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Report to the Government

Actuarial valuation of the General Social Insurance Scheme as of 31 December 2014

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Social Protection Department

ILO/TF/Cyprus/R.23

Republic of Cyprus

Report to the Government

Actuarial valuation of the General Social Insurance Scheme as of 31 December 2014

Public Finance, Actuarial and Statistics Services Branch (SOC/PFACTS)
Social Protection Department
International Labour Office, Geneva

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Foreword

At the request of the Government of Cyprus, the Public Finance, Actuarial and Statistics Services Branch of the Social Protection Department of the International Labour Office (ILO) agreed to undertake the triennial actuarial valuation of the Cyprus General Social Insurance Scheme as at 31 December 2014. The above agreement is part of long-lasting technical cooperation between the ILO and the Cyprus Government in the area of social security actuarial reviews.

Regular actuarial valuations of national social security schemes play a central role in assessing their financial sustainability.

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Acknowledgements

The ILO designated the Public Finance, Actuarial and Statistics Services Branch of the Social Protection Department (SOC/PFACTS) of the International Labour Office to carry out the present actuarial valuation of the Cyprus General Social Insurance Scheme (GSIS), under the responsibility of Ms Anne Drouin, Chief of SOC/PFACTS.

Mr Costas Stavrakis, Senior Social Security Actuary and Pension Specialist, had the responsibility of carrying out the necessary activities for the conduct of the actuarial valuation and the preparation of the present report in accordance with internationally accepted actuarial and ILO standards. The work was also carried out in collaboration with the ILO global programme on employment injury insurance. The other members of the ILO project team were: Mr Pierre Plamondon, Senior Actuary and Internal Peer Reviewer of the Valuation; Mr Michel Millette, Senior Actuary and Unemployment Expert; Mr Andrés Acuna-Ulate, Senior Actuarial Modelling Expert; Mr Eleftherios Zarkadoulas, Actuarial Modelling Expert; and Ms Lida Kefala, Intern and Actuarial Data Analyst.

The compilation of data for the valuation was made by Ms Maria Chrysostomou, head of the Statistics Section at the Social Insurance Services.

The ILO wishes to express its sincere thanks to the Director of the Social Insurance Services, Mr Theofanis Tryfonos, for his invaluable collaboration and assistance during all phases of this exercise.

Executive summary

In accordance with section 76(2) of the Social Insurance Law of Cyprus, this report presents the results of the actuarial valuation of the General Social Insurance Scheme (GSIS) as at 31 December 2014. It describes the current and projected financial status of the GSIS until 2080 and makes recommendations on its financial governance.

The results presented in this report confirm that the legislative amendments introduced by the 2009 and 2012 social insurance reforms respectively are sufficient to financially sustain the GSIS over the long term.

Financial status of the different benefit branches

Unemployment benefit

Unemployment benefits have experienced important variations over recent years. In particular, over the years prior to the economic crisis (2005-2008), they remained below the income from contributions currently allocated to the Unemployment Account. Over the years of economic crisis (2009-2013) when exceptionally high unemployment rates were observed, they increased significantly and produced considerable Unemployment Account deficits, while since 2014 a strong downward trend in expenditure is observed in line with the reduction of the unemployment rate, resulting in gradually reduced deficits.

Given the recent experience of expenditure on unemployment benefits and the level of uncertainty in the decreasing pattern of the unemployment rate in the short and medium terms, it is recommended to leave the current contribution rate of 1.15 per cent of the insurable earnings of employed persons unchanged, but it is vital that the financial position of the Unemployment Account be monitored closely and on a regular basis, ideally quarterly, so that, where necessary, corrective measures are taken on a timely manner.

Other short-term and employment injury benefits

The branch of other short-term and employment injury benefits, which include sickness, maternity and employment injury, has not experienced major variations in its expenditures since the last actuarial valuation. It is recommended to keep the current contribution rate of 1.15 per cent of insurable earnings unchanged.

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 decrease in the ratio of contributors to pensions. However, during each year of the projection period, the total of contributions and investment earnings is sufficient to meet the GSIS annual expenditure. Hence the adopted schedule of contribution rates is sufficient to ensure the long-term sustainability of the GSIS.

Concerning the future evolution of the reserve for long-term benefits:

- Over the period 2015-2035, there is a downward trend in the reserve ratio, primarily due to the effect of the maturity of the supplementary part of the GSIS.
- Over the period 2035-2070, the reserve ratio is projected to remain relatively stable at 4.1, primarily due to the impact of the automatic adjustment mechanism of linking retirement age with the evolution of life expectancy.

- From 2070 onwards, the reserve ratio starts to increase, primarily due to improved demographics.

Account allocation

The present financing and accounting format of the GSIS consists of four accounts, namely Unemployment, Other Benefits, Basic Pensions and Supplementary Pensions.

- Since the financing of GSIS pensions and the actuarial analysis of the financial sustainability of the pension branch is done by considering the Basic and Supplementary Pensions Accounts together, it is recommended to merge those two accounts for accounting purposes.

- All administration expenses of the GSIS are currently allocated to the Other Benefits Account. It is recommended to allocate GSIS total administration expenses to each account proportionately in accordance with the actual occurrence of those expenses in each account.

Investment policy

In order to enhance the financial governance of the GSIS and thus the security of GSIS members' benefits and inter-generational equity, it is recommended to revise the current investment policy of the GSIS.

A diversification of the investment portfolio of the GSIS into non-government securities should be contemplated in order to increase the rates of return through these diversified investments. In addition, investing, in the near future, part of GSIS reserves in non-government assets would help in the containment of longer term future increases in government debt towards the GSIS and provide more flexibility to the GSIS in periods of significant economic difficulties. The GSIS could then draw on these funds, if necessary, from any of the GSIS borrowers and not necessarily from the Government, which might itself face cash flow problems at the same time.

Any change in the current investment policy of the GSIS should be gradual, and the exact amounts from future GSIS surpluses to be invested in non-government securities each year should be decided in close cooperation with the Minister of Finance, who according to the Social Insurance Law is currently responsible for setting up the investment policy of the GSIS.

Uncertainty of results

Tests were performed on the results of the actuarial valuation in order to examine their sensitivity to changes in key assumptions, namely fertility, mortality, net migration, female labour force participation rates and rate of return on GSIS assets. These tests show that, even though the projected financial status of the GSIS is sensitive to those assumptions, the long-term impact of such changes is relatively small.

Abbreviations and key references

GAP	general average premium
GDP	gross domestic product
GSIS	General Social Insurance Scheme
ILO	International Labour Office
PAYG	pay-as-you-go
SOC/PFACTS	Public Finance, Actuarial and Statistics Services of the Social Protection Department of the ILO
TIE	total insurable earnings
TFR	total fertility rate

1. Introduction

The present actuarial valuation report of the Cyprus General Social Insurance Scheme (GSIS) has been carried out in compliance with the provisions of section 76 of the Social Insurance Law No. 59(I)/2010. It presents the financial situation of the GSIS as at 31 December 2014. The previous actuarial valuation presented the financial situation of the GSIS as at 31 December 2011 and was carried out in accordance with the requirements of the Memorandum of Understanding on Specific Economic Policy Conditionality between the Republic of Cyprus and the European Commission.

1.1. Aims of the actuarial valuation

In accordance with section 76(2) of the Social Insurance Law, the main aims of this valuation are to:

1. Review the current and projected financial situation of the GSIS as at 31 December 2014.

2. Assess the long-term financial viability of the GSIS, assuming the legislation remains unchanged, and make recommendations on its financial governance.

3. Assess the sensitivity of the long-term projected financial position of the GSIS to changes in demographic and economic environments.

1.2. Scope of the report

Section 2 gives a general overview of the methodology used in producing the actuarial projection estimates included in this report, which are based on demographic and economic assumptions described in Section 3. The actuarial projection results are presented in Section 4. Section 5 presents the reconciliation of the results with those presented in the previous actuarial valuation, whereas Section 6 provides a sensitivity analysis on the projection results of key assumptions. Finally, Section 7 presents a general conclusion about the financial position of the GSIS, while Section 8 provides the actuarial opinion.

2. Projected methodology

2.1. Methodologies applied

The actuarial valuation of the GSIS involves projections of its revenue and expenditures over a long period so as to be able to estimate changes in the reserve, which varies from one year to the next as a function of the difference between the GSIS revenue and expenditures. The actuarial projections in this report are based on the current provisions of the GSIS, data regarding the starting point for the projections including data on the GSIS contributors and pensioners, and assumptions regarding future demographic and economic experience.

Figure 2.1 shows graphically the general methodology used in this actuarial valuation. Details of that methodology are provided in Annex 2.

Figure 2.1. General methodology

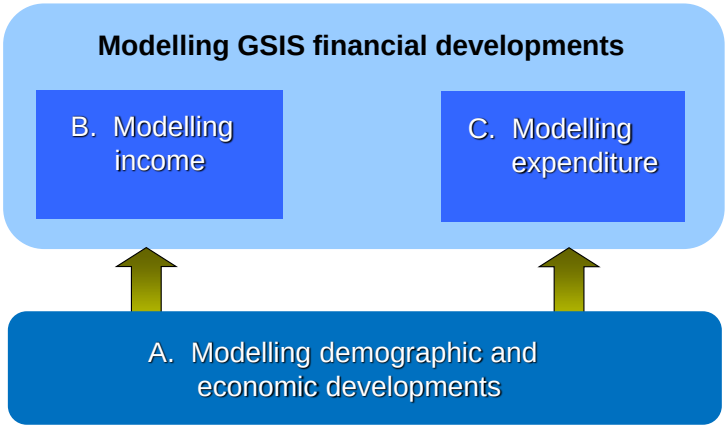


Figure 2.2 presents graphically the methodology used for calculating GSIS revenue from contributions, while figure 2.3 shows the methodology used for calculating GSIS pension expenditure.

The valuation starts with a projection of the general population of Cyprus. The projected population, based on the number of persons in each age group, serves to determine both the working population which contributes to the GSIS and the population eligible for the GSIS various benefits.

The revenue of the GSIS includes both contributions and investment income. For each year in the projection period, total contributions are derived from the total insurance earnings and the contribution rate prescribed by law. The total amount of insurable earnings is estimated on the basis of the projected rates of participation in the GSIS and future level of insurable earnings. Investment income is calculated on the basis of assumptions on rates of return on investments for different types of investment.

Expenditures include the pension benefits paid out, which are projected using assumptions based on the population's eligibility rates for the various benefits, the probability of the occurrence of an event giving entitlement to a pension and the historical record of contributors' insurable earnings.

Figure 2.2. Methodology: GSIS contribution income

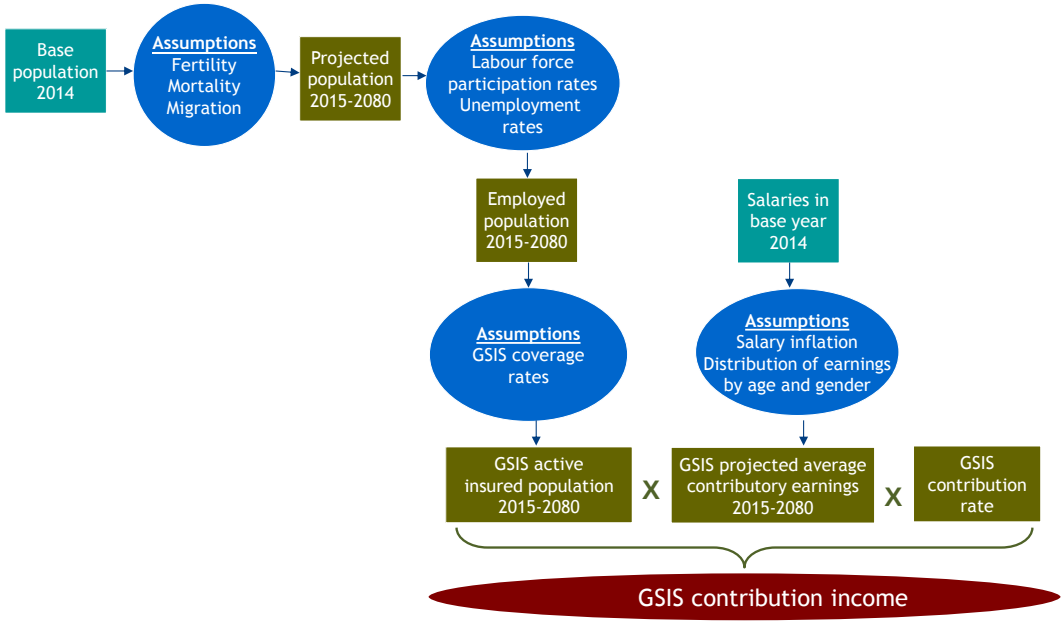
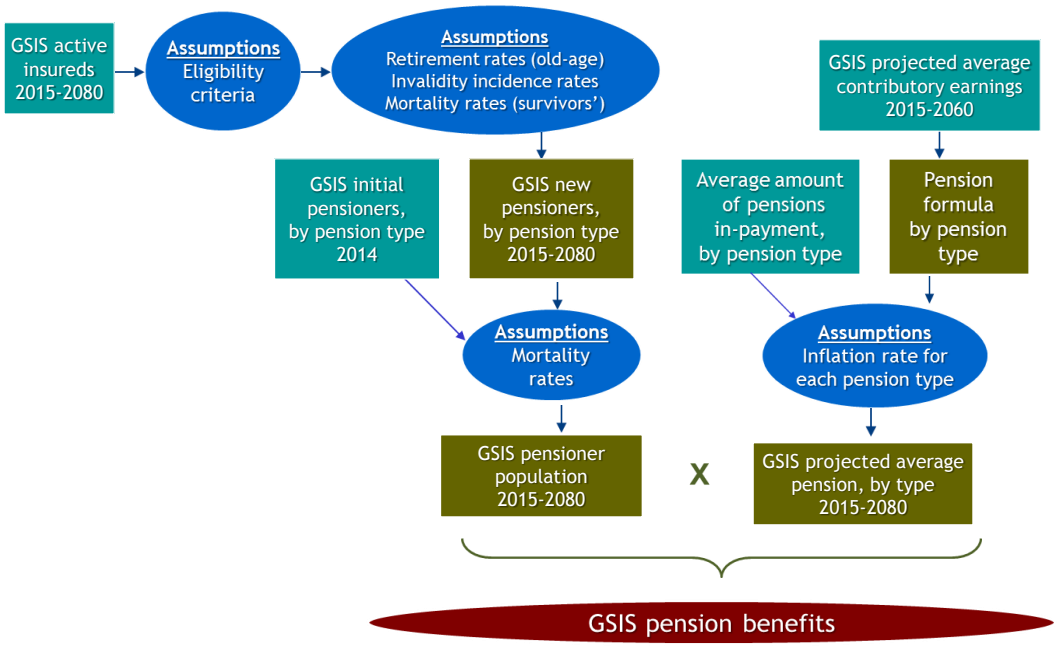


Figure 2.3. Methodology: GSIS pension benefits

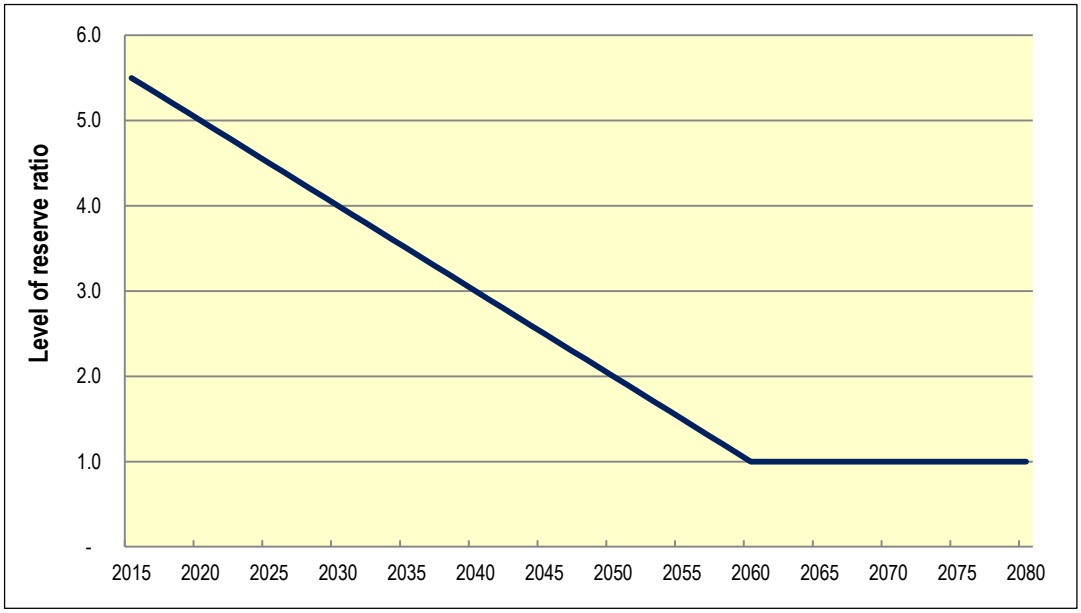


2.2. GSIS financial sustainability

The assumptions and results presented in the following sections make it possible to measure the financial position of the GSIS over the projection period in terms of:

- **Reserve ratio:** The ratio of the level of reserves at the end of one year to the level of expenditures for the same year; the projected reserve ratio may be compared to the minimum target reserve ratio "k", graphically shown in Figure 2.4, and determined by the following formula:
  - k = 5.5 – 0.1 * (t - 2015), for 2015 < t < 2060; and
  - k = 1, for t = 2060 and above.
- **Pay-as-you-go (PAYG) cost rate:** The level of expenditures for one year divided by the total insurable earnings of the same year.
- **General average premium (GAP):** The stable contribution rate needed to be paid over the projection period in respect of the current and future insured population in order to finance GSIS expenditure over the same period in respect of existing and future beneficiaries.

Figure 2.4. Minimum target reserve ratio



It follows from figure 2.4 that the minimum target reserve ratio is set at the level of 5.5 times annual expenditure in 2015 and is linearly decreased to one time annual expenditure in 2060, and thereafter remains at that level. A reserve ratio of one time annual expenditure is generally sufficient in mature social security programmes. A reserve of that level provides a sufficient "buffer" to safeguard the programme against bankruptcy even in the event of sudden adverse economic developments, which might lead to a dramatic reduction in contribution income and an increased number of pensioners. It is considered that the basic part of the GSIS is sufficiently mature to operate on the basis of a reserve ratio of one. On the other hand, the supplementary part of the GSIS, which was introduced later than the basic part, will not completely mature until around the end of the 2040s. After that period, the supplementary part of the GSIS could be able to operate on the same level of funding as the basic part, but until then there would be a transition phase of several decades

during which the target minimum reserve ratio of the supplementary part will be progressively reduced to the level of one.

To adequately evaluate the GSIS future financial situation, a projection period which extends over a period of 66 years to 2080 is selected. In particular, this projection period will allow the inclusion of the effect of the maturity of the supplementary part of the GSIS on its financial status. This period is also consistent with the projection periods of the actuarial valuations of the GSIS produced over the last 20 years, which extended over a minimum period of 50 years. This projection period is sufficient for the purposes of the actuarial analysis. However, the uncertainty associated with the projections in an actuarial report increases over time since the projections increasingly depend on the assumptions made.

2.3. Pension model

This actuarial valuation makes use of an actuarial pension model which is a fully customized version of the ILO generic pension modelling tool. The model has been customized in order to closely comply with local social insurance legislation and capture national pension peculiarities. In addition, methodological enhancements to the projection model are introduced on a regular basis in the context of continued improvement of the accuracy of the projection results.

The model is used primarily for:

– conducting the actuarial valuation of the GSIS every three years in accordance with the Social Insurance Law; and

– assessing the long-term financial impact of various pension reform alternatives.

The pension model is a standard deterministic cohort-based projection model performing long-term projections of income and expenditure for the GSIS. In its current version, the model satisfies the following key methodological features:

- The model is based on standard actuarial mathematics for social security schemes and on actuarially assumed transition probabilities (mortality rates, incapacity rates, retirement rates, etc.) which are used to map the transition of an insured person (active person, [1] inactive person [2] and pensioner) in a given year onto the next year's status.

- The development of the active insured population is linked to the evolution of total employed population and earnings assumptions, which, in turn, are explicitly linked to the assumptions on macroeconomic growth and the wage share of GDP.

- The active insured population is disaggregated into the following population groupings:
  - age (by single age);
  - gender (males/females);
  - insurance level (basic only/basic and supplementary);

[1] Active insured person refers to an individual who has made at least one contribution to the social security scheme during a given year.

[2] Inactive insured person refers to an individual who has made no contribution during the last year due to being unemployed, or out of the labour force, or emigrant, but is registered in the social security scheme, i.e., made contributions during previous years.

- community (Cypriots/EU nationals/third-country nationals); and
- income group (by earnings band).

- For the purpose of projecting insured population by community, the entry/leaving rates applied in the active insured population, as per the pension model, are linked to the immigration/emigration rates applied in the demographic population projections.

- Inactive insured persons are explicitly modelled.

3. The demographic and economic assumptions

The actuarial valuation of the GSIS must be positioned in the specific demographic and economic context of Cyprus. This requires making assumptions on the demographic and economic environment as well as a certain number of scheme-specific assumptions. This section presents the main demographic and economic assumptions made for the purpose of conducting the present actuarial valuation. Annex 4 presents the scheme-specific assumptions used in this valuation.

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 GSIS covers almost exclusively persons in that area.

Since the main aim of this valuation is to review the GSIS financial position until 2080, the assumptions should reflect a long-term perspective. The assumptions take into account historical trends, the present economic environment and GSIS situation and likely future trends. More emphasis is put on historical long-term trends than on more recent short-term trends.

In setting the assumptions, the opinion and forecasts of international organizations, such as the European Commission with regard to economic assumptions and Eurostat with regard to demographic assumptions, as well as comparisons with the assumptions made by other similar social security schemes at international level, were also taken into account.

These assumptions reflect the Actuary's best estimates of demographic and economic changes. They were chosen to be, independently and in aggregate, reasonable and appropriate, taking into account certain interrelationships between them.

Although assumptions are determined in a reasonable manner, there will be differences between the future reality and assumptions made. These differences may have a positive or negative impact on the financial position of the GSIS, compared with the results of this actuarial valuation. Nevertheless, they will be analysed and taken into account in subsequent actuarial valuations.

3.1. Demographic framework

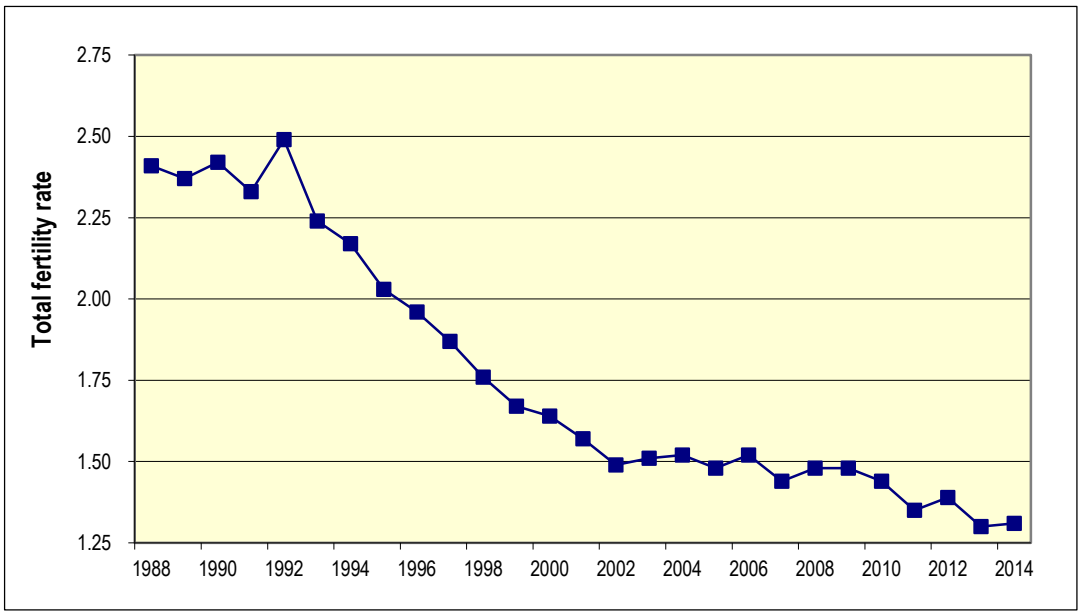
A projection of the general population of the country is the basis for determining the number of contributors and beneficiaries. The projection begins with the latest available statistical data on population estimated by the Statistical Service of Cyprus as at 31 December 2014, to which are applied the assumptions on the future development of fertility, mortality and migration.

The current population structure strongly influences the results of projections for the coming years. The age distribution of the starting population shows a significant ageing of the population in Cyprus, as is the case in many other developed countries.

3.1.1. Fertility

The first cause of this ageing is the large drop in the birth rates in the 1990s and a continuing low level thereafter. In particular, the total fertility rate in Cyprus has decreased sharply from an average level of 2.5 children per woman in the early 1990s to levels below 1.4 since 2011. In particular, the total fertility rate was around 1.3 in 2013 and 2014. Figure 3.1 shows the historical total fertility rates for the period from 1988 to 2014.

Figure 3.1. Historical total fertility rates, 1988-2014



Source: Cyprus Statistical Services, Demographic Reports.

The overall significant decrease in the total fertility rate in the 1990s occurred primarily as a result of changes in a number of social and economic factors. It is unlikely that fertility rates will return to historical levels in the absence of significant societal changes.

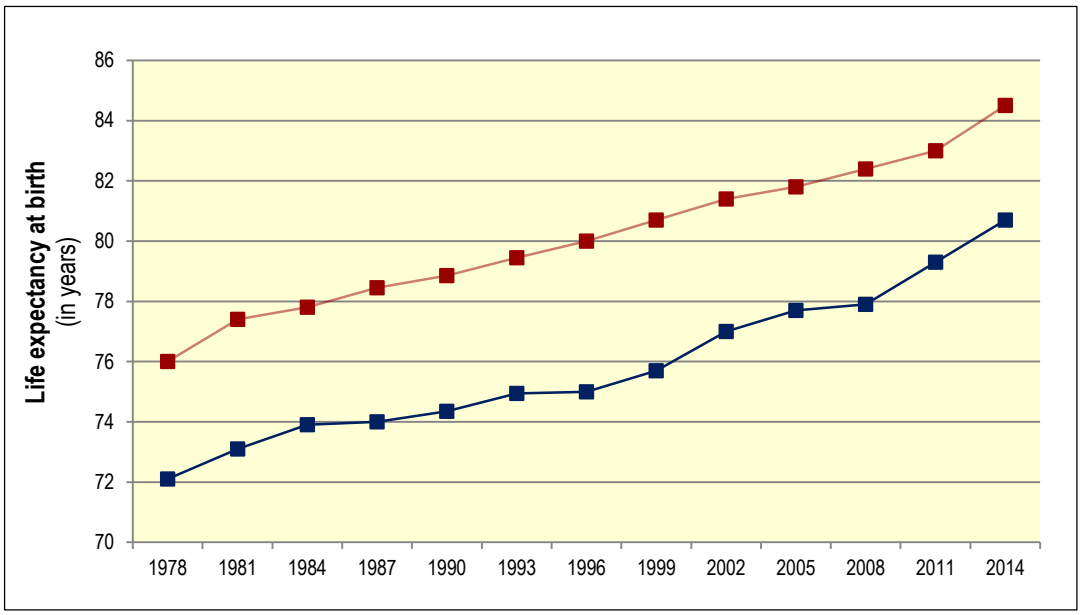
In the present valuation, the total fertility rate is estimated at 1.33 children per woman in 2015, increasing gradually to 1.6 in 2060 and increasing only slightly thereafter, reaching 1.66 in 2080.

3.1.2. Mortality

The other significant cause of the ageing of the population in Cyprus is the large reduction in age-specific mortality rates. This can be best measured by the increase in life expectancy.

As figure 3.2 indicates, male life expectancy at birth increased by 11.9 per cent between 1978 and 2014, rising from 72.1 to 80.7 years. For females, life expectancy at birth increased from 76.0 to 84.5 years during the same period, representing an increase of 11.2 per cent. The increase in life expectancy has been particularly important since 2008 for males and 2011 for females.

Figure 3.2. Historical life expectancies at birth, 1978-2014



Source: Cyprus Statistical Services, Demographic Reports and own calculations.

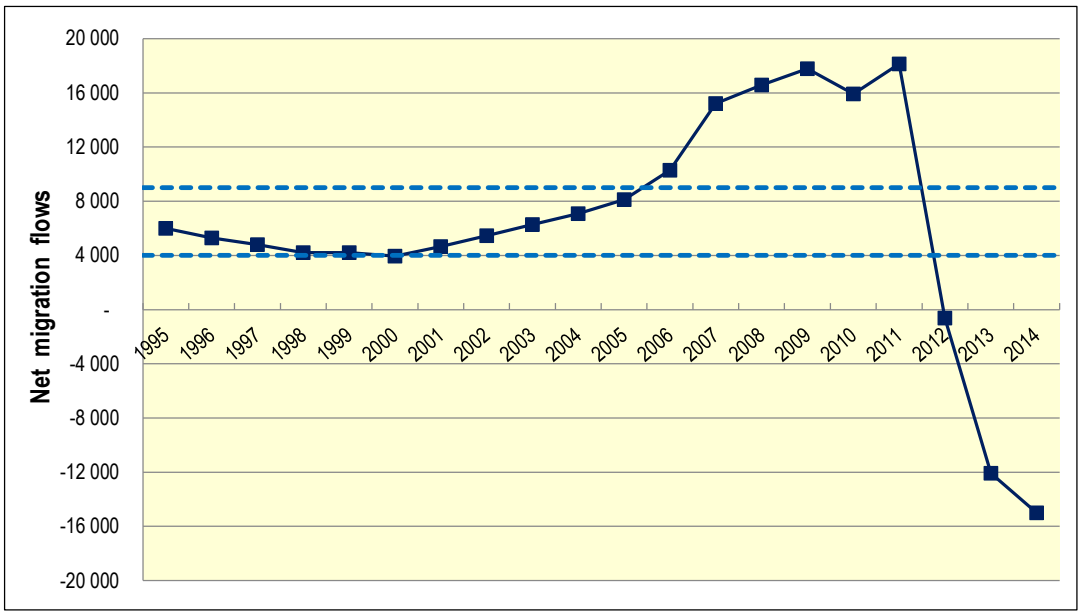
For the present valuation, mortality rates are determined with the methodology used for the development of Eurostat life tables. For the determination of future mortality rates, it is assumed that mortality improvements continue in the future, but at a slower pace than most recently. In particular, it is assumed that the life expectancies at birth observed in 2014, which were 80.7 for males and 84.5 for females, are gradually increased to 87.3 for males and 90.8 for females in 2080. The overall expected rates of mortality improvement over the projection period for both males and females correspond to 40 per cent of the mortality improvement observed over the period 1990-2014. Finally, the gap between the life expectancy of men and women is expected to slightly decrease from 3.8 years in 2014 to 3.5 years in 2080. Sample mortality rates can be found in Annex 4.

3.1.3. Net migration

Net migration in Cyprus (i.e., the excess of immigration over emigration) has been positive and relatively stable over the period 1995-2005, fluctuating between 4,000 and 9,000 net migrants per year. During the period 2006-2011, the number of net migrants was exceptionally high, reaching 18,142 in 2011. In years 2012-2014, the number of net migrants dropped significantly and became negative, primarily due to labour oversupply in certain sectors of the economy resulting from the economic crisis.

It is projected that net migration will continue to be negative for some time, but reverting back to positive values over the medium term. In particular, net migration is projected to be –10,436 in 2015, gradually reaching a positive value in 2022 and thereafter gradually increasing to its peak level of around 8,500 net migrants per year in 2050. Over the remaining period from 2050 to 2080, the annual net migration is projected to gradually decrease to around 6,000 by 2080.

Figure 3.3. Historical net migration flows, 1995-2014



Source: Cyprus Statistical Services, Demographic Reports and author's calculations.

3.1.4. Population projections

According to the above assumptions, the population of Cyprus is projected to increase from its present level of 859,178 persons in 2014 to 1,197,387 in 2080.

Table 3.1 shows the development of population for three age groups (0-14, 15-64 and 65+) throughout the projection period of 2015 to 2080, as well as the old-age dependency ratio, i.e., the ratio of the number of people aged 65 and over to those aged 15-64. This ratio, which provides a demographic measure of population ageing, is projected to increase continuously from 21 per cent in 2015 to 43 per cent in 2050. Over the rest of the projection period, the above ratio is expected to remain stable at 43 per cent. In other words, over the period 2050-2080, it is expected that Cyprus will have 2.4 working-age people for every person aged 65 and over.

An increase in the old-age dependency ratio directly affects the demographic ratio of the number of contributors to the number of pensioners, as is seen in Section 4.4.1.

Table 3.1. Projection of the population of Cyprus, 2015-2080

Year	Number of persons by age group				Old-age dependency ratio (in %)
	0-14	15-64	65 and over	Total	
2015	138 673	584 420	124 762	847 855	21
2020	137 881	557 642	144 663	840 185	26
2025	134 125	550 802	165 929	850 855	30
2030	128 362	549 261	185 819	863 442	34
2035	124 975	554 309	200 467	879 751	36
2040	125 760	562 595	214 256	902 611	38
2045	132 859	572 024	228 543	933 426	40
2050	143 964	580 720	247 348	972 032	43
2055	154 713	596 297	263 462	1 014 472	44
2060	162 394	616 662	276 008	1 055 063	45
2065	167 902	644 066	281 634	1 093 602	44
2070	173 032	672 798	284 098	1 129 929	42
2075	179 072	693 484	291 697	1 164 254	42
2080	185 898	708 715	302 774	1 197 387	43

3.2. Economic and labour market framework

The general economic developments and the evolution of the labour market directly influence the financial development of the GSIS. 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 GSIS.

3.2.1. Economic growth

During the 1980s, the Cyprus economy grew at an average annual (real) rate of 6.3 per cent, while during the 1990s it grew at a much lower rate of 4.1 per cent. Over the period 2001-2008, real GDP grew at an average rate of 3.9 per cent, whereas in year 2014 the economy contracted at a rate of 1.5 per cent.

The real GDP growth is expected to gradually increase from 1.6 per cent in 2015 to 2.5 per cent in 2020, averaging to 2.1 per cent over the period 2015-2020. Thereafter, it is expected to gradually decrease from 2.6 per cent in 2021 to 2.3 per cent in 2030, averaging to 2.5 per cent over the period 2021-2030. Over the rest of the projection period, we expect GDP real growth rates to remain stable at a level of 2.3 per cent.

As shown in table 3.2, during the whole projection period the driving forces behind economic growth will be primarily an increase of labour productivity and to a lesser extent additional employment.

Table 3.2. Annual growth of GDP, productivity and employment (in percentage)

Period	Annual real GDP growth	Annual increase of productivity per worker	Annual employment growth
2015-2020	2.1	1.5	0.5
2021-2030	2.5	1.9	0.6
2031-2040	2.3	1.6	0.6
2041-2050	2.3	1.7	0.6
2051-2060	2.3	1.7	0.6
2061-2070	2.3	1.5	0.8
2071-2080	2.3	1.6	0.7

3.2.2. 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 2011-2014, the overall labour force participation rate [3] for females for the age group 15 to 64 continued its upward trend, even though the corresponding participation rate for the age group 55 to 64 experienced a moderate decrease over the same period, primarily due to the recent economic crisis. In particular, the female participation rate for the age group 15 to 64 increased, on average, by 0.4 percentage points each year, whereas the rate for the age group 55 to 64 decreased, on average, by the same size (0.4) each year. It is noted that in 2015 the participation rate for the age group 55 to 64 increased significantly, by 2.4 percentage points, and it is expected that this increase will continue in future.

For the male population, over the period 2011-2014 the overall participation rate for the age group 15 to 64 remained relatively stable, while the corresponding participation rate for the age group 55 to 64, over the same period, experienced a significant decrease of 1.1 percentage points, on average, each year.

As shown in table 3.3 and figure 3.4, over the projection period the average labour force participation rate for males aged between 15 and 64 is assumed to moderately increase from its current level of 80.8 per cent in 2015 to 83.1 per cent in 2080. Most of that increase is expected to occur in the short term, where a total increase of 1.8 percentage points is anticipated over the period 2015-2020 and thus reaching 82.6 per cent in year 2020. Changes in the male average participation rate result mainly from the anticipated increase in the average exit age from the labour force due to the recent GSIS reform measures, as well as 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 average participation rate is assumed to grow quite significantly from its current level of 68.5 per cent in 2015 to 74.5 per cent in 2080. The increase is considerable for the period up to the year 2040, when the rate reaches a level of 73.3 per cent. Increases in the female participation rate over the projection period are primarily driven by the needs of the continuously growing economy as well as the anticipated increase in the average exit age from the labour force due to the recent GSIS reform measures.

[3] The labour force participation rate is defined as the labour force aged 15 to 64 divided by the population aged 15 to 64.

Figure 3.4. Projected labour force participation rates, 2015-2080

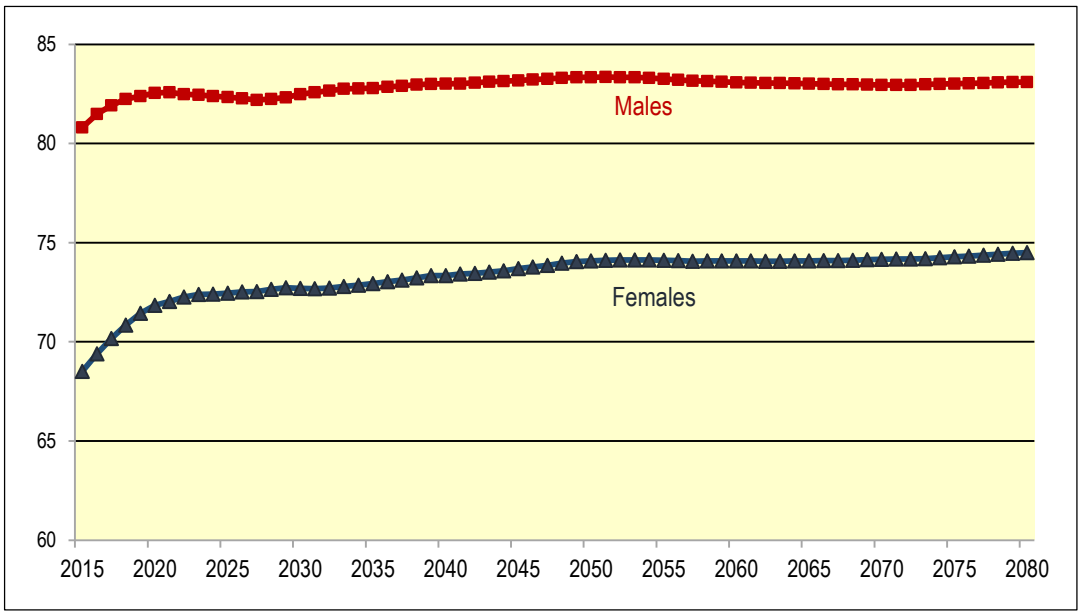


Table 3.3. Assumptions of labour force participation rates and unemployment (in percentage)

	2015	2020	2030	2040	2050	2060	2070	2080
Labour force participation rate								
Male	80.8	82.6	82.5	83.0	83.3	83.1	83.0	83.1
Female	68.5	71.8	72.7	73.3	74.1	74.1	74.2	74.5
Total	74.5	77.0	77.4	78.1	78.7	78.6	78.6	78.8
Employment rate	63.3	67.7	71.7	74.2	74.8	74.7	74.6	74.9
Unemployment rate	15.1	12.0	7.4	5.0	5.0	5.0	5.0	5.0

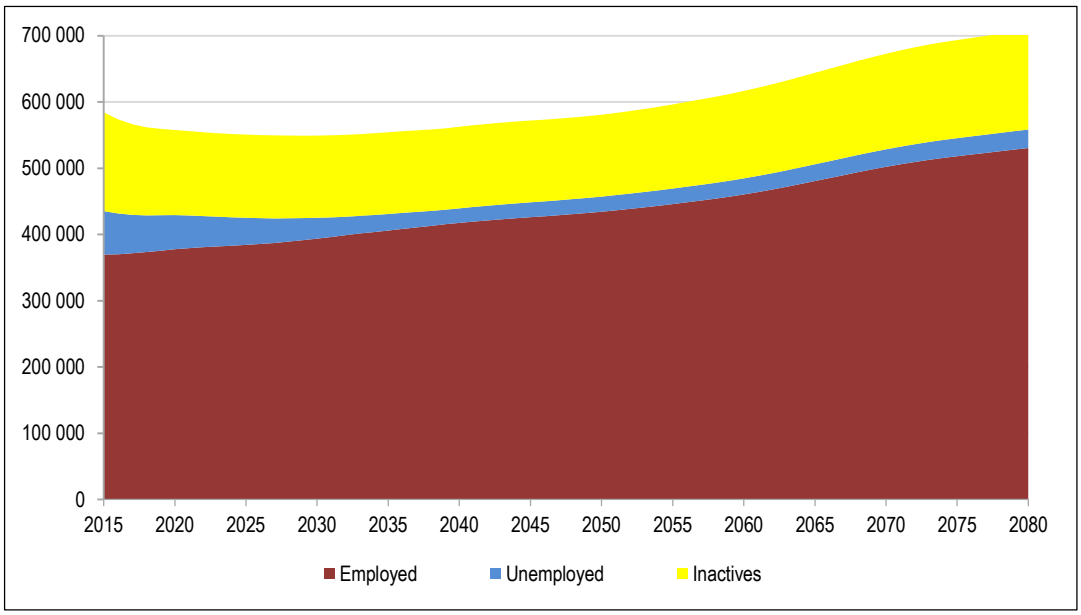
Once the labour force participation rates are determined on the basis of age group and gender, they are applied to the projected population to obtain the labour force. This projection reveals moderate growth of the labour force up to 2080.

The projected number of employed persons is then derived by applying the unemployment rates to the projected labour force. As shown in table 3.3, the unemployment rate for both males and females is anticipated to gradually fall from its current level of 15.1 per cent in 2015 to reach its lower limit of 5.0 per cent in 2039. Thereafter the number of employed persons will vary at the same rate as the labour force.

Table 3.3 also shows the development of the overall employment rate (the ratio of the number of employed persons aged 15-64 to the number of people aged 15-64), which is expected to increase from 63.3 per cent in 2015 to 74.9 per cent in 2080.

Figure 3.5 shows the changes in the population aged 15 to 64 over the projection period 2015-2080 according to the labour force status: employed, unemployed and inactive persons.

Figure 3.5. Distribution of population aged 15-64, by labour force status



3.2.3. Inflation, wages, and interest rates

Price inflation, as measured by the consumer price index, tends to fluctuate from year to year. The desire of the European Central Bank to maintain inflation rates below, but close to, 2 per cent, leads us to expect a constant inflation rate of 2 per cent throughout the projection period. The average inflation rate for the euro area since 1999, when the euro currency was formally introduced, has been 1.9 per cent.

In Cyprus, the increase of the consumer price index has been –0.3 per cent in 2014 and –1.6 per cent in 2015. As shown in table 3.4, the annual price inflation is assumed to be 0.0 per cent in 2016, is expected to increase to 1.1 per cent in 2017 and thereafter to continue increasing annually until it reaches its long-term rate of 2 per cent in 2021.

The real rate of increase in average wages in the long term is tied to increases in labour productivity. This assumption also takes into account the anticipated growth in the labour force in future. Given the current economic environment, which provides evidence of relatively strong economic growth in the short term following the recent economic crisis, a real wage growth of 1.5 per cent, on average, is assumed over the period 2015-2020. Over the following five years, the period 2021-2025, the real wage growth is set to be averaged at 2.0 per cent, whereas thereafter, it is assumed to be averaged at 1.6 per cent, fluctuating between 1.4 and 1.9 per cent.

Table 3.4 shows the expected evolution of *nominal* wage growth rates. In the short term, nominal wage growth is assumed to increase gradually from 0.2 per cent in 2015 to 3.5 per cent in 2020, and thereafter, for the rest of the projection period, it is expected to be in the range of 3.4 to 3.8 per cent.

The interest rate is required for the projection of revenue arising from investment income. This assumption is based on the projection of the rate of return on GSIS assets, which are currently invested to a great extent in non-tradeable government deposits (93 per cent) while the remaining assets are invested in medium-term government bonds and cash deposits held with commercial and cooperative banks in Cyprus.

The interest rate of the Social Insurance Fund on non-tradeable government deposits is calculated as the marginal lending facility rate of the European Central Bank less 0.25 per cent. The assumed initial rate of return reflects observed rates of returns on GSIS assets for

2015, whereas the assumed ultimate real rate of return on GSIS assets is derived from the historical real rates of return on the European Central Bank's marginal lending facility rate over the 17-year period since the introduction of the euro currency on 1 January 1999.

As shown in table 3.4, the annual nominal rate of return on GSIS assets is projected to gradually increase from its current level of 0.2 per cent in 2015 to 3.0 per cent in 2030, and remain constant thereafter.

Table 3.4. Inflation rate, increase of nominal average wage and interest rate, selected years
(in percentage)

Year	Inflation rate	Annual nominal increase of the average wage	Rate of return of the Social Insurance Fund
2015	–1.6	0.2	0.2
2016	0.0	1.5	0.3
2020	1.9	3.5	1.3
2030	2.0	3.6	3.0
2040	2.0	3.8	3.0
2050	2.0	3.7	3.0
2060	2.0	3.6	3.0
2070	2.0	3.4	3.0
2080	2.0	3.8	3.0

4. Results

This valuation deals with the ability of the GSIS 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 GSIS, thus paying contributions and accruing benefit entitlements, until later they receive benefits in accordance with the legal provisions of the GSIS. Future contributions and benefits are calculated:

– according to the methodology covered in Section 2;

– according to the demographic and economic assumptions presented in Section 3; and

– on the basis of the GSIS-specific database presented in Annex 4.

The main purpose of the valuation is to find out whether the financing of the GSIS 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 valuations should be undertaken on a regular basis to check the actual experience in the light of the assumptions made.

This valuation deals with the expenditure and revenue of all branches of the GSIS: unemployment benefits, other short-term and employment injury benefits, and long-term pension benefits. The Social Insurance Fund is currently separated into the following four accounts:

– the Unemployment Account records operations of the GSIS concerning the unemployment benefit;

– the Other Benefits Account records operations of the GSIS concerning other short-term benefits, employment injury benefits and administration expenses;

– the Basic Pensions Account records operations concerning revenue and expenditures with respect to pensions in the basic part of the GSIS; and

– the Supplementary Pensions Account records operations concerning revenue and expenditures with respect to pensions in the supplementary part of the GSIS.

Table 4.1 shows the benefits covered by and the contribution rate allocated into each account for an employed person.

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 supplementary part of the GSIS. 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 GSIS is analysed over several decades.

Table 4.1. Benefits covered and contribution rate by account for employed persons

Account	Benefits covered	Contribution allocation (as % of insurable earnings)
Unemployment	Unemployment benefit	1.15
Other Benefits	Sickness benefit, maternity allowance, maternity grant, funeral grant, employment injury benefits and administration expenses	1.15
Basic Pensions	Basic part of the GSIS: old-age pension, invalidity pension, widow's pension, orphan's benefit and other related lump sum benefits	11.30
Supplementary Pensions	Supplementary part of the GSIS: same as those mentioned under Basic Pensions Account	6.60
Total		**20.20**

In addition to the income from contributions, the Basic and Supplementary Pensions Accounts are credited with investment income and charged with long-term benefits of the respective part of the GSIS. The annual net balances of the accounts serve to increase the reserves in the respective part of the GSIS.

Unemployment and other short-term benefits, as well as employment injury benefits, are in principle financed on a pay-as-you-go (PAYG) basis. The level of contingency reserves held under the Unemployment and Other Benefits Accounts may not exceed one time the annual expenditure of the benefits covered by each account.

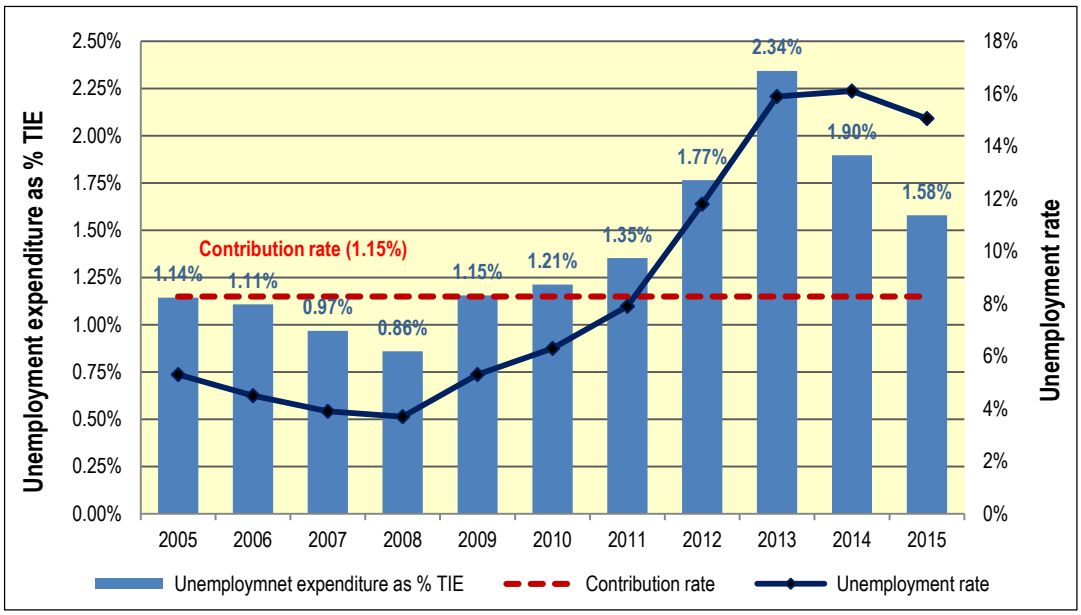
4.1. Unemployment benefit

As shown in table 4.2 and figure 4.1, unemployment benefits have experienced important variations over recent years. In particular, over the period 2005-2009, the total expenditure expressed as a percentage of total insurable earnings (TIE) remained at a relatively low level, below the contribution rate of 1.15 per cent currently allocated to the Unemployment Account. Over the period 2010-2013, the total expenditure expressed as a percentage of insurable earnings increased significantly from 1.21 in 2010 to 2.34 in 2013, as a result of the economic downturn. The upward trend in expenditure was reversed in 2014, when the total expenditure as a percentage of insurable earnings decreased to 1.90, still exceeding the income from contributions (1.15 per cent) by a significant margin of 0.75 percentage points.

Table 4.2. Expenditure on unemployment benefit, 2008-2014

Year	Annual expenditure on benefits (in €)	Expenditure as % of insurable earnings of employed persons
2014	117 040 680	1.90
2013	150 239 188	2.34
2012	124 468 629	1.77
2011	98 390 894	1.35
2010	85 809 195	1.21
Average	**115 189 717**	**1.69**

Figure 4.1. Past expenditure on unemployment benefit as a percentage of insurable earnings, 2005-2015



In line with the expected evolution of the unemployment rate, the downward trend in unemployment expenditure is expected to continue in the short and medium term. In particular, as shown in figure 4.2, the expenditure on unemployment benefit, expressed as a percentage of insurable earnings, is projected to decrease from 1.58 per cent in 2015 to 1.16 per cent in 2030. Over the same period, the annual expenditure is projected to be, on average, 10 per cent above the income from contributions (1.15 per cent). The resulting evolution of the projected reserve of the Unemployment Account over the period 2015-2030 is shown in figure 4.3.

Figure 4.2. Projected expenditure on unemployment benefit as a percentage of insurable earnings, 2015-2030

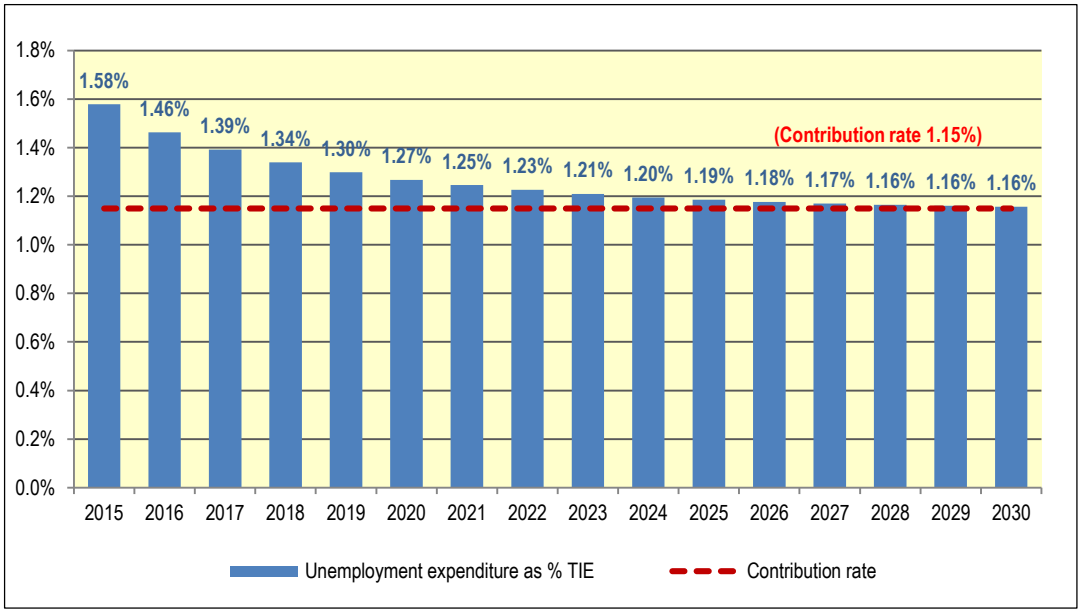
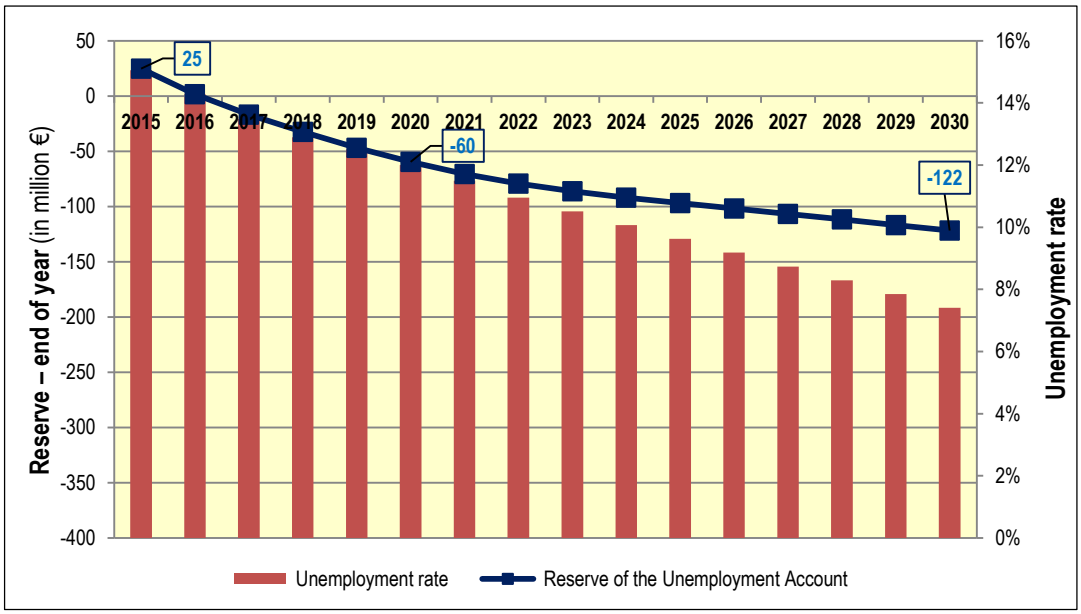


Figure 4.3. Actuarial estimate for the evolution of the Unemployment Account reserve, and unemployment rate assumption, 2015-2030



Following are the main points from figure 4.3:

- Over the next 15 years, even though the unemployment rates are assumed to gradually decrease from 15.1 per cent in 2015 to 7.4 per cent in 2030, they remain at relatively high levels for many years. In fact, it is only in year 2025 that the unemployment rate is projected to drop below the 10 per cent level.

- The above assumed evolution of the unemployment rate results in negative net cash flows each year in the Unemployment Account, which cumulate a negative balance of Unemployment Account reserves of approximately €60 million at the end of 2020 and €120 million at the end of 2030.

- The total amount of negative net cash flows in the Unemployment Account over the five-year period 2015-2020 is estimated at €85 million (on average €17 million each year), which is much higher than the corresponding total amount with respect to the ten-year period 2020-2030, which is estimated to be only €60 million (on average €6 million each year).

- The speed at which the unemployment rate decreases, especially over the next five years, will have a significant impact on the evolution of the financial situation of the Unemployment Account. Effectively, if the unemployment rate turns out to decrease to a much lower level than the assumed rate of 12 per cent in 2020, this would lead to much better levels of Unemployment Account reserves in the short and medium term.

Given the recent experience of expenditure on unemployment benefits, the risk of future fluctuations in this expenditure and the level of uncertainty in the decreasing pattern of the unemployment rate in the short and medium term, it is recommended to leave the current contribution rate of 1.15 per cent of the insurable earnings of employed persons unchanged, but it is vital that the financial position of the Unemployment Account is monitored closely and on a regular basis, ideally quarterly, so that, where necessary, corrective measures are taken.

4.2. Other short-term and employment injury benefits

The benefit branch named "Other Benefits" includes sickness benefit, maternity allowance, grant benefits (maternity grant, marriage grant [4] and funeral grant) and employment injury benefits (injury benefit, disablement benefit and death benefit). As shown in figure 4.4, over the 11-year period 2005-2015, the expenditure under this benefit branch represented 1.14 per cent of insurable earnings (on average), slightly below the contribution rate of 1.15 per cent currently allocated to the Other Benefits Account in respect of employed persons. The experience has been relatively stable over the last 11 years.

Figure 4.4. Short-term benefits as a percentage of insurable earnings, 2005-2015

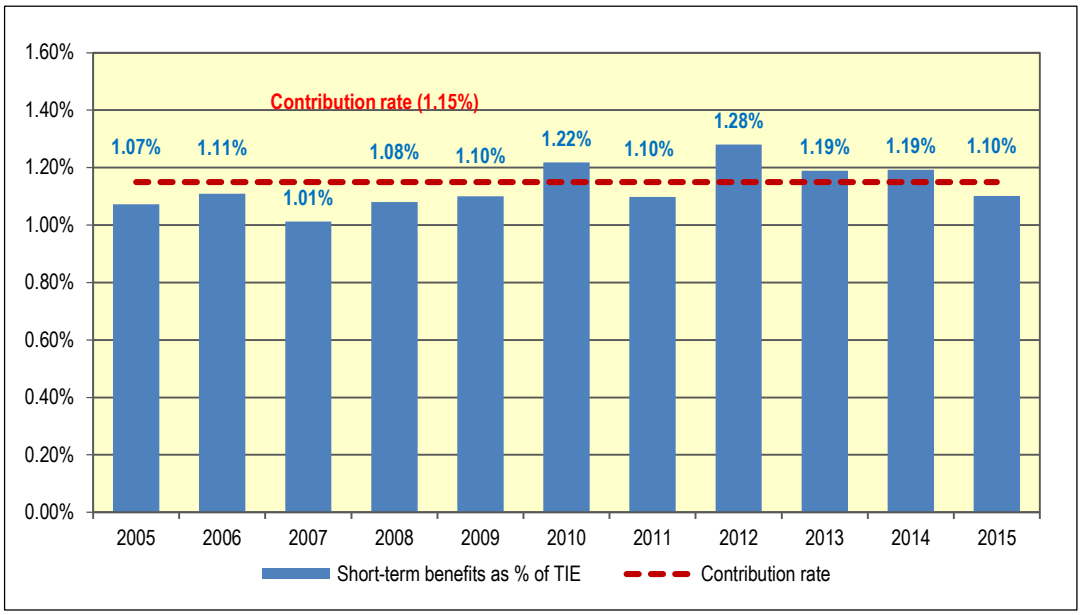


Table 4.3 presents the detailed experience of this benefit branch for the years 2012, 2013 and 2014. Over that period, sickness benefits have represented on average 0.52 per cent of insurable earnings, maternity allowance 0.45 per cent, grant benefits 0.12 per cent and employment injury benefits 0.13 per cent. The total expenditure of other short-term and employment injury benefits has averaged 1.22 per cent of insurable earnings over the three-year period 2012-2014.

Table 4.3 Expenditure on short-term and employment injury benefits, 2012-2014

Year 2012	**Annual expenditure** (in €)	**Expenditure as % of total insurable earnings**
Sickness benefit	41 788 284	0.56
Maternity allowance	32 848 209	0.44
Grant benefits	11 501 534	0.15
Employment injury benefits	9 458 946	0.13
Total	**95 596 973**	**1.28**

[4] Marriage grant was abolished for all marriages which took place as from 1 January, 2013 onwards.

Year 2013	Annual expenditure (in €)	Expenditure as % of total insurable earnings
Sickness benefit	33 323 259	0.49
Maternity allowance	30 859 611	0.46
Grant benefits	7 160 762	0.11
Employment injury benefits	9 194 406	0.13
Total	**80 538 038**	**1.19**

Year 2014	Annual expenditure (in €)	Expenditure as % of total insurable earnings
Sickness benefit	33 236 521	0.51
Maternity allowance	29 300 780	0.45
Grant benefits	6 480 360	0.10
Employment injury benefits	8 721 681	0.13
Total	**77 739 342**	**1.19**

Given the experience on other short-term and employment injury benefits over the last 11 years and the relative stability of the expenditure as a percentage of insurable earnings observed over the same period, it is recommended to keep unchanged the current contribution rate of 1.15 per cent of insurable earnings in respect of employed persons.

4.3. Administration expenses

The actual cost of administration expenses for the years 2012, 2013 and 2014 was relatively stable at 0.14 per cent of insurable earnings. As mentioned above, the administration expenses are currently covered by the Other Benefits Account, but it is recommended that the total administration cost is allocated to the various benefit accounts of the GSIS in accordance with the level of actual administration expenses incurred in each account.

4.4. Long-term benefits

4.4.1. Demographic projections

Table 4.4 shows the anticipated development of the number of contributors, the number of pensions by type of pension benefit and sex, as well as the ratio of the number of contributors to the total number of pensions (old-age, invalidity, widows and orphans). This ratio measures the number of contributors who could support the number of pensions paid out at any point in time.

The number of contributors is directly linked to the assumed labour force participation rates applied to the working-age population. Hence, the demographic and labour market assumptions have a great impact on the expected number of future contributors. As shown in table 4.4, the number of GSIS contributors is expected to slightly decrease in 2016, due to a small decline in the working-age population and labour force, but to increase continuously for the rest of the projection period due to the projected increase in the working-age population and labour force. In particular, over the projection period, the number of contributors is expected to increase by 62 per cent, i.e., from 411,437 in 2015 to 667,220 in 2080.

The number of old-age, invalidity and widow's pensions increases for several decades. In particular, the number of old-age pensioners is expected to more than double over the next 45 years due to population ageing, increasing from 105,988 in 2015 to 248,576 in 2060, then slightly decreasing for the rest of the projection period.

Furthermore, the number of *male* old-age pensioners is projected to grow by a factor of 1.6, i.e., from 63,923 in 2015 to 101,955 in 2080, while the number of female pensioners in 2080 will represent 2.8 times the number estimated in 2015. The important increase in the number of female pensioners is mainly due to the increased participation of women in the labour force projected under the macroeconomic frame of the valuation.

Female old-age pensioners are expected to outnumber their male counterparts by the year 2044 and by 2080 there is projected to be 14,081 (or 14 per cent) more female than male old-age pensioners. Over the same period, the number of invalidity and widow's pensioners is projected to continuously increase, but at a much slower pace than for old-age pensioners.

The ratio of contributors to pensions is projected to decrease from 2.9 in 2015 to 2.4 in 2080, whereas the ratio of contributors to old-age and invalidity pensioners is projected to decrease from 3.7 in 2015 to 2.9 in 2080.

4.4.2. Financial ratios

The future evolution of the average pension under the GSIS may be analysed through the evolution of the aggregate replacement ratio, which is defined as the ratio of the average first pension for new old-age pensioners, who did not emigrate from Cyprus prior to their retirement, to the average earnings of the active contributors aged 55 and over.

In the basic part of the GSIS, as shown in table 4.5, the aggregate replacement ratio is presently 30 per cent for males and 36 per cent for females. Given that the minimum pension is equal to 85 per cent of the full basic pension in the basic part of the GSIS, the range between the minimum and the maximum (full basic) pension is quite narrow. The projected aggregate replacement ratios shown in table 4.5 will remain stable at around these levels in the future given the state of maturity of the GSIS and the presence of the minimum pension.

The supplementary part of the GSIS has not reached the state of maturity. This part of the GSIS was introduced in 1980. It will thus take another ten years before workers will have a history of contribution to the supplementary part of the GSIS covering their whole career. Unlike the situation in the basic part of the GSIS, the aggregate replacement ratios in the supplementary part are increasing with time. In the supplementary part of the GSIS, the pension is directly proportional to the period of contribution. As shown in table 4.5, a relative stability of the aggregate replacement ratios will be reached around 2025, after 45 years of existence of this part of the GSIS. In that year, the aggregate replacement ratio of new old-age pensioners will be 39 per cent for males and 32 per cent for females, and will stay at around these levels thereafter.

Table 4.4. Demographic projections for long-term benefits

Year	Contributors	Number of pensions							Ratio of contributors to pensions
		Old age		Invalidity		Widows	Orphans	Total	
		Males	Females	Males	Females				
2015	411 437	63 923	42 065	4 213	2 307	30 969	831	144 308	2.9
2016	411 269	64 800	43 592	4 270	2 364	31 323	840	147 190	2.8
2017	413 222	66 065	45 162	4 336	2 419	31 681	815	150 477	2.7
2018	415 722	67 557	46 682	4 363	2 486	32 038	789	153 914	2.7
2019	418 759	69 017	48 053	4 412	2 554	32 411	759	157 206	2.7
2020	422 181	70 335	49 499	4 482	2 613	32 796	742	160 467	2.6
2025	434 747	77 280	58 371	4 723	2 910	34 992	575	178 851	2.4
2030	448 193	84 264	68 600	4 991	3 276	37 568	447	199 147	2.3
2035	464 896	90 899	79 599	5 470	3 725	40 260	405	220 358	2.1
2040	481 836	93 183	89 172	6 043	4 120	42 508	398	235 425	2.0
2045	498 076	99 624	101 220	6 315	4 335	43 920	383	255 798	1.9
2050	516 796	104 927	110 626	6 214	4 287	45 039	363	271 455	1.9
2055	536 495	114 158	126 049	6 180	4 043	46 295	349	297 074	1.8
2060	558 931	115 247	133 328	6 440	4 043	47 512	344	306 915	1.8
2065	585 901	109 702	130 634	6 819	4 268	49 226	347	300 997	1.9
2070	615 579	105 326	126 442	7 206	4 561	50 856	356	294 747	2.1
2075	644 645	100 727	119 148	7 479	4 818	50 224	366	282 762	2.3
2080	667 220	101 955	116 036	7 765	5 080	47 993	377	279 206	2.4

Note: For the purpose of the actuarial projections, the orphans aged 21 and over have been considered as widows' pensions recipients.

Table 4.5. Aggregate replacement ratios of new old-age pensioners, 2015-2045 (in percentage)

Year	Basic insurance [1]		Supplementary insurance	
	Males	Females	Males	Females
2015	30	36	34	25
2020	29	35	37	30
2025	29	37	39	32
2030	29	37	39	33
2035	30	37	39	34
2040	29	36	38	33
2045	29	36	38	34

[1] For the purposes of calculating basic insurance replacement rates, the available portion of supplementary pension, which would bring the basic pension up to its maximum level (full basic), is added to the basic pension. This additional supplementary pension is subject to wage rather than price indexation.

4.4.3. Financial projections

The projection of the revenue and expenditure components and the evolution of the reserve of the GSIS are presented in table 4.6. Following are the main points:

- The future evolution of the legislated contribution rate (second column of table 4.6) is closely linked to the projected evolution of the pay-as-you-go (PAYG) cost rate of the GSIS (last column). In year 2080, the PAYG rate is projected to reach 23.8 per cent, which is lower than the legislated contribution rate of 24.4 per cent. It can be concluded that the adopted schedule of contribution rates is sufficient, overall, to ensure the long-term sustainability of the GSIS.

- During the whole projection period, the total of contributions and investment earnings each year is sufficient to meet the GSIS annual expenditure.

- Over the period 2015-2035, there is a downward trend in the reserve ratio. Although four legislated increases in contribution rate take place over that period, the total expenditure is projected to grow at a faster rate than that of contributions, primarily due to the effect of the maturity of the supplementary part of the GSIS.

- Over the period 2035-2070, the reserve ratio is projected to remain relatively stable at 4.1, primarily due to the reform measure of automatic adjustment of retirement age to changes in life expectancy, the full financial effect of which is realized after 2035.

- From 2070 onwards, the total of contributions is broadly sufficient to meet the GSIS expenditure and the reserve ratio starts increasing primarily due to demographics, resulting from the slight improvement of the old-age dependency ratio.

Table 4.6. Financial projections of the GSIS (in million € where applicable)

Year	Contribution rate (in %)	Total insurable earnings	Revenue			Total expenditure	Reserve (end of year)	Reserve ratio	PAYG rate (in %)
			Contributions	Investment earnings	Total				
2015	17.9	6 597	1 203	22	1 225	1 221	7 433	6.1	18.5
2016	17.9	6 684	1 218	37	1 256	1 251	7 493	6.0	18.7
2017	17.9	6 859	1 250	60	1 310	1 293	7 567	5.9	18.8
2018	17.9	7 102	1 294	83	1 377	1 347	7 656	5.7	19.0
2019	19.2	7 395	1 443	100	1 543	1 406	7 852	5.6	19.0
2020	19.2	7 733	1 509	126	1 635	1 477	8 072	5.5	19.1
2025	20.5	9 776	2 034	279	2 312	1 994	9 644	4.8	20.4
2030	21.8	12 246	2 708	339	3 047	2 695	11 736	4.4	22.0
2035	23.1	15 157	3 553	414	3 967	3 503	14 342	4.1	23.1
2040	24.4	18 729	4 639	529	5 168	4 396	18 441	4.2	23.5
2045	24.4	23 014	5 712	692	6 404	5 577	24 046	4.3	24.2
2050	24.4	28 317	7 039	884	7 923	6 938	30 713	4.4	24.5
2055	24.4	34 403	8 567	1 093	9 659	8 940	37 734	4.2	26.0
2060	24.4	42 161	10 491	1 292	11 782	11 010	44 590	4.0	26.1
2065	24.4	51 327	12 740	1 560	14 300	13 272	53 858	4.1	25.9
2070	24.4	62 760	15 543	1 868	17 411	15 900	64 576	4.1	25.3
2075	24.4	76 633	18 945	2 358	21 303	18 558	81 830	4.4	24.2
2080	24.4	93 704	23 156	3 019	26 175	22 294	104 904	4.7	23.8

Figure 4.5 presents, for each year until 2080, the total revenues of the GSIS, consisting of the amount of contributions and investment earnings, as well as GSIS expenditures. It shows that contributions are almost sufficient to support the scheme's expenditures for the whole projection period and that investment earnings help compensate for small contribution insufficiencies in certain years, thus ensuring the maintenance of a constantly positive reserve.

Figure 4.6 shows the projected GSIS reserve ratio as compared to the minimum target reserve ratio (as defined in Section 2) over the period 2015-2080. The GSIS reserve ratio is constantly greater than the minimum target level in all years.

Figure 4.5. Projected GSIS revenues and expenditure and reserve ratio, 2015-2080
(in million €)

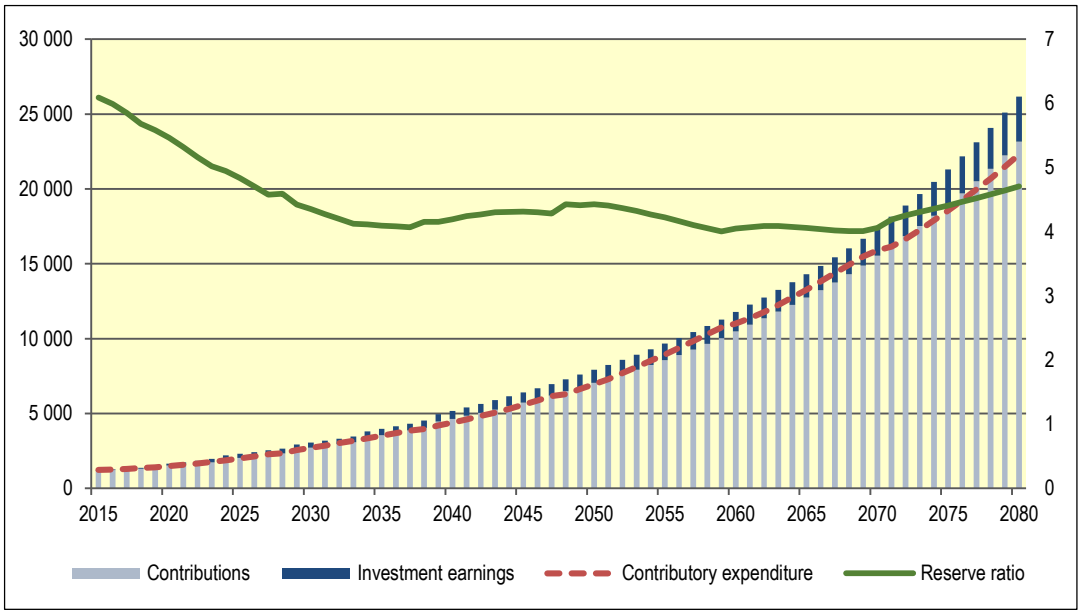
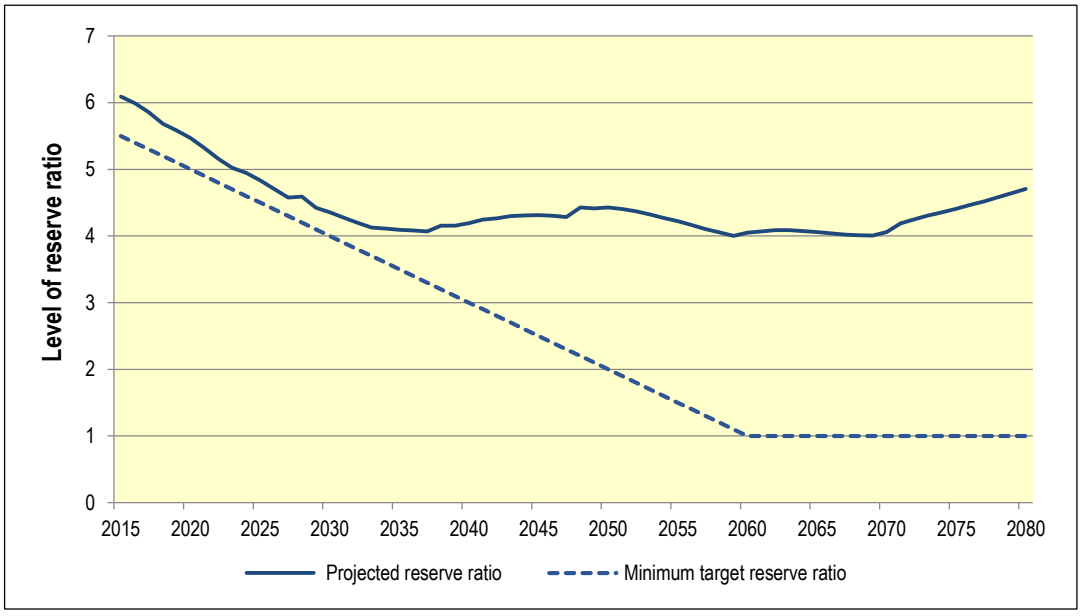


Figure 4.6. Projected GSIS reserve ratio compared to minimum target reserve ratio, 2015-2080



4.5. Recommendations

4.5.1. GSIS account allocation

The present financing and accounting format of the GSIS consists of four accounts, namely Unemployment, Other Benefits, Basic Pensions and Supplementary Pensions.

Merging Basic and Supplementary Pensions Accounts. Since the financing of GSIS pensions (through contributions and investment earnings) and the actuarial analysis of the financial sustainability of the pension branch is done by considering the Basic and Supplementary Pensions Accounts together, it is recommended to merge those two accounts for accounting purposes. According to that approach, contributions and investment income would no longer be split between Basic and Supplementary pensions in the financial statements. However, regarding benefit expenditures, separate information on Basic and Supplementary pensions would continue to be presented. Table 4.7 shows the recommended allocation of total current contribution rate of 20.2 per cent of insurable earnings for employed persons to each account and the corresponding type of expenditure covered.

Table 4.7. Expenditure covered and contribution rate by account for employed persons

Account	Benefits and expenses covered	Contribution allocation (as % of insurable earnings)
Unemployment	Unemployment benefits and administration expenses	1.15
Other Benefits	Sickness benefit, maternity allowance, maternity grant, funeral grant, employment injury benefits and administration expenses	1.15
Pensions	Old-age pension, invalidity pension, widow's pension, orphan's benefit, other related lump sum benefits and administration expenses	17.90
Total		**20.20**

Allocating administrative expenses between benefit branches. All administration expenses of the GSIS are currently allocated to the Other Benefits Account. It is recommended to allocate GSIS total administration expenses to each account proportionately in accordance with the actual occurrence of those expenses in each account.

4.5.2. Unemployment Account

In general, unemployment benefit schemes are designed to be counter-cyclical. Over the recent years of recession in Cyprus, the GSIS unemployment benefit has been meeting its main purpose in helping those affected by the downturns of the economy by running Unemployment Account deficits each year through providing more unemployment benefits in comparison to the contributions received. The social insurance unemployment benefit has been acting as an automatic economic stabilizer, helping to maintain private consumption and enabling quicker economic recovery.

It is advisable to aim towards balancing the revenue and expenditure of the Unemployment Account over one or two economic cycles, typically covering a period of up to 15 years. The Unemployment Account should, on an ongoing basis, be financially viable without the need for transferring funds from other GSIS accounts or from the government.

Over the next 15 years (2016-2030), the annual unemployment benefit expenditure is projected to be, on average, 10 per cent above the income from contributions (1.15 per cent), thus resulting in a cumulative Unemployment Account reserve deficit of approximately €120 million at the end of 2030.

It could be argued that the levels of unemployment observed in Cyprus in recent years have been exceptionally high, far beyond the rates expected in a typical cyclical economic downturn. Taking into account the above argument and the high level of uncertainty associated with the decreasing pattern of the unemployment rate in the short and medium term, it is recommended to leave the current contribution rate of 1.15 per cent of insurable earnings unchanged over the years 2016-2018. However, it is important that over the next three years the financial position of the Unemployment Account, as well as the short- and medium-term trends in key economic indicators such as economic growth, jobs creation and unemployment rate, are closely monitored and on a regular basis (ideally quarterly). For this purpose, a relatively small amount of approximately €40 million would be required to be transferred to the Unemployment Account in order to keep its reserve at a positive level over the short term.

A reassessment of the financial position of the Unemployment Account in three years' time will indicate whether further transfer of funds is necessary. If a fund transfer is required, it is recommended to the Government of Cyprus to avoid undertaking an inter-account transfer of funds but instead to consider alternative options over the medium term, including increasing the contribution rate allocated to the Unemployment Account and rationalizing the provisions of unemployment benefit entitlements.

4.5.3. Investment policy

Currently, GSIS assets are invested primarily in non-tradeable government deposits (93 per cent) while the remaining assets are invested in medium-term government bonds and cash deposits held with commercial and cooperative banks in Cyprus.

The GSIS could consider the possibility of increasing the proportion of its assets invested in non-government securities in order to enhance diversification of the investment portfolio and aim to achieve higher rates of return through these diversified investments. Any revision of the investment policy should take into account the profile of the liabilities of the GSIS, subject to an acceptable level of risk. Achieving higher rates of return would directly contribute towards the improvement of the financial status of the GSIS through increased revenues. The extent of this improvement would eventually depend on the amount of investment in non-government assets and the additional investment return that could be achieved on those assets as compared to the expected return under current investment policy. Nevertheless, the financial improvement is not expected to be significant given that investment income, under current investment policy, is projected to represent, on average over the next 65 years, only 10 per cent of total revenues. It must be borne in mind that the main revenue source of the GSIS in the future will continue to be contributions.

Furthermore, investing, in the near future, part of GSIS reserves in non-government assets would help in the containment of longer-term future increases of government debt towards the GSIS and would mean that, in future, government securities would represent a much smaller share of the total reserves. In that context, any cash flow needs of the GSIS in periods of significant economic difficulties can then be met by recovering funds (or selling securities) from any of the GSIS borrowers and not necessarily the Government, which might itself face cash flow problems at that time.

Any change in the current investment policy of the GSIS should be gradual in order to avoid a negative impact on government cash flow and a deterioration of its budgetary position, as well as to allow time for the implementation of the new investment framework of the GSIS. The actual percentage of future GSIS surpluses to be invested in non-government securities each year should be decided in close cooperation with the Ministry of Finance in the context of government finances, and in particular by considering the impact

of public social protection programmes, including the GSIS, on the government budget. [5] It is noted that according to the Social Insurance Law, the Minister of Finance is currently responsible for setting up the investment policy of the GSIS, while the Social Insurance Board has an advisory role on investments.

Finally, it is important to note that the new investment policy and strategy should:

– be consistent with the financing objectives of the GSIS, the maturity status of the GSIS and its future cash flow requirements;

– aim to achieve a reasonable balance between the two primary investment objectives of security of asset and return on investments; and

– take into account the national economic and social utility of the investments and consider the extent to which those investments make a substantial contribution to the long-term national growth rates.

By contributing to long-term national economic growth, the chosen investments can improve the financial status of the GSIS in terms of the number of workers and the amount of their insurable earnings. Indeed, social security schemes are primarily dependent, in the long term, on the evolution of economic growth.

[5] The European Commission's recent forecasts, as per Spring 2016 Economic Forecast, project that the general government gross debt will remain above 100 per cent of GDP at least until 2017.

5. Reconciliation with the previous valuation

5.1. Introduction

The results presented in this report were reconciled with those previously projected in the actuarial valuation as at 31 December 2011, so as to determine the effects of the changes that affect the projections. The indicator used for the reconciliation is the pay-as-you-go (PAYG) rate, which is the ratio of expenditures to insurable earnings in a given year and corresponds to the contribution rate that would need to be paid to cover the cost of the GSIS if there were no reserves.

The sources of difference of results observed at the two valuation dates, which are discussed below, are separated as follows:

– amendments in the Social Insurance Law and other relevant laws;

– methodological improvements made to the projection model;

– GSIS experience for years 2012, 2013 and 2014 affecting the starting data of the report as at 31 December 2014; and

– changes made to the key actuarial assumptions.

5.2. Amendments to the legislation

There has been no significant amendment to the legal provisions of the GSIS since the last actuarial valuation.

5.3. Methodological improvements to the projection model

In principle, there was one methodological improvement made to the pension projection model used in previous actuarial valuations in the area of projecting insured population by insurance level. In particular, the above improvement relates to capturing the incidence of movement between "basic only" and "basic and supplementary" insured persons in the early participation years, reflecting GSIS past experience.

5.4. Experience update, 2012-2014

The projections made in the 2011 actuarial report were compared with the results published in the financial statements for the years 2012, 2013 and 2014, as shown in Annex 3 of this report. Those results were adjusted so that they could be presented on the same basis as those in the present actuarial report, that is, by:

– assuming that expenditure amounts are disbursed as soon as they are encumbered and received as soon as they are due; and

– ignoring the two ad-hoc transfers of funds between the Supplementary Pensions Account and Unemployment Account which took place in 2012 and 2014 respectively.

Table 5.1 shows the results of that comparison. Each element in the table is analysed in the pages which follow.

Table 5.1. Changes in GSIS reserves

	(A) Actual (in millions €)	(B) Expected (in millions €)	(C)=(A)-(B) Difference (in millions €)	(C)/(B) Deviation (in %)
Reserves as at 31 December, 2011	**7 281**	**7 281**	**0**	**0.0**
Plus contributions	3 445	3 742	–297	–7.9
Plus investment income	237	309	–72	–23.2
Minus expenditures	3 397	3 479	-82	–2.4
Reserves as at 31 December, 2014	**7 566**	**7 853**	**–287**	**–3.7**

[1] The expected amount of investment income of €309 million is based on the total reserves of the GSIS as of 31 December, 2011 and the expected rates of return shown in Table 5.3.

5.4.1. Contributions

The total amount of contributions collected during the period 2012-2014 was approximately €3,445 million or 7.9 per cent lower than projected in the 2011 actuarial valuation. This difference is mainly due to a lower than expected number of contributors, resulting from a lower than expected level of employment, primarily in the years 2012 and 2013. As shown in table 5.2, the number of contributors in 2014 was 412,387, that is, 26,878 lower than the number projected in the 2011 valuation, a difference of 6.1 per cent. Over the period 2012-2014, the total number of contributors decreased by 9.6 per cent from 456,306 in 2011 to 412,387 in 2014, whereas over the same period the corresponding expected decrease was only 3.7 per cent.

Table 5.2. Actual vs expected annual increase of contributors, 2011-2014 (numbers and percentages)

Year	Actual		Expected	
	Number	% Increase	Number	% Increase
2011	456 306	–	456 306	–
2012	440 334	–3.5	450 214	–1.3
2013	418 713	–4.9	440 401	–2.2
2014	412 387	–1.5	439 265	–0.3

5.4.2. Investment income

Over the period 2011 to 2014, total income from investments was €237 million, 23 per cent lower than anticipated, primarily due to the continued decrease of the European Central Bank interest rates with a view to tackling the economic crisis and cushioning its impact on the real economy.

Table 5.3 compares the assumed nominal rates of return on GSIS assets with the rates observed from 2012 to 2014. During that period, the average annual rate of return on GSIS assets was 1.1 per cent, whereas the expected rate was 1.4 per cent.

Table 5.3. Nominal rate of return on GSIS assets (in percentage)

Year	Actual rate of return	Expected rate of return
2012	1.6	1.6
2013	1.1	1.3
2014	0.5	1.3
Average rate	**1.1**	**1.4**

5.4.3. Expenditure

Benefit payments during the period 2012-2014 were €82 million lower than anticipated, representing a deviation from the expected results of about 2.4 per cent. The difference between actual and expected results is mainly due to an over-projection of the number of pensions in payment. As shown in table 5.4, the total number of pensions in payment in 2014 was 141,782, that is, 1,923 less than the number projected in the 2011 actuarial valuation, a difference of 1.3 per cent. Over the period 2011-2014, the total number of pensions in payment increased steadily from 131,343 in 2011 to 141,782 in 2014, an increase of 7.9 per cent, whereas over the same period the corresponding expected increase was higher, at 9.4 per cent.

Table 5.4. Actual vs expected annual increase of pensioners, 2012-2014 (numbers and percentages)

Year	Actual		Expected	
	Number	% Increase	Number	% Increase
2011	131 343	–	131 343	–
2012	135 464	3.1	136 920	4.2
2013	137 197	1.3	140 927	2.9
2014	141 782	3.3	143 705	2.0

5.5. Changes in assumptions

Table 5.5 summarizes the changes made to the key assumptions used in this report compared with those used in the previous report. These changes are as follows:

- The *total fertility rate* starts at a lower level than in the previous actuarial report, but reaches comparable levels in the long term. In the 2011 actuarial valuation, the rate was increasing gradually from 1.51 in 2015 to 1.62 in 2060. In this report, the fertility rate is 1.33 children per woman in 2015, increasing gradually to 1.59 in 2060 and 1.66 in 2080.

- In this report, the *life expectancies* for both males and females are assumed to reach 85.2 and 88.9 years respectively in 2060. These life expectancies are almost the same as those projected in the 2011 valuation, which were assumed to reach 85.1 years for males and 89.0 years for females in 2060.

- In the 2011 valuation, net migration was 4,087 in 2015 gradually increasing to 5,268 in 2035 and then decreasing to 4,134 in 2060. In this valuation, net migration increases from –10,436 in 2015 to 4,458 in 2035 and thereafter increasing to 7,949 by 2060.

- The assumed overall *male labour force participation rate* is higher in the present valuation than in the 2011 valuation, whereas the *female labour force participation rate* is broadly similar. In the previous report, the male labour force participation rate of

81.1 per cent in 2015 was projected to reach 81.7 per cent in 2060. For females, it was 68.6 per cent in 2015, increasing to 74.0 per cent in 2060. In the present report, the male labour force participation rate of 80.8 per cent in 2015 is projected to reach 83.1 per cent in 2060. For females, it is 68.5 per cent in 2015, increasing to 74.1 per cent in 2060.

- In this report, the *unemployment rate* is assumed to gradually decrease to 5.0 per cent in 2039 and remain stable thereafter, whereas in the previous report it was assumed to decrease to 7.4 per cent from 2047 onwards.

- In this report, the assumed annual *real rate of return* on GSIS assets in the long term is set at 1.0 per cent from 2025 onwards, whereas in the 2011 report it was set at 1.5 per cent from 2024 onwards.

- Some other GSIS-specific assumptions, which are described in Annex 4, were also changed, for example the invalidity incidence rates. As will be seen in Section 5.6, overall the changes in these GSIS-specific assumptions had a minor effect on the projection results.

Table 5.5. Changes to key assumptions

Assumption		Actuarial report as at 31.12.2014		Actuarial report as at 31.12.2011	
Total fertility rate	2015		1.33		1.51
	2040		1.51		1.57
	2060		1.59		1.62
	2080		1.66		–
Life expectancy at birth		**Males**	**Females**	**Males**	**Females**
	2015	79.4	83.6	79.1	83.5
	2060	85.2	88.9	85.1	89.0
	2080	87.3	90.8	–	–
Net migration	2015		–10 436		4 087
	2035		4 458		5 268
	2060		7 949		4 134
	2080		6 183		–
Real GDP growth rate (%)			1.6 (2015)		1.1 (2015)
			2.3 (2030+)		2.0 (2030+)
Labour force participation rates (15-64) (%)		**Males**	**Females**	**Males**	**Females**
	2015	80.8	68.5	81.1	68.6
	2040	83.0	73.3	81.4	73.8
	2060	83.1	74.1	81.7	74.0
	2080	83.1	74.5	–	–
Unemployment rate (15-64) (%)			15.1 (2015)		14.6 (2015)
			12.0 (2020)		10.2 (2020)
			7.4 (2030)		8.4 (2030)
			5.0 (2039+)		7.4 (2047+)
Price inflation (%)			2.0 (2021+)		2.0 (2020+)
Real wage increase (%)			1.7 (2020+)		1.6 (2030+)
Real rate of return (%)			1.0 (2025+)		1.5 (2024+)

5.6. Reconciliation results

Table 5.6 shows the results of the reconciliation. It shows the effect of the various factors on the pay-as-you-go rates.

Experience update. The experience update (2012-2014) had the effect of increasing the pay-as-you-go rates by 0.7 per cent in 2015, 0.2 per cent in 2040 and 2.5 per cent in 2060.

Improvements in methodology. The methodological improvements made to the projection model have resulted in a decrease of the pay-as-you-go rate of 0.6 per cent in 2040 and an increase of 0.5 per cent in the longer term (2060).

Changes in assumptions. The overall impact of changes to the projection assumptions is an increase in the pay-as-you-go rate of 0.6 per cent in 2015 and 2.4 per cent in 2040, but a decrease of 1.5 per cent in 2060.

– concerning demographic assumptions, the lower fertility and lower net migration (over the short term) projected in the 2014 valuation cause an increase of the PAYG rate in the first decades of the projection;

– concerning economic assumptions, the more favourable assumptions in the 2014 valuation regarding the long-term participation rates of males, lower ultimate unemployment rate and slightly higher real wage increase lead to a decrease of the PAYG rate in the long term.

– concerning scheme-specific assumptions, as mentioned above, the modifications have only a minor impact.

Table 5.6. Reconciliation of the pay-as-you-go rates as a percentage of insurable earnings, 2011 and 2014 actuarial valuations

	2015	2040	2060
As per actuarial report as at 31 December 2011	**17.2**	**21.5**	**24.6**
I. Amendments	**+0.0**	**+0.0**	**+0.0**
II. Experience update, 2012-2014	**+0.7**	**+0.2**	**+2.5**
III. Improvements in methodology	**+0.0**	**–0.6**	**+0.5**
IV. Changes in assumptions			
Demographic	+0.4	+2.7	–0.4
Economic	+0.2	–0.4	–0.8
Scheme-specific	+0.0	+0.1	–0.3
Subtotal	**+0.6**	**+2.4**	**–1.5**
Total of I to IV	**+1.3**	**+2.0**	**+1.5**
As per actuarial report as at 31 December, 2014	**18.5**	**23.5**	**26.1**

6. Sensitivity tests

Since all projections have a degree of uncertainty, sensitivity tests were carried out on the results. These tests were used to measure the changes in the results that would occur if changes in an assumption were different than those made in the base scenario. The tests were limited to the following five key demographic and economic variables which are subject to a relatively high degree of uncertainty:

– *Demographic*: fertility, mortality and net migration.

– *Economic*: female labour force participation rates and real rate of return on GSIS assets.

Two tests were conducted for each of the above assumptions. The first evaluated the effect on the results of changes less favourable for the GSIS than those used in the base scenario; the second evaluated the effect of more favourable changes. The variations in assumptions tested represent a difference considered to be significant with respect to the assumptions made in the base scenario without, however, being the upper and lower limits of a probable interval of change for each variable.

In order to examine the degree of sensitivity of projected results to each change of assumption, three financial indicators are presented for each test, the values of which are compared with those in the base scenario. These indicators are:

– *general average premium (GAP)*: the stable contribution rate needed to be paid over the projection period in respect of current and future insured population in order to finance GSIS expenditure over the same period in respect of existing and future beneficiaries;

– *reserve ratio*: the ratio of the level of reserves at the end of one year to the level of expenditures for the same year; and

– *pay-as-you-go rate (PAYG)*: the ratio of expenditure to insurable earnings in a given year.

A less favourable change in an assumption (Test I) typically results in a lower reserve ratio and a higher GAP, as well as a higher PAYG rate. A more favourable change (Test II) has the opposite effect.

Table 6.1 summarizes the alternative assumptions used in the sensitivity tests. It is followed by a brief discussion of each assumption and the impact that the variation in each assumption has on projection results. Table 6.2, presented at the end of this section, shows the values of the above three financial indicators for each sensitivity test.

Table 6.1. Sensitivity test assumptions

Assumption		Test I (unfavourable)		Best estimate assumptions in the report		Test II (favourable)	
Total fertility rate	2040		1.45		1.51		1.56
	2080		1.50		1.66		1.80
Life expectancy at birth		**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
	2040	84.2	88.0	83.0	86.9	81.8	85.8
	2080	89.5	92.9	87.5	90.9	85.5	88.9
Net migration	2050		7 154		8 832		10 510
	2080		5 008		6 183		7 357
Female labour force participation rate (15-64) (%)	2050		71.1		74.1		77
	2080		71.5		74.5		77.5
Real rate of return (%)			0.0 (2023+)		1.0 (2025+)		2.0 (2029+)

6.1. Sensitivity of demographic assumptions

6.1.1. Fertility

In this actuarial report, the total fertility rate is assumed to gradually increase from 1.33 children per woman in 2015 to 1.51 in 2040 and to 1.66 in 2080.

A change in the fertility rate, and consequently in the number of births, results in a change in the number of new GSIS contributors around 25 years later. Therefore, the effect of a variation in fertility on the projected financial situation of the GSIS can be observed only in the long term.

In Test I (unfavourable), the assumed fertility rate is lower than that used in the report. It increases at a slower pace than the base scenario, reaching 1.45 in 2040 and 1.50 in 2080. In Test II (favourable), it increases more rapidly, reaching 1.56 in 2040 and 1.80 in 2080.

In 2080, the cumulative effect of the fertility rate results in a reduction of 1.7 per cent of the number of contributors in Test I and an increase of 2.1 per cent in Test II.

6.1.2. Mortality

In the present report, it is assumed that the life expectancy at birth gradually increases during the projection period, reaching 87.5 years for males and 90.9 years for females in 2080.

The sensitivity tests used variations in the level of improvement in life expectancy or mortality reduction during the projection period. An improvement in life expectancy that is greater than the improvement assumed in the base scenario would typically increase the aggregate benefit amount because the pension benefit payments would be made over a longer period. Similarly, a smaller improvement in life expectancy would typically reduce the aggregate benefit amount. However, the above anticipated change in the aggregate benefit amount due to an increase or decrease in life expectancy is effectively offset by opposite-sign contribution stemming from the anticipated increase in the effective retirement age resulting from the linkage of retirement age and life expectancy.

Test I (unfavourable) assumes an increase in life expectancy compared with the base scenario. Life expectancy at birth would thus be 89.5 years for males and 92.9 years for females in 2080. That represents an increase of two years for each sex compared with the base scenario. Test II (favourable), on the other hand, assumes a shorter life expectancy of 85.5 for males and 88.9 years for females in 2080, representing a reduction of two years for each sex compared with the base scenario.

As expected, the sensitivity of the results to a change in life expectancy is very limited. In particular, in 2080 under Test I (unfavourable), the aggregate GSIS expenditure increases by 0.3 per cent, whereas under Test II (favourable) it decreases by 0.1 per cent.

6.1.3. Net migration

The best-estimate projections of the report assume that net migration progressively increases from –10,436 people in 2015 to 8,832 people in 2050 and thereafter gradually decreases to 6,183 people in 2080.

A change in net migration is a change in the number of new contributors to the GSIS. Over a longer term, the number of beneficiaries also changes.

In Test I (unfavourable), the assumed net migration gradually increases from its current level of –10,436 people to 7,154 people in 2050 and thereafter progressively decreases to 5,008 in 2080. That represents an average decrease of 1,114 people in the annual number of net migrants over the period 2020-2080 compared with the base scenario. Test II (favourable), on the other hand, assumes higher levels of net migration, that is, 10,510 in 2050 and 7,357 in 2080, representing an average increase of 1,114 net migrants per year during the period 2020-2080 compared with the base scenario.

According to Test I, the number of contributors decreases by 10.1 per cent in 2080, compared with the base scenario, whereas in Test II, the number of contributors increases by 10.1 per cent.

6.2. Sensitivity of economic assumptions

6.2.1. Female labour force participation rate

The present report assumes that the average labour force participation rate for females between 15 and 64 increases from 68.5 per cent in 2015 to 74.1 per cent in 2050 and thereafter reaches 74.5 in 2080.

A downward change in female labour force participation rates (Test I) affects employment, given that the rate of unemployment remains unchanged from the base scenario. This decrease results in a reduction in the number of female contributors of the GSIS and in the aggregate amount of benefits over the longer term. An upward change in activity on the labour market (Test II) has the opposite effect.

In Test I (unfavourable), the assumed female participation rate progressively increases from 68.2 to 71.1 per cent in 2050, and thereafter reaches 71.5 in 2080, 3 percentage points lower than the best-estimate rate of the base scenario for those years. By contrast, in Test II (favourable), the assumed female participation rate gradually increases from 68.8 to 77 per cent in 2050, reaching 77.5 per cent in 2080, which is 3 percentage points higher than the best-estimate rate of the base scenario for those years.

According to Test I, the female employed population declines by 4.0 per cent by 2080, compared with the base scenario, whereas in Test II the female employed population increases by approximately 4.0 per cent by 2080.

6.2.3. Real rate of return

The projected real rate of return on the GSIS of the base scenario is assumed to progressively increase to its ultimate level of 1.0 per cent in 2025, and thereafter remain constant.

Variations of this assumption have an immediate impact on income generated by the reserve. Contributions and aggregate benefits are not affected.

In Test I (unfavourable), the real rate of return is assumed to be lower than in the base scenario and results in lower investment income levels. The ultimate level of real rate of return is 0.0 per cent and is reached in 2023. In Test II (favourable), the real rate of return is assumed to be higher than in the base scenario, reaching its ultimate level of 2.0 per cent in 2029.

Because of the cumulative effect of the above rate of return changes on the reserve, in Test I investment income decreases by 42 per cent in 2040 compared with the base scenario. In Test II, investment income in 2040 increases by 49 per cent compared to the base scenario.

Table 6.2. Results of sensitivity tests

Assumption	Test	General average premium (in %)	Reserve ratio		Pay-as-you-go rates (in %)	
			2040	2080	2040	2080
Best-estimate assumptions of the report		21.4	4.2	4.7	23.5	23.8
Fertility	**Test I**	21.5	4.2	4.5	23.5	24.3
	Test II	21.3	4.2	5.0	23.5	23.3
Mortality	**Test I**	21.5	4.1	4.3	23.5	23.9
	Test II	21.3	4.3	5.0	23.5	23.8
Net migration	**Test I**	22.1	4.1	3.2	23.7	25.5
	Test II	20.8	4.2	6.1	23.3	22.4
Female labour force participation rate	**Test I**	21.6	4.0	4.3	23.8	23.9
	Test II	21.3	4.4	5.0	23.1	23.9
Real rate of return on GSIS assets	**Test I**	21.9	3.6	3.3	23.5	23.8
	Test II	20.9	4.7	6.9	23.5	23.8

7. Conclusion

This actuarial report shows that the legislated schedule of contribution rates, following the 2009 and 2012 social insurance reforms, is sufficient to financially sustain the long-term benefits branch of the GSIS over the period 2015 to 2080. The projected financial status of the GSIS is healthy, with the reserve ratio of the GSIS remaining at a level higher than four times the annual expenditure until the end of the projection period.

It is recommended that the Government eventually introduces the necessary legislative changes for adapting its investment policy so that the proportion of GSIS assets invested in non-government securities increases. The revision of the investment policy is necessary for the sound financial governance of the GSIS.

With respect to the unemployment benefit branch of the GSIS, a close monitoring of the Unemployment Account is necessary.

The projected financial status of the GSIS presented in this report is based on an assumed long-term demographic and economic framework. Therefore, it remains important to review the GSIS financial position on a regular basis by producing periodic actuarial valuations. As required by the Social Insurance Law, the next actuarial report is scheduled to be produced as at 31 December, 2017.

8. Actuarial opinion

In our opinion, this actuarial report, which was prepared in compliance with the provisions of section 76 of the Social Insurance Law No. 59(I)/2010:

– is based on data that are sufficient and reliable;

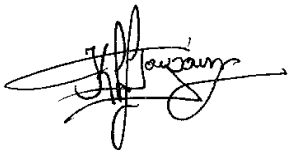
– uses assumptions that are, individually and in aggregate, reasonable and appropriate; and

– employs a methodology that is appropriate for the purposes of this report and consistent with sound actuarial principles.

The report and opinions given in it are in accordance with internationally accepted actuarial practice as provided by the International Standards of Actuarial Practice for General Actuarial Practice (ISAP 1) and Financial Analysis of Social Security Programs (ISAP 2) of the International Actuarial Association.

On behalf of the ILO:

Anne Drouin
FSA, FCIA



Costas Stavrakis
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Annex 1. Overview of the legal provisions of the General Social Insurance Scheme

A1.1. Introduction

The information presented in this annex is valid as at 31 December 2014, the date of the actuarial valuation of the GSIS. Any amendments in the legislation after the above date are not shown.

It is noted that the following recent amendments of the GSIS, as a result of the enactment of the Social Insurance Law, No. 193(I) of 2012, were incorporated in the present actuarial valuation:

- As of 1 January 2013, actuarial reduction of pension entitlements from the GSIS by 0.5 per cent per month for retirements before the statutory retirement age in line with the planned increase in the minimum age for entitlement to an unreduced pension to reach 65 (by 6 months per year), between 2013 and 2016;
- Freeze of pensions (all types) under the GSIS for the period 2013-2016;
- Abolishment of the increase of pensions for a working dependant spouse under the GSIS as of 1st January 2013 (this applies only to new pensioners);
- Stricter eligibility conditions to old-age pension: as of 1 April 2013, gradual extension of the minimum contributory period (one year per year) from the current 10 to 15 years over the period 2013-2017;
- Increase of contributions, as of 1 January 2014, of salaried employees and employers to the GSIS by an additional 1 percentage point (p.p.) of the increase which was legislated to take effect in 2014 as per 2009 GSIS reform – the above increase is shared as follows: 0.5 p.p. from salaried employees and 0.5 p.p. from employers and 1 p.p. in the case of self-employed persons; and
- Introduction of an automatic adjustment of the statutory retirement age every 5 year in line with changes in life expectancy at the statutory retirement age, to be applied in 2018 and the first revision will cover the period 2018-2023.

A1.2. 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, payable to wives and eligible children of persons missing as a result of the Turkish invasion.

On 6 October 1980, the supplementary part of the GSIS was introduced. This new part of the GSIS is earnings-related.

A1.3. Coverage

The GSIS 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 entitled to all benefits apart from employment injury benefits. Other voluntary contributors are entitled only to maternity grant, funeral grant, old-age pension and survivors' benefits.

A1.3.1. Voluntary insurance

Voluntary insurance is allowed to persons who:

– wish to continue insurance after a prescribed period of compulsory insurance; or

– work abroad in the service of Cypriot employers.

The condition for continuation of insurance on a voluntary basis is that the person concerned has basic insurance of at least one insurance point, earned from paid contributions.

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.

A1.4. Contributions

A1.4.1. 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 insurance conditions for old-age pension must continue to pay contributions until satisfaction of the insurance conditions. In no case can contributions be paid after the age of 68.

A1.4.2. Insurable earnings

Insurable earnings, on which contributions are paid, are the gross earnings up to a maximum of six times the basic insurable earnings. In 2014, basic insurable earnings are fixed at €174.38 per week, or €9,068 per year. The maximum insurable earnings for contribution purposes in 2014 are €54,396.

The total annual insurable earnings of every insured person are converted into insurance points. The conversion of insurable earnings into insurance points is done by dividing the earnings of a given year by the annual basic insurable earnings of the given year (in 2014, one point is credited for every €9,068 of earnings). The first insurance point represents *basic insurance* and insurance points in excess of one represent *supplementary insurance*.

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 (notional) income is prescribed, but the individual self-employed person has the right to opt for a higher income up to the maximum insurable earnings or apply for contribution payments on the actual income, if that is lower that the notional income.

A1.4.3. Contribution rate

Table A1.1 shows the current contribution rate paid by or on behalf of insured persons.

Table A1.1. Contribution rates in force as at 31 December, 2014

Employed persons	15.6 per cent of insurable earnings, shared equally between the employer and the employee
Self-employed persons	14.6 per cent of insurable income
Voluntary contributors working abroad for a Cypriot employer	15.6 per cent of insurable earnings, as agreed in the contract of employment
Other voluntary contributors	13.0 per cent of an amount of earnings they fix, not exceeding the value of insurance points obtained in the previous year, or the average value of insurance points obtained over the last three years if higher
National guard	1.25 per cent of the basic insurable earnings paid by state
State contribution	4.6 per cent of the insurable earnings of employed persons, self-employed and voluntary contributors working abroad, and 4.1 per cent of insurable earnings of other voluntary contributor

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 amount of contributions due and rising progressively by 3 per cent for each month of delay. The maximum amount of charge is 27 per cent of the amount of contributions due.

Table A1.2 shows the legislated future contribution rate paid on behalf of an employed person.

Table A1.2. Legislated future contribution rate (as % of insurable earnings) for employed persons

Period	Employee	Employer	State	Total
2014-2018	7.8	7.8	4.6	20.2
2019-2023	8.3	8.3	4.9	21.5
2024-2028	8.8	8.8	5.2	22.8
2029-2033	9.3	9.3	5.5	24.1
2034-2038	9.8	9.8	5.8	25.4
2039-2060	10.3	10.3	6.1	26.7

A1.4.4. Financial provisions

The Social Insurance Fund maintains four separate accounts: the Unemployment Benefit Account, the Other Benefits Account, the Basic Pensions Account and the Supplementary Pensions Account.

The *Unemployment Benefit Account*, in principle, is credited with 1.15 per cent of the insurable earnings of employed persons on which contributions have been paid, and is charged with the payment of unemployment benefit.

The *Other Benefits Account*, in principle, is credited with 1.15 per cent of the insurable earnings of employed persons, 1.3 per cent of the insurable income of self-employed persons and 0.2 per cent of the insurable earnings of voluntary insured persons, on which contributions have been paid, and is charged with the payment of sickness benefit, maternity allowance, grants, employment injury benefits and administration expenses.

The *Basic Pensions Account*, in principle, is credited with 11.3 per cent of insurable earnings of employed and self-employed persons, 10.3 per cent of insurable earnings of voluntary insured persons, on which contributions have been paid, and is charged with the payment of pensions in the basic part of the GSIS, including old-age pension, invalidity pension, widow's pension and orphan's benefit.

The *Supplementary Pensions Account*, in principle, is credited with 6.6 per cent of insurable earnings of all insured persons, on which contributions have been paid, and is charged with the payment of pensions in the supplementary part of the GSIS, including old-age pension, invalidity pension, widow's pension and orphan's benefit.

A1.5. Non-contributory pension benefits

The non-contributory pension benefits provided under the GSIS are classified into two main categories:

(1) credited pension benefits; and

(2) pension supplements.

A1.5.1. Credited pension benefits

The credited pension benefits refer to the credits awarded to insured persons with respect to the following periods:

– *Service in the national guard:* Basic insurance credits to insured men for any period of service in the national guard of the Republic of Cyprus.

– *Unemployment:* Any period of unemployment for which unemployment benefit is paid (up to 26 weeks) and, in addition, any period of unemployment (up to 26 weeks) for which no entitlement to benefit exists.

– *Incapacity for work:* Any period of incapacity for work due to sickness, injury or maternity 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.

– *Parental leave:* Basic insurance credits to insured persons normally up to 18 weeks are granted to each parent entitled to pension, who claimed unpaid leave for child care after 1 January, 2003, in respect of each child, for the period preceding the 8th birthday of the child, provided that the insured's parent does not have any paid or credited contributions in those weeks.

– *Childhood:* Basic insurance credits to insured women for childhood 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, provided that she does not have any paid or credited contributions in those weeks.

– *Student:* Any period of full time education or approved training after the age of 16.

– *Unemployment shortly after the Turkish invasion:* Credits awarded to insured persons for any periods of unemployment between 1.7.1974 and 3.10.1976, following the Turkish invasion. The level of credits is based on the level of paid or credited contributions in the years preceding 1.7.1974.

– *Prospective insurance period between the date of insured person's invalidation or death and age 63:* 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 supplementary part of the GSIS 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 the beginning of the year the person becomes 16 or 25 if this is after 6.10.1980 up to the relevant date. The condition for the award of prospective credits is that the person qualifies for the pension.

– *Retrospective insurance period with the introduction of the supplementary part of the GSIS:* Supplementary insurance credits awarded to insured persons aged between 50 and 63 as at 6.10.1980, the date of introduction of the supplementary part of the GSIS. Credits were granted from the age of 50 up to 5.10.1980, based on the level of paid or credited contributions in the supplementary part of the GSIS for the period from 6.10.1980 to the date the insured person becomes 63.

A1.5.2. Pension supplements

The pension supplements refer to amounts granted to pensioners for increasing their pension income. They consist of:

– *Minimum pension:* Refers to the amount of supplement necessary to raise the level of old-age, invalidity or widow's/widower's pension up to the minimum pension which is equal to 85 per cent of the full basic pension.

– *Invalidity pension:* Refers to the supplemental amount to the invalidity pension, in case of partial invalidity, granted at age 63 when invalidity pension is converted to old-age pension under the assumption of full invalidity (100 per cent).

A1.6. Benefits

A1.6.1. Benefit structure

The basic benefit is related to basic insurance. It includes increases for dependants. The supplementary benefit is related to supplementary insurance. No increases for dependants are payable on the supplementary benefit.

The basic insurance provides for the payment of a minimum pension equal to a percentage of the full basic pension in respect of old-age, invalidity and widow's pension. This percentage is set at 85 per cent. The minimum pension is €352.88 per month (paid for 13 months) in 2014 for a person with no dependants.

The Consolidated Fund finances the amount between the 70 and 85 per cent. Every year, funds are transferred from the Consolidated Fund to the GSIS for the financing of the above amount. The funds transferred each year are determined as a fixed percentage of annual basic pension (old-age, invalidity and widow) expenditure and that percentage is set by the appointed actuary of the GSIS every three years.

A1.6.2. Maternity grant

The insurance conditions are that the husband or the wife:

(1) has been insured for at least 26 weeks and has basic insurance up to the date of birth of at least 0.5 of insurance point, earned from paid contributions; and

(2) has paid or been credited with contributions which provided him/her with at least 0.39 of insurance point within the *relevant contributions year*.

The relevant contributions year is defined as the last contributions year, prior to the benefit year which includes the date of fulfilling the relevant insurance conditions. The benefit year is defined as the period which starts the first Monday of July of each year and ends the last Sunday prior to the first Monday of July of the following year. So for example, if the marriage incurred during the first half of 2014 the relevant contributions year is 2012, given that the benefits year runs from 1 July 2013 to 6 July, 2014.

The amount of the maternity grant is 6 per cent of the basic insurable earnings, i.e., €544 in 2014 and is paid only to the wife.

A1.6.3. 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 satisfy the same insurance conditions as those of the maternity grant; and

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

In 2014, the amount of the funeral grant, which is set at 5.6 per cent of the basic insurable earnings, is €508 for cases (1) to (4) above and €254 for dependants.

A1.6.4. Maternity allowance

The insurance conditions are that a person:

(1) has been insured for at least 26 weeks and has basic insurance up to the first day of commencement of maternity leave of at least 0.5 of insurance point, earned from paid contributions; and

(2) has paid or been credited with contributions which provided her with at least 0.39 of insurance point within the *relevant contributions year*.

The amount of the maternity allowance consists of the:

– basic benefit, which is equal to 72 per cent of the weekly value of the insurance point earned in the basic insurance during the relevant contributions year, increased to 80 per cent, 90 per cent and 100 per cent for one, two and three dependants respectively; and

– supplementary benefit, which is equal to 72 per cent of the weekly value of the insurance points earned in the supplementary insurance during the relevant contributions 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 18 weeks beginning between the second and the ninth week preceding the expected week of confinement.

A1.6.5. 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 insurance conditions for old-age pension at 63 are allowed to draw benefit up to the date on which they satisfy the relevant insurance conditions but in no case after the age of 65.

The insurance conditions are that a person:

(1) has been insured for at least 26 weeks and has basic insurance up to the date of incapacity at least 0.5 of insurance point, earned from paid contributions; and

(2) has paid or been credited with contributions which provided him/her with at least 0.39 of insurance point within the *relevant contributions year*.

The amount of sickness benefit consists of the:

– basic benefit, which is equal to 60 per cent of the weekly value of the insurance point earned in the basic insurance during the *relevant contributions year*, increased to 80 per cent, 90 per cent and 100 per cent for one, two and three dependants respectively; and

– supplementary benefit, which is equal to 50 per cent of the weekly value of the insurance points earned in the supplementary insurance during the *relevant contributions year*, up to a maximum amount of one times the basic insurable earnings.

In order to re-qualify for sickness 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 of employment must have elapsed since the date of exhaustion.

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 three days for employed persons and nine days for self-employed persons. The benefit is payable in each period of interruption of employment for 156 days and under certain conditions it can be extended for another 156 days.

A1.6.6. Unemployment benefit

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

The insurance conditions are that a person:

(1) has been insured for at least 26 weeks and has basic insurance up to the date of unemployment at least 0.5 of insurance point, earned from paid contributions; and

(2) has paid or been credited with contributions which provided him/her with at least 0.39 of insurance point within the *relevant contributions year*.

The method of calculation of the unemployment benefit is the same as the sickness benefit. The waiting period before the commencement of the benefit is three days for employed persons and 30 days for voluntary contributors working abroad in the service of Cypriot employers. The benefit is payable for a maximum of 156 days.

In order to re-qualify for unemployment 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 26 weeks of employment must have elapsed since the date of exhaustion. In case the person is at least 60 years old and does not receive any pension or lump-sum amount the period of 26 weeks is reduced to 13 weeks of employment.

A1.6.7. 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 than the $^1/_3$ of the sum usually earned by a healthy person of the same occupation or category and education in the same area.

The insurance conditions are that:

(1) the person has been insured for at least 156 weeks and has basic insurance up to the date of invalidity at least 3 insurance points, earned from paid contributions;

(2) the total number of insurance points in the basic insurance, earned from paid or credited contributions, is equal to at least 25 per cent of the number of years over the period between 5 October 1964 (or the first day of the year of attainment of age 16, if later) and the last day before the week of invalidation; and

(3) the person has paid or been credited with contributions which provided him/her with at least 0.39 of insurance point within the relevant contributions year. This condition is also satisfied if the average number of insurance points earned from paid or credited contributions over the last two years is equal to at least 0.39 of insurance point.

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

The amount of the pension is equal to the old-age pension in case of full invalidity (100 per cent). When the loss of earnings is partial, the following percentages are payable:

Loss of earning capacity	Percentage of full pension
Below 66 2/3%	60
66 2/3% to 75%	75
76% to 99%	85

A1.6.8. Old-age pension

As a general rule, the old-age pension is payable at the age of 65 for men and women, provided that the following insurance conditions are met:

(1) the person has been insured for at least x weeks and has basic insurance up to the date of old-age pension entitlement at least y insurance points, earned from paid contributions, where:

x = 676 weeks and y = 13 insurance points as from 5.1.2015;

x = 728 weeks and y = 14 insurance points as from 4.1.2016;

x = 780 weeks and y = 15 insurance points as from 2.1.2017; and

(2) the total number of insurance points in the basic insurance, earned from paid or credited contributions, is equal to at least 30 per cent of the number of years over the period between 5 October, 1964 (or the first day of the year of attainment of age 16, if later) and the week before the week of old-age pension entitlement.

Old-age pension could be paid at an earlier age on certain conditions:

– At age 63 if the insured person satisfies the above two insurance conditions and the total number of insurance points in the basic insurance, earned from paid or credited contributions, is equal to at least 70 per cent of the number of years over the period between 5 October, 1964 (or the first day of the year of attainment of age 16, if later) and the week before the week of old-age pension entitlement.

– Miners are entitled to the old-age pension one month earlier than the pensionable age of 63 for every 5 months of work in a mine, but in no case before the age of 58, provided that they have at least three years of work in a mine.

An insured 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 an invalidity pension if the person had not completed the age of 63. Eligibility to the old-age pension is not conditional on retirement from regular employment.

The old-age pension consists of:

– the basic pension, which is equal to 60 per cent of the weekly value of the annual average number of insurance points earned in the basic insurance over the period between 5 October, 1964 (or the first day of the year of attainment of age 16, if later) and the week before the week of old-age pension entitlement, increased to 80 per cent, 90 per cent and 100 per cent for one, two and three dependants respectively; and

– the supplementary pension, which is equal to 1.5 per cent of the weekly value of the total number of insurance points earned in the supplementary insurance.

For the purposes of old-age basic pension calculation, a maximum of six years of education/ training credits is taken into account.

The old-age pension amount is subject to an actuarial reduction 0.5 per cent for every month included in the period between the date the person chooses to claim the pension (beyond the age of 63) and:

– the age of 63.5 as of 1.1.2013 (max. 3 per cent actuarial reduction);

– the age of 64 as of 1.1.2014 (max. 6 per cent actuarial reduction);

– the age of 64.5 per cent as of 1.1.2015 (max. 9 per cent actuarial reduction); and

– the age of 65 as of 1.1.2016 and onwards (max 12 per cent actuarial reduction).

A lump-sum benefit is payable at age 68 to persons who do not meet the insurance conditions for an old-age pension, provided that the person has been insured for at least 312 weeks and has basic insurance up to the date of old-age lump-sum entitlement at least 6 insurance points, earned from paid contributions.

The lump-sum amount is equal to 15 per cent of the value of the total number of insurance points earned from paid and credited contributions.

A person may ask for postponement of the payment of the pension until the age of 68. In this case, the pension amount is increased by 0.5 per cent for each month of postponement. No deferment possible from age 63 up to:

– the age of 63.5 as of 1.1.13;

– the age of 64 as of 1.1.14;

– the age of 64.5 as of 1.1.15; and

– the age of 65 as of 1.1.16 and onwards.

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 the total amount of insurable earnings during that period.

A1.6.9. Widow's pension

The widow's pension is payable to the widow (or widower under certain conditions of dependence) of a person who, at the time of death:

– had not reached the pensionable age and satisfied the insurance conditions (1) and (2) for the invalidity 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 provided that the insurance conditions for sickness benefit are satisfied.

The widow's pension consists of the:

– basic pension, which is equal to:

  ▪ if the husband was not in receipt of an old-age pension, 100 per cent of the basic invalidity pension to which the deceased would have been entitled on his death; or

  ▪ if the husband was in receipt of an old-age pension, 100 per cent of the basic old-age pension which was payable; and

– supplementary pension, which 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; or

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

A lump sum is payable to a widow whose husband satisfies only the first insurance condition of the invalidity pension. This lump sum is equal to 15 per cent of the total number of insurance points earned from paid and credited contributions in the basic insurance plus 9 per cent of the total number of insurance points earned from paid and credited contributions in the supplementary insurance.

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

A1.6.10. Orphan's benefit

The orphan's benefit is payable for a minor:

(1) when both parents are dead and at least one of the parents was an insured person; or

(2) when the parent who was taking care of the minor died in case where the parents were separated provided that the parent who died was an insured person; or

(3) when one of the parents died and the surviving parent is not entitled to a widow's pension provided that the deceased parent fulfils the insurance conditions for a widow's pension; or

(4) when the widowed mother, who was in receipt of widow's pension, remarried.

The amount of the benefit for cases (1) and (2) above consists of the:

– basic benefit, which is equal to 40 per cent of the basic insurable earnings for each orphan; and

– supplementary benefit, which is equal to 50 per cent of the supplementary widow's pension which was or would have been payable for each orphan (calculated for a maximum of two orphans).

The amount of the benefit for cases (3) and (4) is equal to 20 per cent of the basic insurable earnings for each orphan, and is payable for up to three 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 who are unmarried and permanently incapable of self-support. A gratuity of one year's benefit is payable, for cases (1) and (2), on termination of his entitlement other than by death before the age of 17 (or a proportion of the year's benefit with respect to the months remaining up to the age of 17 if those are less than 12).

A1.6.11. Missing person's allowance

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

A1.6.12. Employment injury benefits

Temporary incapacity (injury benefit) – The injury benefit is payable to an employed person incapable of work as a result of an employment accident or occupational disease. The benefit is payable for a maximum of 12 months from the date of accident. The amount of the benefit is the same as the sickness benefit, except that the basic benefit is the benefit which corresponds to the basic insurable 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. Disablement benefit may take the form of either a grant or a pension depending on the degree of disablement.

The amount of the benefit is as follows:

– For an incapacity between 10 and 19 per cent, a disablement grant is paid, equal to €3,778 (in 2014) for 10 per cent disablement, increasing proportionately to €7,178 (in 2014) for 19 per cent disablement.

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

  (i) basic pension, which is equal to 60 per cent of the basic insurable earnings, increased to 80 per cent, 90 per cent and 100 per cent for one, two and three dependants respectively; and

  (ii) supplementary pension, which is equal to 60 per cent of the value of the annual average number of insurance points earned from paid or credited contributions in the supplementary insurance over 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 of disablement. In addition, when the beneficiary of a disablement pension with a degree below 100 per cent is incapable of work and is expected to remain incapable permanently, and provided that the disablement is due to an employment injury, the disablement pension can be calculated on the basis that the degree of disablement is equal to the degree of invalidity, if this is more favourable to the beneficiary.

A constant attendance allowance of €228 per month (in 2014) is payable for disablement pensioners needing constant care.

Death benefits: The death benefits are paid to the survivors of an employed person who dies as a result of employment accident or an occupational disease. The benefits include *widow's pension*, *orphan's benefit* and *parent's allowance* when the deceased is not survived by a spouse or by orphans.

The *widow's pension* consists of the:

– *basic pension:* same as basic disablement pension for 100 per cent disablement; and

– *supplementary pension:* 60 per cent of the supplementary disablement pension that the deceased was entitled to, for a 100 per cent disablement.

The *orphan's benefit* consists of the:

– *basic benefit:* same as the orphan's benefit payable under cases (1) and (2); and

– *supplementary benefit:* same as the orphan's benefit payable under cases (1) and (2).

The *parent's allowance* consists of the:

– *basic allowance:* 40 per cent of basic insurable earnings per parent; and

– *supplementary allowance:* 30 per cent of the supplementary disablement pension that the deceased was entitled to, for a 100 per cent disablement.

A1.7. General provisions

A1.7.1. Revision of insurable earnings

The amount of the basic insurable earnings as well as the ceiling on such earnings is adjusted in accordance the movement of the general level of insurable earnings every year. In particular, they are increased by the rate of increase of average insurable earnings between the two last years for which full statistical information is available. This means that the amount of the basic insurable earnings for 2015 is determined by applying the rate of increase of average insurable earnings between 2013 and 2014 to the amount of basic insurable earnings of 2014.

A1.7.2. Revision of benefit rates after award

The rates of basic pensions are reviewed at the beginning of each year in the same way as the basic insurable earnings are revised.

The rates of the supplementary pensions are reviewed in accordance to the increase in the cost of living. This revision is in line with the movement of the average level of the consumer price index over the two second half of the two years preceding the relevant year. This means that the annual rate of increase of the supplementary benefits as of 1 January 2015 is determined by a comparison of the average level of the consumer price index in the second half of 2014 and the second half of 2013.

Furthermore, the rates of pensions are increased every July in accordance to the increase in the cost of living of the first half of the year of reference compared to the second half of the previous year, if the increase is higher than 1 per cent. The July increase is taken into account when determining the increase of the rates of pension at the beginning of the following year. Pension indexation is suspended over the period from 1.1.2013 to 31.12.2016.

A1.7.3. Beneficiaries under repealed scheme

Beneficiaries in respect of pension payable before the introduction of the new scheme on 6 October, 1980 are receiving benefits corresponding to the basic benefits under the new scheme.

A1.7.4. Social pension subsidy

The social pension subsidy represents the amount paid by the GSIS to the Consolidated Fund, thus contributing towards the financing of the tax-financed social pension scheme, and is equal to the amount of increase of a GSIS pension that would have been granted to a GSIS pensioner if the dependant's spouse was not a recipient of social pension.

Annex 2. Methodology of the actuarial valuation

A2.1. Introduction

This actuarial valuation makes use of the comprehensive methodology developed at ILO SOC/ PFACTS for reviewing the long-term actuarial and financial status of national pension schemes. This valuation has been undertaken using an actuarial pension model which is a fully customised version of the ILO generic pension modelling tools in order to fit the situation of Cyprus and to closely comply with the legal provisions of the GSIS 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 GSIS are determined and used in combination with the demographic and economic frameworks.

A2.2. Modelling the demographic and economic developments

The use of the ILO actuarial 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 such as the earnings levels in the basic and supplementary part of the GSIS.

The selection of 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.

A2.2.1. General population

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

A2.2.2. Economic growth

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

A2.2.3. 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.

A2.2.4. 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 insurance 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.

A2.3. Modelling the financial development of the GSIS

The present actuarial valuation addresses all revenue and expenditure items of the GSIS. The most important components of this valuation concern long-term pension benefits. This section focuses on them.

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

A2.3.1. Purpose of pension projections

There are two main purposes of the pension model. First, it is used to assess the financial viability of the long-term benefits branch of the GSIS in the context of the triennial actuarial valuation as required by the Social Insurance Law. This refers to the measure of the long-term balance between revenue and expenditures of the GSIS. In case of imbalance, possible revisions of the contribution rate and/or the benefit structure are 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 GSIS, 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.

Furthermore, the pension model is also used for:

– providing a solid quantitative framework to government authorities that can guide future policy decisions;

– long-term budgetary planning; and

– performing cash flow projections between the Consolidated Fund and the Social Insurance Fund.

A2.3.2. Pension data and assumptions

Pension projections require the demographic and macroeconomic frame already described and, in addition, a set of assumptions specific to the GSIS.

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.

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

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 GSIS's assets, the past performance of the fund, the GSIS's investment policy and assumptions on future economic growth and wage development.

A2.3.3. 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 projections of insurable earnings and benefit expenditures are then performed according to the economic assumptions and the GSIS'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. It is not the objective of pension projections to forecast the exact development of revenue and expenditures of the GSIS, but to check its financial viability. This entails evaluating the GSIS with regard to the relative balance between future revenue and expenditures. This type of evaluation is crucial, especially in the case of the Cyprus GSIS, which has not yet reached its mature stage.

A2.4. Pension model

The actuarial pension model deployed for the purposes of this actuarial valuation is a standard deterministic cohort-based projection model performing long-term projections of income and expenditure for the GSIS. It is based on macrosimulation techniques, i.e., the projections rely on grouped data. Each status of an insured person (active person, inactive person and pensioner) is explicitly modelled, distinguishing new persons from initial stock.

The pension model is operated under the supervision of the appointed actuary of the GSIS who must be certified to use it.

On a regular basis, the actuarial pension projection model is subject to methodological enhancements in the context of continued improvement of the accuracy of the projection results. Following is an overview of the key methodological features that the current version of the model satisfies.

A2.4.1. Standard actuarial mathematics and transition probabilities

The pension projection model is based on standard actuarial mathematics for social security schemes. Key components of the mathematical structure of the model are the actuarially assumed transition probabilities (mortality rates, incapacity rates, retirement rates, etc.) which are used to map the transition status of an insured person (active, inactive or pensioner) in a given year onto the next year's status.

A2.4.2. Ensuring consistency between the active insured population and total employment

The pension projection model ensures that the development of the active insured population is consistent with the evolution of the employed population. This is achieved by applying annual decrements (retirement, disability, mortality, exit, etc.) for each age and sex to the existing group of active insured persons and assuming a number of new entrants/re-entrants for each year, on the basis of the assumptions on overall employment growth and coverage rates considered by the pension model. For this purpose, an assumption on the distribution of new entrants/re-entrants by age and sex is used.

A2.4.3. Insured population groupings

The active insured population is disaggregated by age (single age), sex (males/females), insurance level (basic only/basic and supplementary), income group (by earnings band) and community.

For the purposes of projecting insured population by insurance level, the pension model captures the incidence of movement between "basic only" and "basic and supplementary" insured persons, reflecting GSIS past experience under which "basic only" insured persons at younger ages move to the "basic and supplementary" insured population grouping at early stages of their career.

With regard to the insured population grouping by community, the following three communities, which have distinct insurance profiles in terms of level of earnings and past insurance credits, are considered by the pension model:

– "Cypriots" include Cypriot nationals;

– "EU nationals" include EU and other third-country nationals who are entitled to a pro-rata pension from the GSIS even if they do not satisfy its normal eligibility conditions, because either: (i) under the EU regulation 883/2004, any insurance periods completed in other EU countries can be taken into consideration for the purposes of testing eligibility conditions, or (ii) certain social security bilateral agreements with Cyprus are in force; and

– "TC nationals" include third-country nationals who qualify for a GSIS pension if they satisfy its normal eligibility conditions – not entitled to a pro-rata pension from GSIS because Cyprus has not entered into a social security bilateral agreement with the country of their nationality.

For the purposes of projecting insured population by community, the entry/leaving rates applied in the active insured population, as per the pension model, are linked to the immigration/emigration rates applied in the demographic population projections.

A2.4.4. Explicitly modelling inactive insured persons

The inactive insured population is disaggregated by age (by single age), sex (males/females), insurance level (basic only/basic and supplementary) and community.

The pension model incorporates the stock of inactive insured persons at the start of the projection period and explicitly models the new inactive insured persons, by capturing the incidence of movements between active and inactive insured persons.

A2.4.5. Explicitly modelling the accumulation of insurance points

In projecting the active and inactive insured populations, the following two key variables, which affect the accumulation of basic and supplementary insurance points of the insured persons, are explicitly modelled:

– distribution of past insurance points (for both active and inactive insured persons) in base year; and

– acquisition of new insurance points (for active insured persons) in subsequent years.

A2.4.6. Modelling the effect of the minimum pension

The pension model is capable of estimating the projected cost of the minimum pension supplement with a high degree of accuracy, since the distribution of pensioners by level of pension is produced by the model. The estimation of the distribution of pensioners by level of pension is possible through the insured population grouping by insurance level (basic only/basic and supplementary) and the modelling of the distribution of past insurance points and insurable earnings.

Annex 3. Financial results of the General Social Insurance Scheme, 2012-2014

This annex presents the financial results of the four accounts (Basic Pensions, Supplementary Pensions, Unemployment and Other Benefits) of the GSIS for the period 2012-2014 (see tables 3.1 to 3.4).

The reserve of the Basic Pensions Account has increased by 13 per cent, from €1,371 million at the end of 2011 to €1,554 million at the end of 2014. The reserve ratio of the Basic Pensions Account, i.e., the size of the reserve divided by the total annual expenditure of the Basic Pensions Account, has increased slightly from 2.14 in 2012 to 2.22 in 2014.

The reserve of the Supplementary Pensions Account has decreased by 2 per cent, from €5,910 million on 31 December 2011 to €5,821 million on 31 December 2014. The reserve ratio of the Supplementary Pensions Account has decreased slightly from 15 to 12 times the annual expenditure over the three-year period 2012-2014.

The annual level of expenditure on the Unemployment Benefits Account has experienced significant increases during the period 201214. During each year over the three-year period 2012-2014, income was constantly lower than expenditure. Therefore, the overall financial status of the Unemployment Benefits Account would normally have deteriorated over the last three years. However, two transfers of funds from the Supplementary Pensions Account to the Unemployment Account took place during that period: €50 million in 2012 and €170 million in 2014. As a result, the Unemployment Account has a positive reserve of €51 million at the end of 2014.

The reserve of the Other Benefits Account has deteriorated from a positive reserve of €16 million at the end of 2011 to a negative reserve of €43 million at the end of 2014.

Table A3.1. Basic Pensions Account

	2012	2013	2014
RESERVE at 1 January	**1 371 378 716**	**1 471 310 697**	**1 498 172 999**
Revenue			
Contributions	739 873 209	674 700 931	720 207 543
Receipt from Consolidated Fund	26 423 098	25 296 338	25 813 088
Interest earnings	17 359 436	12 547 828	6 327 193
Other income	4 126 446	3 499 610	4 850 550
Total income	**787 782 189**	**716 044 707**	**757 198 374**
Expenditure			
Benefits			
Pensions	687 850 208	689 182 405	701 057 815
Total expenditure	**687 850 208**	**689 182 405**	**701 057 815**
RESERVE at 31 December	**1471 310 697**	**1498 172 999**	**1554 313 557**

Table A3.2. Supplementary Pensions Account

	2012	2013	2014
RESERVE at 1 January	**5 909 727 584**	**5 986 107 693**	**6 002 528 507**
Revenue			
Contributions	414 379 685	377 880 388	420 696 490
Interest earnings	98 745 244	69 925 954	32 561 831
Other income	2 310 810	1 959 781	2 833 065
Total income	**515 435 739**	**449 766 123**	**456 091 386**
Expenditure			
Benefits			
Pensions	389 055 630	433 345 309	467 707 600
Total expenditure	**389 055 630**	**433 345 309**	**467 707 600**
Transfer from Supplementary Pensions Account to Unemployment Account	–50 000 000	–	–170 000 000
RESERVE at 31 December	**5 986 107 693**	**6 002 528 507**	**5 820 912 293**

Table A3.3. Unemployment Account

	2012	2013	2014
RESERVE at 1 January	**–719 508**	**5 299 703**	**–71 677 127**
Revenue			
Contributions	80 215 156	72 956 863	69 358 633
Interest earnings	–	–	–
Other income	353 929	308 380	391 477
Total income	80 569 085	73 265 243	69 750 110
Expenditure			
Unemployment benefit	124 468 629	150 239 188	117 040 680
Investment earnings paid	81 245	2 885	200 587
Total expenditure	**124 549 874**	**150 242 073**	**117 241 267**
Transfer from Supplementary Pensions Account to Unemployment Account	50 000 000	–	170 000 000
RESERVE at 31 December	**5 299 703**	**–71 677 127**	**50 831 716**

Table A3.4. Other Benefits Account

	2012	2013	2014
RESERVE at 1 January	**15 646 280**	**–10 097 739**	**–26 202 884**
Revenue			
Contributions	85 632 872	78 112 097	73 736 567
Other income	3 138 440	3 065 221	2 834 348
Total income	**88 771 312**	**81 177 318**	**76 570 915**
Expenditure			
Benefits			
Short-term benefits (including medical care)	94 157 328	78 824 739	76 005 759
Employment injury benefits	9 458 947	9 194 406	8 721 681
Administrative expenses	10 899 056	9 263 318	8 769 997
Total expenditure	**114 515 331**	**97 282 464**	**93 497 437**
RESERVE at 31 December	**–10 097 739**	**–26 202 885**	**–43 129 407**

Annex 4. Scheme-specific data and assumptions

A4.1. Introduction

In addition to the demographic and economic assumptions presented in Section 3 of this report, the projection of the future financial development of the GSIS requires a database specific to the GSIS (characteristics of insured persons and pensions in payment) and some particular actuarial assumptions. For the present valuation, projections have been performed separately for insured persons with basic insurance only and those with basic and supplementary insurance. In addition, basic data and assumptions have been divided according to the sex and age of insured persons.

A4.2. Data and assumptions on the insured population

A4.2.1. Number of insured persons

Data on the insured population were obtained from the Statistics section of the Social Insurance Services. The database presents a population of 412,386 active insured persons having contributed in 2014. Out of these persons, 268,188 had annual earnings over €9,068 (in 2014) and have thus been credited with both basic and supplementary insurance points. The distribution of these populations by age and sex is presented in table A4.1.

In addition to the persons who have contributed in 2014, the GSIS covers another 321,220 persons who have contributed to the GSIS in the past, but not in 2014. Their characteristics are presented in table A4.2. These persons still have the status of insured persons and may re-enter the GSIS at some point in the future.

Table A4.1. Active insured persons, 2014

Age	Basic only			Basic and Supplementary		
	Males	Females	Total	Males	Females	Total
15-19	1 902	2 536	4 438	66	61	127
20-24	11 443	12 183	23 626	3 997	3 962	7 959
25-29	12 662	13 824	26 486	16 005	15 836	31 841
30-34	9 082	12 037	21 119	22 729	20 456	43 185
35-39	6 331	10 872	17 203	20 663	19 017	39 680
40-44	5 237	10 385	15 622	19 441	17 784	37 225
45-49	4 560	8 329	12 889	18 063	15 499	33 562
50-54	4 108	5 790	9 898	18 442	14 431	32 873
55-59	3 492	3 543	7 035	15 497	10 898	26 395
60-64	2 483	2 045	4 528	9 135	5 484	14 619
65-68	778	576	1 354	483	239	722
Total	**62 078**	**82 120**	**144 198**	**144 521**	**123 667**	**268 188**

Table A4.2. Inactive insured persons, 2014

Age	Basic only [1]			Basic and Supplementary [2]		
	Males	Females	Total	Males	Females	Total
16-19	96	29	125	3	3	6
20-24	2 486	2 384	4 870	625	397	1 022
25-29	8 894	8 882	17 776	5 462	3 762	9 224
30-34	10 993	12 953	23 946	10 715	6 847	17 562
35-39	9 064	14 838	23 902	11 998	7 394	19 392
40-44	8 981	19 421	28 402	12 533	8 444	20 977
45-49	6 076	14 854	20 930	11 655	8 434	20 089
50-54	4 301	12 311	16 612	10 800	9 008	19 808
55-59	4 678	10 090	14 768	10 963	9 093	20 056
60-64	5 168	8 714	13 882	8 022	7 813	15 835
65+	3 192	5 451	8 643	1 676	1 718	3 394
Total	**63 929**	**109 927**	**173 856**	**84 452**	**62 913**	**147 365**

[1] Persons with at least one insurance point in the basic part of the GSIS are included. [2] Persons with at least one insurance point in the supplementary part of the GSIS are included.

A4.2.2. Insurable earnings

Credits under GSIS are computed in terms of points. For the year 2014, one insurance point is equivalent to annual earnings of €9,068. The first insurance point is credited to the basic part of the GSIS and annual earnings in excess of €9,068 and up to €54,396 are converted into insurance points in the supplementary part. Table A4.3 presents average annual insurable earnings of active contributors by insurance level (basic only/basic and supplementary) and for specific age groups.

Table A4.3. Average annual insurable earnings of active contributors (2014) [1]

Age	Basic only		Basic and Supplementary	
	Males	Females	Males	Females
16-19	3 367	3 226	11 596	11 384
20-24	4 272	4 323	12 609	12 010
25-29	4 608	4 655	15 575	14 725
30-34	4 688	4 750	19 478	18 621
35-39	4 717	4 860	23 382	22 226
40-44	4 745	5 005	26 011	23 411
45-49	4 865	5 075	26 434	22 988
50-54	4 809	5 129	27 027	23 039
55-59	4 786	5 102	26 161	22 981
60-64	4 845	5 113	24 824	20 157
65-68	4 163	4 102	19 371	15 939
Total	**4 646**	**4 827**	**23 230**	**20 703**

[1] New entries, re-entries and terminations are not included.

In order to reflect the dispersion of earnings and, consequently, the distribution of earnings for active contributors by insurance level (basic only/basic and supplementary), a coefficient of variation has been applied to average earnings by age group and for each year of projection. In addition, the average earnings of the insured population have been separated into three sub-groups: the lowest 30 per cent, a medium range of 40 per cent and the highest 30 per cent.

A4.2.3. Accrued insurance points

Accrued insurance points in the basic and the supplementary insurance of the GSIS, for the active and inactive insured populations, were obtained from the administrative file of the Statistics section of the Social Insurance Services. Average data by insurance level (basic only/basic and supplementary) are presented in tables A4.4 and A4.5 respectively.

Table A4.4. Past insurance points of active insured persons by insurance level in the basic and supplementary part of the GSIS, as at 31 December 2014

Age	Insurance: Basic only		Insurance: Basic and Supplementary			
	Basic		Basic		Supplementary	
	Males	Females	Males	Females	Males	Females
23	2.6	2.8	3.7	3.6	2.0	1.6
28	4.4	4.3	6.3	6.7	4.8	4.7
33	6.6	5.5	10.2	11.1	11.6	11.4
38	8.5	6.1	14.6	15.2	21.1	19.3
43	11.2	7.5	19.4	18.9	30.9	24.4
48	16.0	9.3	24.0	22.0	38.4	26.4
53	20.5	13.3	28.6	24.8	48.6	32.0
58	27.3	17.1	32.8	27.4	54.4	37.3
63	35.5	22.8	38.6	29.7	53.1	26.9

Table A4.5. Past insurance points of inactive insured persons by insurance level in the basic and supplementary part of the GSIS, as at 31 December 2014

Age	Insurance: Basic only		Insurance: Basic and Supplementary			
	Basic		Basic		Supplementary	
	Males	Females	Males	Females	Males	Females
23	1.6	1.9	2.1	2.3	0.6	0.3
28	1.6	1.7	3.1	3.5	1.5	1.0
33	1.4	1.8	4.0	4.9	2.7	2.2
38	1.4	1.9	4.8	5.8	3.8	2.9
43	1.4	2.1	5.8	7.1	4.8	4.1
48	1.4	2.2	8.3	8.4	7.3	5.0
53	1.5	2.4	11.5	10.8	12.9	8.0
58	1.9	2.7	18.2	15.8	27.5	18.3
63	3.0	3.5	12.7	13.1	15.8	10.2

A4.3. Demographic assumptions related to the GSIS

A4.3.1. 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 A4.6. 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 GSIS, 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 A4.6. Sample mortality rates applied to the insured population

Age	Males			Females		
	2014	2050	2080	2014	2050	2080
0	0.00662	0.00176	0.00058	0.00406	0.00121	0.00044
5	0.00026	0.00005	0.00001	0.00043	0.00009	0.00002
10	0.00029	0.00007	0.00002	0.00030	0.00009	0.00003
15	0.00039	0.00000	0.00008	0.00025	0.00011	0.00005
20	0.00053	0.00028	0.00016	0.00025	0.00012	0.00006
25	0.00069	0.00045	0.00031	0.00028	0.00016	0.00010
30	0.00085	0.00059	0.00044	0.00032	0.00019	0.00012
35	0.00104	0.00075	0.00057	0.00036	0.00024	0.00016
40	0.00131	0.00092	0.00068	0.00048	0.00035	0.00027
45	0.00171	0.00119	0.00087	0.00072	0.00055	0.00044
50	0.00240	0.00156	0.00109	0.00115	0.00084	0.00065
55	0.00365	0.00218	0.00142	0.00188	0.00127	0.00091
60	0.00618	0.00349	0.00216	0.00308	0.00187	0.00123
65	0.01138	0.00625	0.00379	0.00504	0.00291	0.00185
70	0.01865	0.01035	0.00634	0.00869	0.00486	0.00299
75	0.02998	0.01706	0.01067	0.01752	0.00930	0.00549
80	0.05299	0.03159	0.02053	0.03967	0.02079	0.01214
85	0.10388	0.06735	0.04694	0.08857	0.04999	0.03103
90	0.19968	0.14133	0.10596	0.17162	0.10882	0.07445
95	0.34033	0.26716	0.21836	0.30416	0.21892	0.16644
100	**1.00000**	**1.00000**	**1.00000**	**1.00000**	**1.00000**	**1.00000**

A4.3.2. Invalidity incidence

Rates of entry into invalidity have been calculated from the past experience of the GSIS. Recent data for the years 2012, 2013 and 2014 were obtained. Invalidity incidence rates are kept constant for the whole projection period. The rates are presented in table A4.7.

Table A4.7. Rates of entry into invalidity

Age	Males	Females
22	0.00025	0.00018
27	0.00045	0.00028
32	0.00046	0.00033
37	0.00093	0.00063
42	0.00159	0.00104
47	0.00228	0.00150
52	0.00450	0.00288
57	0.00834	0.00589
62	0.01097	0.00826

A4.3.3. Retirement

The actuarially assumed retirement rates used in the pension model are consistent with the economic framework described in Annex 2. Consistency checks are performed to produce an appropriate retirement pattern, which is consistent with the one observed recently under the GSIS.

In particular, retirement rates are in principle applied from age 63 to 65 in the initial years as per recent retirement experience under the GSIS. These retirement rates gradually shift to higher ages, in line with the Social Insurance Law which provides for a periodic increase of the normal retirement age in the future.

A4.3.4. Family structure

Information on the family structure of insured persons is necessary for the projection of survivors' benefits. In the case of the GSIS, these data are also used to project the dependants' supplement paid in the basic part of the GSIS. 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.

Data on the percentage of persons married were obtained from tables of the 2011 Census. The age differential between spouses was calculated from data of the Demographic Reports of the Cyprus Statistical Services. The average number of children has been assumed equal to 0.1, 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 A4.8.

Table A4.8. Assumptions on the family structure (for male insured persons)

Age	Probability of being married at death	Average age of the spouse	Average age of orphans
17	0.01	17	1
22	0.05	20	1
27	0.28	24	2
32	0.58	29	4
37	0.73	34	7
42	0.79	39	10
47	0.84	44	13
52	0.87	49	16
57	0.90	54	17
62	0.91	59	18
67	0.90	64	19
72	0.89	69	20
77	0.84	74	20
82	0.74	80	20
87	0.61	85	20

A4.4. Other assumptions

A4.4.1. Credited pension benefits

Taking into account the GSIS recent experience and trends over the period 2011-2014, as well as the development of the fertility rate, female labour force participation rates, education level and other factors, including legal requirements, assumptions were made with regard to the eligible credits to be awarded to future pensioners in respect of the following periods:

– compulsory service in the national guard for male insured persons;

– childhood – granted to female pensioners;

– study;

– unemployment; and

– incapacity for work.

Section A1.5.1 of Annex 1 gives more details on the credited pension benefits.

A4.4.2. Indexing of GSIS parameters and pensions in payment

It has been assumed that the basic insurable earnings and the minimum pension are indexed annually in line with the wage growth assumption. In addition, pensions in payment are assumed to be indexed in the future in line with the wage index in the basic insurance and with the consumer price index in the supplementary insurance.

It is noted that pension indexation is suspended from 1 January 2013 until 31 December 2016.

A4.4.3. Administrative expenses

Administrative expenses are totally affected to the Other Benefits account and are determined as the amount paid in 2014 indexed with the assumed nominal rate of increase of wages determined for the economic framework of the valuation.

A4.5. Pensions in payment, August 2014 [1]

A4.5.1. Old-age pensions (amounts in € where applicable)

Age group	Basic only				Basic and Supplementary			
	Males		Females		Males		Females	
	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
64	96	2 894	82	2 136	5 464	12 984	2 788	9 880
65-69	1 091	2 984	1 539	3 335	18 448	12 619	11 520	8 276
70-74	1 526	3 642	2 115	4 234	12 803	11 120	8 247	7 016
75-79	1 660	3 768	2 232	4 457	10 218	9 992	5 249	6 603
80-84	1 209	4 206	2 582	4 567	5 693	8 718	1 708	6 680
85-89	704	4 376	1 065	4 521	3 062	7 880	682	6 004
90-94	298	4 491	390	4 503	1 066	7 420	251	5 802
95+	168	5 076	146	4 727	193	6 718	49	5 633
Total	**6 752**	**3 807**	**10 151**	**4 262**	**56 947**	**11 084**	**30 494**	**7 629**

A4.5.2. Invalidity pensions (amounts in € where applicable)

Age group	Basic only				Basic and Supplementary			
	Males		Females		Males		Females	
	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
20-24	–	–	–	–	4	5 161	1	6 419
25-29	3	4 066	1	4 920	29	7 348	4	5 102
30-34	4	3 687	–	–	62	7 218	20	5 853
35-39	4	5 129	2	4 301	133	7 841	72	6 940
40-44	11	4 461	6	3 944	214	8 344	119	6 471
45-49	11	4 079	11	3 602	384	8 655	197	6 012
50-54	16	3 470	23	3 590	690	8 543	426	6 010
55-59	32	3 698	70	3 427	1 174	8 874	586	6 510
60-63	54	3 346	58	3 360	997	8 928	491	6 316
Total	**135**	**3 674**	**171**	**3 474**	**3 687**	**8 692**	**1 916**	**6 302**

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

A4.5.3. Widows' pensions (amounts in € where applicable)

Age group	Basic only				Basic and Supplementary			
	Males		Females		Males		Females	
	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
19-24	–	–	–	–	–	–	1	10 512
25-29	–	–	2	3 777	–	–	17	8 707
30-34	–	–	1	6 881	–	–	66	9 175
35-39	–	–	2	4 165	–	–	128	9 686
40-44	–	–	12	5 336	–	–	252	9 494
45-49	–	–	17	3 430	–	–	395	9 695
50-54	–	–	24	3 722	1	4 588	692	9 190
55-59	–	–	85	3 746	1	4 587	1 167	8 478
60-64	–	–	244	4 272	–	–	1 698	8 144
65-69	–	–	530	4 205	–	–	2 538	7 962
70-74	2	4 587	891	4 338	–	–	3 192	7 328
75-79	1	4 588	1 386	4 373	4	6 003	4 160	6 785
80-84	1	189	1 552	4 590	1	6 463	4 172	6 426
85-90	5	4 855	1 521	4 803	1	5 690	2 715	6 194
90-94	2	4 992	998	4 985	–	–	939	6 099
99+	4	5 278	474	4 994	1	11 039	175	6 117
Total	**15**	**4 622**	**7 739**	**4 590**	**9**	**6 265**	**22 307**	**7 198**

Note: For the purpose of actuarial projections, orphans aged 23 and over were classified as widowers.

A4.5.4. Orphans' pensions (amounts in € where applicable)

Age group	Basic only				Basic and Supplementary			
	Males		Females		Males		Females	
	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
0-4	9	1 799	7	1 523	1	6 438	–	–
5-9	50	1 650	41	1 750	3	5 583	1	5 694
10-14	88	1 680	89	1 733	9	5 679	12	5 901
15-19	137	1 765	129	1 791	6	3 698	7	1 862
20-24	121	1 769	85	1 785	11	4 673	6	2 436
25-29	8	1 799	2	1 799	1	3 609	–	–
30-34	6	1 799	4	1 799	–	–	1	4 393
35-39	–	–	1	3 598	6	4 657	1	4 893
40-44	4	2 698	5	2 878	2	4 909	7	4 355
45-49	5	3 598	5	3 238	12	3 944	16	4 086
50-54	10	3 238	7	3 598	19	4 105	24	3 934
55-59	23	3 598	18	3 598	22	3 966	37	3 907
60-64	25	3 598	43	3 598	18	3 892	29	3 808
65-69	19	3 598	64	3 598	8	3 703	14	3 901
70+	39	3 598	140	3 598	3	3 728	6	3 875
Total	**544**	**2 151**	**640**	**2 567**	**121**	**4 237**	**161**	**3 954**

Note: For the purpose of actuarial projections, orphans aged 23 and over were classified as widowers.

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