimum pension

History of insurance points				Total number of points	Average number of points per year	Social insurance pension	VAT compensation allowance	Total
Lower band		Upper band						
Number of years	Number of points	Number of years	Number of points					
40	1	25	2	90	2.25	5157	494	5651
40	1	20	2	80	2.00	4584	494	5078
40	1	15	2	70	1.75	4011	494	4505
40	1	10	2	60	1.50	3438	494	3932
40	1	5	2	50	1.25	2865	494	3359
40	1	0	0	40	1.00	2600	494	3094
35	1	25	2	85	2.43	4871	494	5365
35	1	20	2	75	2.14	4298	494	4792
35	1	15	2	65	1.86	3725	494	4219
35	1	10	2	55	1.57	3152	494	3646
35	1	5	2	45	1.29	2600	494	3094
35	1	0	0	35	1.00	2600	494	3094
30	1	25	2	80	2.67	4584	494	5078
30	1	20	2	70	2.33	4011	494	4505
30	1	15	2	60	2.00	3438	494	3932
30	1	10	2	50	1.67	2865	494	3359
30	1	5	2	40	1.33	2600	494	3094
30	1	0	0	30	1.00	2600	494	3094
25	1	25	2	75	3.00	4298	494	4792
25	1	20	2	65	2.60	3725	494	4219
25	1	15	2	55	2.20	3152	494	3646
25	1	10	2	45	1.80	2600	494	3094
25	1	5	2	35	1.40	2600	494	3094
25	1	0	0	25	1.00	2600	494	3094
20	1	20	2	60	3.00	3438	494	3932
20	1	15	2	50	2.50	2865	494	3359
20	1	10	2	40	2.00	2600	494	3094
20	1	5	2	30	1.50	2600	494	3094
20	1	0	0	20	1.00	2600	494	3094
15	1	15	2	45	3.00	2600	494	3094
15	1	10	2	35	2.33	2600	494	3094
15	1	5	2	25	1.67	2600	494	3094
15	1	0	0	15	1.00	2600	494	3094

Note: Under this proposal, the VAT compensation allowance would eventually be abolished. It is indicated here for comparing initial pension amounts with the current law (Table A5.1) during the transition period.

Annex 6. Detailed financial projections for pensions under the different scenarios

This annex presents detailed financial projections of revenue and expenditure for long-term benefits over the next 50 years, separately for the lower and the upper band. Projections are presented under *status quo* and separately under each reform option considered in the report. The tables also include the general average premium calculated over 50 years.

Table A6.1. ***Status quo*** **– Lower band financial projections** (in million £)

Year	Contribution rate	Total insurable earnings	Revenue				Expenditure	Reserve (end of year)	Reserve ratio	PAYG cost
			Contri-butions	Transfer Cons Fund*	Investment earnings	Total				
2004	8.7%	2 634	229	6	19	254	241	420	1.7	9.2%
2005	8.7%	2 822	246	6	21	273	257	436	1.7	9.1%
2006	8.7%	3 001	261	7	19	287	276	448	1.6	9.2%
2007	8.7%	3 194	278	7	18	303	298	453	1.5	9.3%
2008	8.7%	3 393	295	8	18	321	322	452	1.4	9.5%
2009	8.7%	3 602	313	9	17	340	348	443	1.3	9.7%
2010	8.7%	3 818	332	10	17	359	378	424	1.1	9.9%
2011	8.7%	4 048	352	11	16	379	409	394	1.0	10.1%
2012	8.7%	4 292	373	11	14	399	441	352	0.8	10.3%
2013	8.7%	4 546	396	12	13	421	474	298	0.6	10.4%
2014	8.7%	4 813	419	13	10	442	511	230	0.4	10.6%
2015	8.7%	5 092	443	15	7	465	549	146	0.3	10.8%
2020	8.7%	6 658	579	22	-21	580	798	-639	-0.8	12.0%
2025	8.7%	8 542	743	33	-87	690	1 165	-2 435	-2.1	13.6%
2030	8.7%	10 939	952	49	-217	783	1 659	-5 953	-3.6	15.2%
2035	8.7%	13 949	1 214	68	-441	840	2 277	-11 938	-5.2	16.3%
2040	8.7%	17 744	1 544	92	-798	837	3 093	-21 454	-6.9	17.4%
2045	8.7%	22 420	1 951	123	-1 349	724	4 155	-36 078	-8.7	18.5%
2050	8.7%	28 332	2 465	164	-2 180	449	5 574	-58 100	-10.4	19.7%

* For financing the increase of the minimum pension

General average premium over 50 years = 14.4%

Table A6.2. ***Status quo*** **- Upper band financial projections** (in million £)

Year	Contribution rate	Total insurable earnings	Revenue			Expenditure	Reserve (end of year)	Reserve ratio	PAYG cost
			Contributions	Investment earnings	Total				
2004	5.6%	2 634	147	103	250	80	2 301	28.6	3.1%
2005	5.6%	2 822	158	117	275	89	2 487	27.9	3.2%
2006	5.6%	3 001	168	113	281	100	2 669	26.8	3.3%
2007	5.6%	3 194	179	108	287	114	2 842	25.0	3.6%
2008	5.6%	3 393	190	115	305	130	3 017	23.2	3.8%
2009	5.6%	3 602	202	122	323	148	3 192	21.6	4.1%
2010	5.6%	3 818	214	129	342	169	3 366	19.9	4.4%
2011	5.6%	4 048	227	135	362	192	3 536	18.4	4.7%
2012	5.6%	4 292	240	142	382	216	3 701	17.1	5.0%
2013	5.6%	4 546	255	148	403	242	3 862	15.9	5.3%
2014	5.6%	4 813	270	154	424	272	4 014	14.8	5.6%
2015	5.6%	5 092	285	160	445	304	4 156	13.7	6.0%
2020	5.6%	6 658	373	180	553	506	4 607	9.1	7.6%
2025	5.6%	8 542	478	172	651	791	4 325	5.5	9.3%
2030	5.6%	10 939	613	119	731	1 154	2 808	2.4	10.6%
2035	5.6%	13 949	781	-2	779	1 603	-459	-0.3	11.5%
2040	5.6%	17 744	994	-218	775	2 200	-6 282	-2.9	12.4%
2045	5.6%	22 420	1 256	-581	674	3 010	-15 994	-5.3	13.4%
2050	5.6%	28 332	1 587	-1 163	424	4 089	-31 490	-7.7	14.4%

General average premium over 50 years = 8.5%

Table A6.3. Reform package No. 1 – Parametric reforms - Lower band financial projections (in million £)

Year	Contribution rate	Total insurable earnings	Revenue			Expenditure	Reserve (end of year)	Reserve ratio	PAYG cost
			Contri-butions	Investment earnings	Total				
2004	8.7%	2 634	229	19	254	241	420	1.7	9.2%
2005	8.7%	2 822	246	21	273	239	454	1.9	8.5%
2006	8.7%	3 001	261	21	289	244	499	2.0	8.1%
2007	8.7%	3 194	278	21	306	251	554	2.2	7.9%
2008	8.7%	3 393	295	23	326	265	616	2.3	7.8%
2009	8.7%	3 602	313	25	348	280	683	2.4	7.8%
2010	8.7%	3 818	332	28	371	289	765	2.7	7.6%
2011	8.7%	4 048	352	32	395	298	862	2.9	7.4%
2012	8.7%	4 292	373	36	421	318	966	3.0	7.4%
2013	8.7%	4 546	396	40	448	338	1 076	3.2	7.4%
2014	8.7%	4 813	419	44	477	360	1 193	3.3	7.5%
2015	8.7%	5 092	443	49	508	381	1 320	3.5	7.5%
2020	8.7%	6 658	579	77	680	519	2 062	4.0	7.8%
2025	8.7%	8 542	743	111	889	717	2 921	4.1	8.4%
2030	8.7%	10 939	952	141	1 145	1 004	3 693	3.7	9.2%
2035	8.7%	13 949	1 214	168	1 453	1 315	4 380	3.3	9.4%
2040	8.7%	17 744	1 544	194	1 835	1 704	5 063	3.0	9.6%
2045	8.7%	22 420	1 951	215	2 296	2 235	5 562	2.5	10.0%
2050	8.7%	28 332	2 465	205	2 845	3 018	5 222	1.7	10.7%

General average premium over 50 years = 8.7%

Table A6.4. Reform package No. 1 – Parametric reforms - Upper band financial projections (in million £)

Year	Contribution rate	Total insurable earnings	Revenue			Expenditure	Reserve (end of year)	Reserve ratio	PAYG cost
			Contributions	Investment earnings	Total				
2004	5.6%	2 634	147	103	250	80	2 301	28.6	3.1%
2005	5.6%	2 822	158	117	275	89	2 487	28.0	3.2%
2006	5.6%	3 001	168	114	282	94	2 674	28.4	3.1%
2007	5.6%	3 194	179	108	287	102	2 859	27.9	3.2%
2008	5.6%	3 393	190	116	306	117	3 048	26.0	3.5%
2009	5.6%	3 602	202	123	325	134	3 239	24.2	3.7%
2010	5.6%	3 818	214	131	345	144	3 440	23.9	3.8%
2011	5.6%	4 048	227	139	366	156	3 649	23.3	3.9%
2012	5.6%	4 292	240	147	388	179	3 857	21.5	4.2%
2013	5.6%	4 546	255	155	410	204	4 064	20.0	4.5%
2014	5.6%	4 813	270	163	433	229	4 267	18.6	4.8%
2015	5.6%	5 092	285	171	456	258	4 466	17.3	5.1%
2020	5.6%	6 658	373	204	577	448	5 272	11.8	6.7%
2025	5.6%	8 542	478	218	696	701	5 559	7.9	8.2%
2030	5.6%	10 939	613	195	808	1 049	4 860	4.6	9.6%
2035	5.6%	13 949	781	118	899	1 464	2 721	1.9	10.5%
2040	5.6%	17 744	994	-38	956	2 012	-1 504	-0.7	11.3%
2045	5.6%	22 420	1 256	-312	944	2 737	-8 859	-3.2	12.2%
2050	5.6%	28 332	1 587	-767	820	3 732	-21 024	-5.6	13.2%

General average premium over 50 years = 7.5%

Table A6.5. Reform package No. 2 – Replacement of the lower band by a universal pension, with a modified earnings-related pension - Combined financial projections for the lower and the upper band (in million £)

Year	Contribution rate	Total insurable earnings	Revenue			Expenditure	Reserve (end of year)	Reserve ratio	PAYG cost
			Contributions	Investment earnings	Total				
2004	14.3%	2 634	377	16	393	321	383	1.2	12.2%
2005	11.6%	2 822	327	19	347	330	400	1.2	11.7%
2006	11.6%	3 001	348	18	366	348	418	1.2	11.6%
2007	11.6%	3 194	371	17	387	369	436	1.2	11.6%
2008	11.6%	3 393	394	17	411	394	453	1.1	11.6%
2009	11.6%	3 602	418	18	436	419	469	1.1	11.6%
2010	11.6%	3 818	443	19	462	441	490	1.1	11.5%
2011	11.6%	4 048	470	20	489	462	518	1.1	11.4%
2012	11.6%	4 292	498	21	519	488	549	1.1	11.4%
2013	11.6%	4 546	527	22	550	513	585	1.1	11.3%
2014	11.6%	4 813	558	24	582	539	628	1.2	11.2%
2015	11.6%	5 092	591	26	616	564	681	1.2	11.1%
2020	11.6%	6 658	772	41	814	697	1 111	1.6	10.5%
2025	11.6%	8 542	991	77	1 068	832	2 081	2.5	9.7%
2030	11.6%	10 939	1 269	125	1 393	1 148	3 293	2.9	10.5%
2035	11.6%	13 949	1 618	173	1 791	1 547	4 522	2.9	11.1%
2040	11.6%	17 744	2 058	215	2 274	2 099	5 569	2.7	11.8%
2045	11.6%	22 420	2 601	238	2 839	2 804	6 083	2.2	12.5%
2050	11.6%	28 332	3 286	215	3 502	3 797	5 325	1.4	13.4%

General average premium over 50 years = 11.2%

Table A6.6. Reform package No. 3A – Combination of the lower and upper bands and increase of the minimum pension (indexed with CPI) - Combined financial projections for the lower and the upper band (in million £)

Year	Contribution rate	Total insurable earnings	Revenue			Expenditure	Reserve (end of year)	Reserve ratio	PAYG cost
			Contributions	Investment earnings	Total				
2004	14.3%	2 634	377	122	499	321	2 716	8.4	12.2%
2005	14.3%	2 822	404	137	541	342	2 914	8.5	12.1%
2006	14.3%	3 001	429	133	562	354	3 122	8.8	11.8%
2007	14.3%	3 194	457	127	583	372	3 334	9.0	11.6%
2008	14.3%	3 393	485	135	620	405	3 549	8.8	11.9%
2009	14.3%	3 602	515	143	659	441	3 766	8.5	12.3%
2010	14.3%	3 818	546	152	698	464	4 001	8.6	12.2%
2011	14.3%	4 048	579	162	741	490	4 251	8.7	12.1%
2012	14.3%	4 292	614	172	785	538	4 498	8.4	12.5%
2013	14.3%	4 546	650	181	831	590	4 740	8.0	13.0%
2014	14.3%	4 813	688	191	879	639	4 979	7.8	13.3%
2015	14.3%	5 092	728	200	928	691	5 216	7.5	13.6%
2020	14.3%	6 658	952	241	1 193	1 027	6 217	6.1	15.4%
2025	14.3%	8 542	1 221	259	1 481	1 483	6 607	4.5	17.4%
2030	14.3%	10 939	1 564	229	1 793	2 119	5 668	2.7	19.4%
2035	14.3%	13 949	1 995	128	2 123	2 840	2 899	1.0	20.4%
2040	14.3%	17 744	2 537	-66	2 472	3 769	-2 333	-0.6	21.2%
2045	14.3%	22 420	3 206	-401	2 805	5 016	-11 361	-2.3	22.4%
2050	14.3%	28 332	4 051	-972	3 079	6 787	-26 676	-3.9	24.0%

General average premium over 50 years = 16.7%

Table A6.7. Reform package No. 3B – Combination of the lower and upper bands and increase of the minimum pension (indexed with wages) - Combined financial projections for the lower and the upper band (in million £)

Year	Contribution rate	Total insurable earnings	Revenue			Expenditure	Reserve (end of year)	Reserve ratio	PAYG cost
			Contri-butions	Investment earnings	Total				
2004	14.3%	2 634	377	122	499	321	2 716	8.4	12.2%
2005	14.3%	2 822	404	137	541	342	2 914	8.5	12.1%
2006	14.3%	3 001	429	133	562	360	3 116	8.7	12.0%
2007	14.3%	3 194	457	126	583	383	3 316	8.6	12.0%
2008	14.3%	3 393	485	134	619	423	3 512	8.3	12.5%
2009	14.3%	3 602	515	142	657	467	3 702	7.9	13.0%
2010	14.3%	3 818	546	149	695	496	3 901	7.9	13.0%
2011	14.3%	4 048	579	157	736	530	4 107	7.8	13.1%
2012	14.3%	4 292	614	165	779	587	4 298	7.3	13.7%
2013	14.3%	4 546	650	172	822	649	4 471	6.9	14.3%
2014	14.3%	4 813	688	179	867	710	4 628	6.5	14.8%
2015	14.3%	5 092	728	184	912	774	4 766	6.2	15.2%
2020	14.3%	6 658	952	196	1 148	1 188	4 974	4.2	17.8%
2025	14.3%	8 542	1 221	159	1 381	1 752	3 872	2.2	20.5%
2030	14.3%	10 939	1 564	35	1 599	2 523	428	0.2	23.1%
2035	14.3%	13 949	1 995	-211	1 783	3 405	-6 216	-1.8	24.4%
2040	14.3%	17 744	2 537	-621	1 916	4 534	-17 168	-3.8	25.6%
2045	14.3%	22 420	3 206	-1 269	1 937	6 040	-34 440	-5.7	26.9%
2050	14.3%	28 332	4 051	-2 283	1 768	8 145	-61 450	-7.5	28.7%

* For financing the increase of the minimum pension

General average premium over 50 years = 19.9%