



Greek Pension System Fiche  
European Commission  
Economic Policy Committee  
Ageing Working Group  
*Ageing Projections Exercise 2015*



## 1. OVERVIEW OF THE GREEK PENSION SYSTEM

### 1.1. Description

The Greek pension system comprises:

- Main pension provision – includes 6 social insurance funds, which cover, on a mandatory basis, salaried employees and self-employed persons grouped in certain professions/occupations;
- Auxiliary pension provision – includes a main insurance fund, which covers the majority of insured;
- Social solidarity grant provision (EKAS), a means-tested benefit, which covers residents of Greece who get low income.

Table I shows the main and auxiliary pension funds by type of occupation/profession.

TABLE I Correspondence of main and auxiliary pension funds			
	Main Fund	Occupational type	Auxiliary Fund
I.	IKA-ETAM	Private sector employees	ETEA (Private & Public sector employees)
I.a.	TAP-DEH	Public electricity company employees	
II.	Public Sector (PS)	Civil servants	MTPY
		Firefighters-Policemen-Air Force-Army-Navy	TEAPASA-MTA-MTN-MTS
III.	OAEF	Self-employed	OAEF (on voluntary basis)
IV.	OGA	Agricultural workers	-
V.	ETAA	Lawyers-Engineers-Notaries	ETAA
		Doctors	-
VI.	ETAP-MME	Media Employees	ETAP-MME
VII.	NAT	Shipmen	NAT

It is noted that the main pension schemes of TAP-OTE, and Banks were merged with IKA-ETAM.

Table 1a below shows the evolution of the statutory retirement age, earliest retirement age and penalties for early retirement over the projection period 2013-60.

TABLE 1a							
Statutory retirement age, earliest retirement age and penalties for early retirement							
		2013	2020	2030	2040	2050	2060
Men - with 20 contribution years	statutory retirement age	67	67	67+	67+	67+	67+
	earliest retirement age	62	62	62+	62+	62+	67+
	penalty in case of earliest retirement age	1/20 0	1/20 0	1/20 0	1/20 0	1/20 0	1/20 0
Men - with 40 contribution years	statutory retirement age	62	62	62+	62+	62+	62+
	earliest retirement age	-	-	-	-	-	-
	penalty in case of earliest retirement age	-	-	-	-	-	-
Women - with 20 contribution years	statutory retirement age	62	67	67+	67+	67+	67+
	earliest retirement age	62	62	62+	62+	62+	62+
	penalty in case of earliest retirement age	1/20 0	1/20 0	1/20 0	1/20 0	1/20 0	1/20 0
Women - with 40 contribution years	statutory retirement age	62	62	62+	62+	62+	62+
	earliest retirement age	-	-	-	-	-	-
	penalty in case of earliest retirement age	-	-	-	-	-	-

According to recent legislation the age thresholds will be re-determined in line with the change in life expectancy of the country's population with the age of 65 years' as point of reference. That shall come into effect as of 1.1.2021 and upon its first implementation the change within the 2010 - 2020 ten-year period shall be taken into account.

If the estimations regarding the change in life expectancy of the population, according to the "Europop 2013" projections, are materialized, then the table 1a will be revised as follows:

TABLE 1b							
Statutory retirement age, earliest retirement age and penalties for early retirement*							
		2013	2020	2030	2040	2050	2060
Men - with 20 contribution years	statutory retirement age	67	67	69,0	69,9	70,8	71,9
	earliest retirement age	62	62	64,0	64,9	65,8	66,9
	penalty in case of earliest retirement age	1/20 0	1/20 0	1/20 0	1/20 0	1/20 0	1/20 0
Men - with 40 contribution years	statutory retirement age	62	62	64,0	64,9	65,8	66,9
	earliest retirement age	-	-	-	-	-	-
	penalty in case of earliest retirement age	-	-	-	-	-	-
Women - with 20 contribution years	statutory retirement age	67	67	69,0	69,9	70,8	71,9
	earliest retirement age	62	62	64,0	64,9	65,8	66,9
	penalty in case of earliest retirement age	1/20 0	1/20 0	1/20 0	1/20 0	1/20 0	1/20 0
Women - with 40 contribution years	statutory retirement age	62	62	64,0	64,9	65,8	66,9
	earliest retirement age	-	-	-	-	-	-
	penalty in case of earliest retirement age	-	-	-	-	-	-

\* Estimated according to the "Europop 2013" life expectancy projections

The new law increased the retirement ages significantly by: i) unifying age thresholds for males and females, ii) imposing longer career prerequisites and iii) introducing the life expectancy factor.

A brief description of social pension system is given below.

### *1.1.1 Main pension provision*

The most important laws over social pension system before the latest reform were 2084/1992, 3029/2002 and 3655/2008. Unified pension formula and retirement ages (equalized for male and female) for all insured first employed after 1992 were introduced.

In July 2010, the Greek Parliament adopted a comprehensive pension reform which will apply as of 1/1/2015. The new social security system introduced by laws 3863/2010 and 3865/2010 constitutes the most significant reform in recent years.

This reform introduced a new, transparent system to strengthen the link between contributions and benefits, increased retirement ages, applied a uniform pension calculation method among all pension schemes (with minor exceptions in terms of population) and decreased the generosity of benefits. At the same time, this reform leads to a significant and substantial correction in the financial course of the social security system. The new measures apply to the public sector and all primary insurance funds except OGA.

The key elements for main pension provision are:

(i) The introduction of a basic pension of 360€/month (12 yearly payments). For those with less than 15 years of contributions, and thus not eligible for the contributory pension, the basic pension is means-tested, and provides an important social safety net.

(ii) The system introduces accrual rates with the same profile for all workers that depend only on the length of the career (ranging from 0.8 to 1.5 percent of earnings). The new accrual rates are significantly lower than those in the old system (ranging from 2 to 3 percent). Overall the new system is less generous than the previous one. More precisely, this system is less generous for medium and high-wage earners but still remains generous for low-wage earners. The key driver is the redistribution of a part of the “economic benefit” gained from medium and high-wage earners to low-wage earners.

(iii) The full contributory period is set 40 years.

(iv) As from 2021, the minimum and statutory retirement ages will be adjusted in line with changes in life expectancy every three years.

(v) Indexation of benefits is equal to the minimum of CPI and the sum of 50% CPI and 50% GDP growth [ $\min(50\% \text{ GDP growth} + 50\% \text{ CPI}, \text{CPI})$ ].

(vi) Pensionable earnings will be calculated based on the full-earnings history. The valorisation mechanism for the calculation of pensionable earnings is based on change in consumer price index and maturity rate.

(vii) The 2010 legislation set a unified statutory retirement age for all. And a minimum age for retirement was set at 60. In 2012 by a new law the above age thresholds were further increased by two years, (60 to 62 and 65 to 67).

(viii) The legislation includes a sustainability clause, which stipulates that if long-term projections show that the rise in public pension expenditure between 2009 and 2060 will be over 2.5 percentage points of GDP, then relevant parameters of the pension system will be changed to bring the increase of expenditure below the targeted threshold.

Laws 4093/2012 and 4302/2014 increased statutory retirement age from 60 to 62 and from 65 to 67 for the whole social security system.

The main pension schemes are financed by employers/employees contributions and by state contributions.

### ***1.1.2 Auxiliary pension provision***

The auxiliary pension provision began forming in the 1930s, based on the legislation of the main pension provision which had already come into effect. The employees of many different professions and companies founded several auxiliary funds in order to amend the income they would be entitled to in the future as well as their pension status. There spawned therefore, a long list of auxiliary funds in which discrete groups of employees would contribute, like electricians, bakers, people working in banks. As of 1983 the auxiliary pension extended to the majority of employees.

Nevertheless, the defragmentation of the auxiliary pension provision bore the need of drastically reducing the number of auxiliary pension funds so that they could be better organized, managed and financially monitored. Initially, in 1992 law 2084 unified the pension formula for all people first insured from 1/1/1993, since each fund had its own provisions until then. Law 3655/2008 merged and incorporated many of these funds into newfound ones, according to the type of professions of their insured population.

On February 2012 the Parliament adopted a reform of auxiliary pension system by law 4052/2012, which establishes a unified auxiliary pension fund that aims to incorporate all employees' funds, and introduces a pay-as-you-go (PAYG) notional defined contribution system (NDC).

The auxiliary pension provision works in parallel to the main pension provision and is mandatory for most people. The former is financed separately from the main pension from both employer and employee. It is awarded under the prerequisite of receiving a main pension.

### ***1.1.3 Social solidarity grant provision***

Any pensioner aged 65 or older, who legally resides in Greece is entitled to a social solidarity grant (EKAS), if satisfies the following financial criteria :

- ✓ overall net annual income from pensions must not exceed €8.472,09;
- ✓ total annual personal taxable income must not exceed €9.884,11; and
- ✓ total annual family taxable income must not exceed €15.380,90.

The amount of grant payable per month is €230,00 with net income up to €7.715,65; €172,50 with net income from €7.715,66 to €8.018,26; €115,00 with net income from €8.018,27 to €8.219,93; €57,50 with net income from €8.219,94 to €8.472,09.

An amount of €30,00 per month is granted under the following special income conditions:

- ✓ overall net annual income from pensions must range from €8.472,10 to €9.200,00;
- ✓ total annual personal taxable income must not exceed €9.884,11;
- ✓ total annual family taxable income must not exceed €13.500,00; and
- ✓ overall net monthly income from pensions must not exceed €850,00.

In any case of reduced old-age and invalidity pensions the above amounts of EKAS are reduced by 1/3.

## 1.2. Recent reforms of the pension system included in the projection

All recent reforms are included in the projection exercise.

### 1.2.1. Main pension provision

A summary of main provisions of the new legislation (laws 3863/2010, 3865/2010, 3986/2011, 4024/2011, 4051/2012, 4093/2012 and 4302/2014), which applies to all main pension schemes, is provided below.

#### The pension amount consists of two parts, namely the:

*Basic pension part.* The amount of pension that does not correspond to insurance contributions will be granted starting 1.1.2015, with years of service accumulating from 1.1.2011. The full monthly pension (12 times a year) is the flat amount of 360 € in 2010 and is payable in the cases of establishment of pension rights. The requirement needed is 35 years of permanent residency in Greece between the ages of 15 and 67. When insufficient or no pension rights at all have been accrued during one's working life, the individual is entitled to the means tested basic pension amount, payable 12 times a year, at the age of statutory retirement.

*Proportional pension part.* The amount of pension which is in proportion to the amount of insurance contributions pertaining to the years of insurance, from 1.1.2011 onwards, of each insured party establishing a pension entitlement subsequent to 1.1.2015 vis-à-vis primary insurance institutions (except OGA) or the Public Sector. The proportional pension amount aims at rewarding insured people who choose to prolong their working lives.

#### Accrual Rates of proportional pension:

The statutory accrual rates in the old system used to vary significantly across pension funds. The new system introduces accrual rates (table II), only for the proportional part of the pension that depend only on the length of the career (ranging from 0.8 to 1.5 percent of earnings) with the same profile for all workers. For each full year of insurance the monthly pension will be calculated on the basis of percentages of the pensionable earnings or insurance categories, which are mentioned in the table below:

TABLE II Statutory Accrual Rates for the Proportional part of the pension amount, of the Reform		
TOTAL INSURED YEARS		ANNUAL ACCRUAL RATE FOR THE WHOLE OF THE INSURED'S CAREER ON THE BASIS OF THE INSURED DAILY WAGES SCALE
FROM	TO	
1	15	0,80%
15,01	18	0,86%
18,01	21	0,92%
21,01	24	0,99%
24,01	27	1,06%
27,01	30	1,14%
30,01	33	1,22%
33,01	36	1,31%
36,01	39	1,40%
39,01	45	1,50%

### Retirement age-minimum career:

Law 4093/2012 combined with laws 3863/2010 and 3865/2010, set the retirement age threshold for a full pension at 67 with at least 15 years of past credits and at 62 with a minimum career of 40 years. Also minimum retirement age is set at 62 and this includes early pensions as well.

The retirement age thresholds for both men and women become the same. Additionally, a transitional period was provided for those entitled pension up to 31/12/2012, with gradual increase of minimum work years and age thresholds.

Law 4302/2014 introduced a new provision for OGA insured, which entitle full pension at 62 with a minimum career of 40 years.

### Average pensionable salary:

The career length, which is taken into account for the calculation of pensionable salary is increased gradually, reaching the full career length, starting from 2015. The law equalized the rules of the pensionable salary calculation between the public and private sector employees and the self employed.

### Pension increases:

Pension indexation is fully linked to a uniform adjustment index which cannot exceed CPI. In particular, the index is equal to the minimum of CPI and the sum of 50% CPI and 50% GDP growth [min (50% GDP growth +50% CPI, CPI)].

### Minimum/maximum pension amount:

The minimum monthly pension for those insured from 1.1.2011 is equal to 15 daily wages of unskilled labor worker as those specified by the National General Collective Labour Agreement of 2015, (with the exception of public sector and OGA insured). For public sector, minimum pension is linked to the relevant salary scale.

The annual amount of maximum old age pension (including family benefits), is 28.483,00€ for those insured in IKA-ETAM before 1/1/1993 and 33.280,80€ (2013 value) for all other insured.

### Invalidity pensions:

The law provides strict conditions of eligibility for Invalidity pensions.

Specifically:

- Disability pensions are under tight scrutiny by a committee of independently and randomly chosen doctors.
- Also a new and more precise disability percentage table has come into effect.

### Life expectancy:

The legislation stipulates a retirement age increase mechanism from the year 2021 on that will adjust the retirement age in line with life expectancy every three years. The modeling process used has taken this parameter into account.

### Current insured:

Starting on 1.1.2011, the current insured will be getting a pension which will comprise of two components:

- The first component will be using the arrangements before 1.1.2011 for as many years as the insured worked before 1.1.2011.
- The second component will be using the reformed arrangements for as many years as the insured worked after 1.1.2011.

### Other measures to control expenditure include:

- i. Abolition of the 13<sup>th</sup> and 14<sup>th</sup> pension for all pensioners, which was initially replaced by an annual allowance of 800€, for an annual pension lower than 30.000€. Later, the annual allowance was fully abolished for all pensioners by law.
- ii. Zero nominal increase in pensions up to 2016.
- iii. In 2011 and 2012 several laws (L4024/2011, L4051/2012, L 4093/2012 introduced pension cuts. Pension cuts affected monthly amounts over 1.000€.

#### *1.2.2. Auxiliary pension provision*

The 2010 major changes in the main pension system had indirectly affected the auxiliary pension system, (eligibility, life expectancy and pensionable salary). However, in 2012 a structural reform for auxiliary pensions was introduced.

### Reform-NDC system

Law 4052 introduced a pay-as-you-go (PAYG) notional defined contribution system (NDC) with the following elements:

- (i) The notional rate of return, which will be the annual growth in pensionable earnings (contributory earnings) of all insured with the Fund, applied for the accrual of contributions.
- (ii) The life expectancy at retirement, applied for the calculation of the amount of pension.
- (iii) The sustainability factor, applied to guarantee the system's financial stability.

Pensions paid must be equal to contributions received or, alternatively, the average contribution rate must be equal to the ratio of total benefits paid to total contributory earnings. The amount of pension paid must be entirely linked to the pensioner's age. In order to calculate the amount of old-age pension, a whole life annuity will be used. All insured after 1.1.2014 shall be fully encompassed in the new system.

Whole life annuities will be recalculated every three years. In 2021 the new NDC scheme shall be running parallel to the new Primary Pension scheme (L. 3863) as per the change in life expectancy.

#### Current insured:

For those insured before 1.1.2014, the new system will be implemented pro rata starting on 1.1.2015 and they will be getting a pension which will comprise of two components:

- The first component part will be using the arrangements before 1.1.2015 for as many years as the insured worked before 1.1.2015.
- The second component will be using the reformed arrangements for as many years as the insured worked after 1.1.2015.

#### Other measures to control expenditures include:

- 13<sup>th</sup> and 14<sup>th</sup> auxiliary pension was abolished for all pensioners.
- In 2011 and 2012 several laws (L4024/2011, L4051/2012, L 4093/2012) introduced pension cuts.

## 2. DEMOGRAPHIC AND LABOUR FORCES PROJECTIONS

### 2.1. Demographic Development

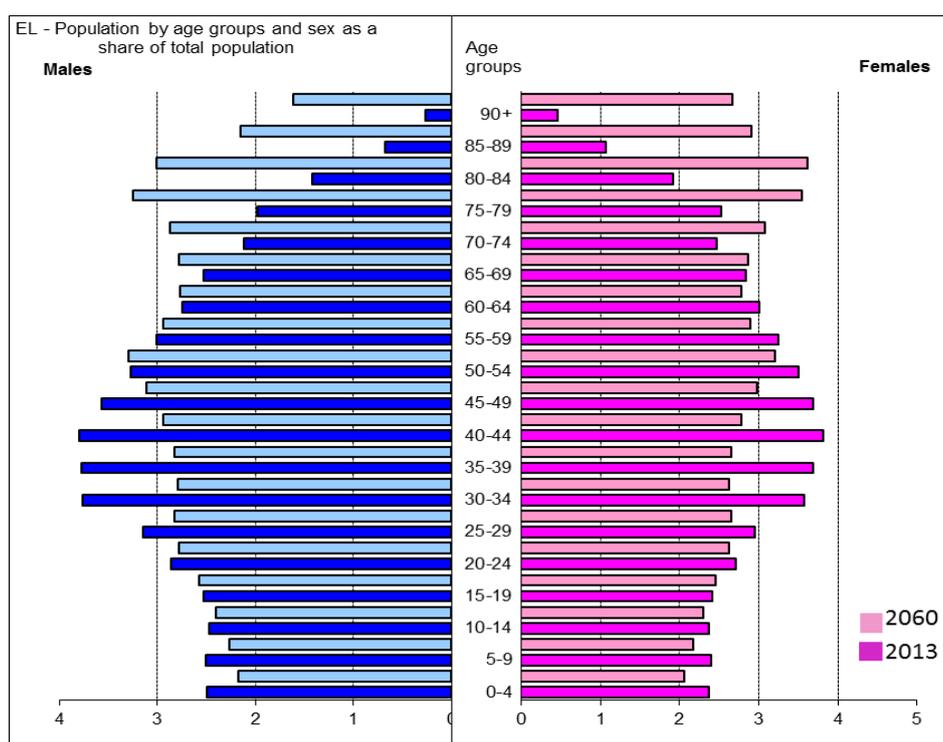
The evolution of main demographic variables is given in table 2. The population is projected by EUROSTAT and decreases from 11,05 million in 2013 to 8,56 millions in 2060. Furthermore, the old-age dependency ratio increases from 31,2 in 2013 to 60,8 in 2060.

Life expectancy at birth, for both men and women, also increases (from 78,0 in 2013 to 84,9 in 2060 and from 83,3 in 2013 to 89,0 for men and women respectively). Life expectancy at 65+ for men, goes from 18,0 at base year to 22,7 years at the end of the projection period, while for women goes from 20,8 to 25,4. Increased life expectancy at 65+ is an important factor for the projection, as statutory retirement age is automatically linked with life expectancy.

Net migration is forecasted to be negative up to 2030, which is considered one of the main reasons for the projected population shrinkage.

	Main demographic variables evolution						
	2013	2020	2030	2040	2050	2060	Peak year*
Population (thousand)	11045	10673	10062	9572	9109	8560	2013
Population growth rate	-0,4	-0,6	-0,6	-0,5	-0,5	-0,7	2014
Old-age dependency ratio (pop65/pop15-64)	31,2	34,6	41,6	53,8	63,7	60,8	2051
Ageing of the aged (pop80+/pop65+)	28,7	31,9	31,5	32,9	38,1	46,5	2060
Men - Life expectancy at birth	78,0	79,2	80,8	82,2	83,6	84,9	2060
Men - Life expectancy at 65	18,0	18,8	19,8	20,8	21,8	22,7	2060
Women - Life expectancy at birth	83,3	84,2	85,5	86,7	87,9	89,0	2060
Women - Life expectancy at 65	20,8	21,5	22,6	23,6	24,5	25,4	2060
Men - Survivor rate at 65+	84,3	86,0	88,1	89,9	91,4	92,7	2060
Men - Survivor rate at 80+	55,3	59,1	64,1	68,6	72,7	76,3	2060
Women - Survivor rate at 65+	92,9	93,6	94,5	95,2	95,9	96,4	2060
Women - Survivor rate at 80+	74,0	76,6	79,8	82,7	85,2	87,3	2060
Net migration	-15,9	-22,3	-10,0	1,3	7,3	4,7	2050
Net migration over population change	0,3	0,4	0,2	0,0	-0,1	-0,1	2014

GRAPH 1 shows the age pyramid comparison between 2013 and 2060 for men and women.



## 2.2. Labour Force

Labor force participation is projected to increase for workers aged 55-64 (from 42,4% in 2013 to 78,0% in 2060 – table 3). The largest increase will occur until 2020 (reaching 59,4%). Labor force participation is projected to increase significantly also for workers aged 65-74 (from 4,9% in 2013 to 25,1% at the end of the projection).

Employment rate for workers aged 65-74, increases from 4,4 in 2013 to 24,4 in 2060, which affects the projection results.

	Participation rate, employment rate and share of workers for the age groups 55-64 and 65-74						
	2013	2020	2030	2040	2050	2060	Peak year*
Labour force participation rate 55-64	42,4	59,4	69,4	74,5	77,2	78,0	2060
Employment rate for workers aged 55-64	35,5	51,5	63,6	71,3	73,8	74,6	2060
Share of workers aged 55-64 on the labour force 55-64	83,7	86,6	91,7	95,6	95,6	95,7	2055
Labour force participation rate 65-74	4,9	7,2	14,3	19,5	23,4	25,1	2060
Employment rate for workers aged 65-74	4,4	6,5	13,6	18,9	22,7	24,4	2060
Share of workers aged 65-74 on the labour force 65-74	89,8	91,3	94,8	97,1	97,2	97,3	2053
Median age of the labour force	39,0	42,0	44,0	44,0	43,0	43,0	2026

The average effective entry age remains constant for the projection period (22.6 years for men and 24.1 for women - Tables 4a & 4b respectively). Due to pension reforms the average contributory period reached 37,8 years for men and 37,5 for women by 2060 (tables 4a & 4b respectively). Percentage of adults life spent at retirement decreases for both men and women.

	Labour market entry age, exit age and expected duration of life spent at retirement - MEN						
	2013	2020	2030	2040	2050	2060	Peak year
Average effective entry age (CSM) (I)	22,4	22,6	22,6	22,6	22,6	22,6	2014
Average effective exit age (CSM) (II)	61,0	64,9	65,9	66,9	67,5	67,5	2050
Average effective working career (CSM) (II)- (I)	38,5	42,3	43,2	44,3	44,9	44,9	2050
Contributory period	0,0	31,9	34,7	35,2	36,4	37,8	2060
Contributory period/Average working career	0,0	75,3	80,3	79,6	81,0	84,1	2060
Duration of retirement	21,1	18,8	19,0	19,2	19,3	20,1	2013
Duration of retirement/average working career	54,7	44,4	43,9	43,4	43,0	44,8	2013
Percentage of adult life spent at retirement	32,9	28,6	28,4	28,2	28,1	28,9	2013
Early/late exit	3,0	5,9	5,6	5,4	8,2	9,9	2013

	Labour market entry age, exit age and expected duration of life spent at retirement - WOMEN						
	2013	2020	2030	2040	2050	2060	Peak year
Average effective entry age (CSM) (I)	24,7	24,1	24,1	24,1	24,1	24,1	2013
Average effective exit age (CSM) (II)	61,2	64,8	65,5	66,3	67,1	67,1	2050
Average effective working career (CSM) (II)- (I)	36,5	40,7	41,4	42,1	43,0	43,0	2050
Contributory period	0,0	29,3	32,8	34,9	36,2	37,5	2060
Contributory period/Average working career	0,0	72,0	79,4	82,7	84,3	87,3	2042
Duration of retirement	24,4	21,5	22,6	22,6	22,7	23,6	2013
Duration of retirement/average working career	66,9	52,8	54,6	53,6	52,8	54,9	2013
Percentage of adult life spent at retirement	36,1	31,5	32,2	31,9	31,6	32,5	2013
Early/late exit	3,4	6,6	4,9	5,0	7,2	9,8	2013

In the first part of projection, the ratio "Contributory period/Average working career" is affected by the high unemployment. Afterwards the ratio increases as it is affected by stricter eligibility conditions and improved financial parameters.

### 3. PENSION PROJECTION RESULTS

#### 3.1. Extent of the coverage of the pension schemes in the projections

This projection covers the pension expenditure of the main, auxiliary and social solidarity grant provision which in total, as shown in table 5, represent almost 100% of the total public pension expenditure as defined by Eurostat (ESSPROS).

	Eurostat (ESSPROS) vs. Ageing Working Group definition of pension expenditure (% GDP)							
	2005	2006	2007	2008	2009	2010	2011	2012
1 Eurostat total pension expenditure	12,2	12,1	12,3	12,7	13,5	13,9	14,9	17,5
2 Eurostat public pension expenditure	:	:	:	:	:	13,8	14,8	17,4
3 Public pension expenditure (AWG)	:	:	:	:	:	13,6	:	17,4
4 Difference (2) - (3)						0,2	:	0,0
5 Expenditure categories not considered in the AWG definition, please specify:	:	:	:	:	:	:	:	:
5.1 ...	:	:	:	:	:	:	:	:
5.2 ...	:	:	:	:	:	:	:	:
5.3 ...	:	:	:	:	:	:	:	:

The 2012 public pension expenditure includes Christmas, Easter, and vacation allowances ( about 0,73% of 2012 GDP). From 2013 those allowances are abolished.

Also from 2013 and onwards, public pension expenditure is affected by legislated serious pension cuts according to L.4093/2012, ( about 0,7% of 2013 GDP).

Table 5a shows the affect of the above to the formation of public pension expenditure from 2012 to 2013.

TABLE 5a	Public Pension Expenditure from 2012 to 2013
Eurostat (ESSPROS) vs. Ageing Working Group definition of pension expenditure (% GDP)	
	<b>2012</b>
1 Eurostat total pension expenditure	17,5
2 Eurostat public pension expenditure*	17,4
Main Pension Allowances and 13th -14th Auxiliary Pension included	0,7
Public Pension Expenditure without the above	16,7
	<b>2013</b>
Public pension expenditure (AWG)	16,2
Pension cuts L4093/2012	0,7
Public pension expenditure (AWG) without the application of pension cuts	16,9

### 3.1.1. Main pension provision

Six main pension schemes are modeled in detail, with a total benefit expenditure of 13,1%, of GDP in 2013. These schemes cover 95,6% of the main pension benefit expenditure, since the overall expenditure for the main pension schemes in that year was 13,7% of GDP. These figures do not include pension expenditure for employees of Bank of Greece, since Bank of Greece guarantees the pensions of its personnel. The six schemes modeled are:

IKA-ETAM	: Employees of the private sector
OAEI	: Self-employed
Public Sector	: Employees of the public sector
OGA	: Agricultural sector
ETAA	: Employees & Self-Employed (Engineers, Doctors, Lawyers)
DEH	: Public Power Corporation Personnel

In order to guarantee the full (100%) coverage in the projections, there has been a loading (0,5% of GDP for the year 2013) on the amount of total benefits and a loading (0,1% of GDP for the year 2013) on the amount of total contributions, of the modeled main pension schemes for NAT (Seamen) and ETAPMME (Media Personnel), which are not explicitly modeled. A loading (0,1% of GDP for the year 2013) on the amount of total benefits, is also included for OGA's uninsured.

### 3.1.2. Auxiliary pension provision

ETEA is modeled, under which merged the following former auxiliary schemes:

ETEAM	(Employees - majority of private sector)
TEADY	(Public Sector Employees)
TEAPOKA	(Public Sector Employees)

TADKY (Public Sector Employees)  
 TEAYEK (Employees of commercial shops)  
 TEAIEGE (Private school teachers)  
 TEAPOZO (Brewery employees)  
 TEAX (Chemists)  
 TEAYNTP (Shipping agencies employees)  
 TEAPDEH (Public power company employees)  
 TEAPOTE (Hellenic Telecommunications Organization employees)  
 TEAPERT (Public TV Employees)  
 BANKS (Banks employees)

The pension expenditure of ETEA is approximately 71% (1,5% of GDP) of the total auxiliary benefit expenditure for the year 2013.

In order to guarantee the full (100%) coverage in the projections, there has been a loading on the amount of total benefits (0,6% of GDP in 2013) and on the amount of total contributions (0,5% of GDP in 2013) for the rest of the funds which are not explicitly modeled.

The above loading covers two groups:

- shelf employed (ETAA, OAEE) and employees (ETAA, ETAP-MME, NAT & police officers fund)
- dividend schemes (public sector/MTPY, army, navy, and air force)

Law 4281/2014 provides that the schemes of the first group will be merged with ETEA (2015), unless they convert to occupational funds. The funds of the later group will operate under a system with sustainability factor (as of 2015). Therefore the loadings were projected in accordance with ETEA's benefit expenditure and contributions.

### 3.2. Overview of projection results

Expenditure	Projected gross and net pension spending and contributions (% of GDP)						
	2013	2020	2030	2040	2050	2060	Peak year*
Gross public pension expenditure	16,2	15,5	14,4	14,1	14,4	14,3	2014
Private occupational pensions	:	:	:	:	:	:	:
Private individual pensions	:	:	:	:	:	:	:
<i>Mandatory private</i>	:	:	:	:	:	:	:
<i>Non-mandatory private</i>	:	:	:	:	:	:	:
Gross total pension expenditure	16,2	15,5	14,4	14,1	14,4	14,3	2014
Net public pension expenditure	:	:	:	:	:	:	:
Net total pension expenditure	:	:	:	:	:	:	:
Contributions	2013	2020	2030	2040	2050	2060	Peak year*
Public pension contributions	10,2	10,2	10,3	10,0	10,9	11,2	2060
Total pension contributions	10,2	10,2	10,3	10,0	10,9	11,2	2060

Following are the main points in relation to table 6:

- ✓ Overall, the total public pension expenditure amounted to 16,2% of GDP in 2013 while the respective amount for 2060 reaches 14,3%. This represents a total decrease of 1,9% of GDP over the projection period 2013-60, while it reaches its maximum value of 16,3% of GDP in 2014.

- ✓ The total amount of contributions from employers, employees and state for the public pension funds increases from 10,2% of GDP in 2013 to 11,2% of GDP in 2060. The projection includes also employer rates of new Public servants (insured in IKA-ETAM from 1.1.2011) where the employer pays contributions. Therefore, the total employer contributions are gradually increasing until they stabilize near the end of the projection.
- ✓ L. 3029/2002 states that IKA will receive 1% of GDP until 2032. This is why there is a drop in the state contribution in 2033. After 2033 the state contribution gradually increases because the financing of the basic pension of €360 increases as well.
- ✓ The expenditure of the auxiliary pension provision decreases by 0,5% of GDP between 2013 and 2060, while it reaches its maximum value of 2,1% of GDP in 2013.

**NOTES:**

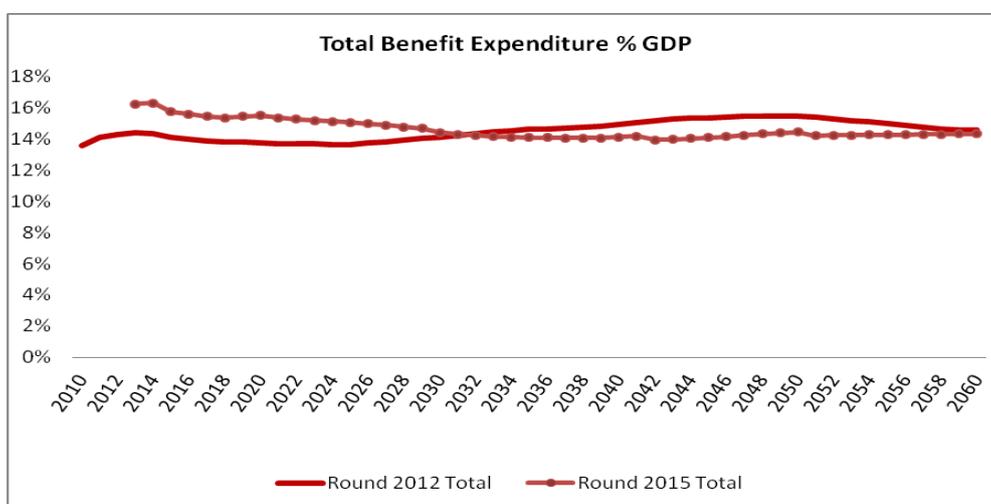
- 1) Revenues from third parties like social funding, government grants, income from property and other revenues are not included in this study. However legislated state contribution is included.
- 2) Table 6 includes loadings for benefits/contribution for main and auxiliary funds.

**3.2.1. Differences between 2012 and 2015 rounds**

The following table shows the round 2012 and 2015 pension expenditure as a share of GDP in the relevant base years :

Pension expenditure / GDP	Round 2012	Round 2015
Year	2010	2013
Main Pension	11,3%	13,7%
Auxiliary Pension	1,8%	2,1%
Ekas	0,4%	0,4%
Total	13,6%	16,2%

From 2010 to 2013, the increase in the pension expenditure as percentage of GDP is due mainly to the significant (about 20%) decrease of the Greek GDP.



In the 2015 round, for the first years of the projection the benefit expenditure is increased. Gradually, the benefit expenditure for this round decreases and from 2030 and onwards stabilizes around 14% of GDP and reaches 14,3% in 2060. The expenditure in this projection period is limited mainly due to the auxiliary pension reform.

In the 2012 round, from 2030 onwards benefit expenditure was increasing reaching its maximum value of 15,4% in 2050 and subsequently was decreasing to 14,6% by 2060.

The differences between the 2012 round and the 2015 round are due to the following reasons:

- ✓ In 2015 round, for the first years of the projection the benefit expenditure results increased because of massive retirements due to the continuous reforms of the previous years and high unemployment.
- ✓ The 2010 statutory retirement age was 65 and now (2013) it is 67. Also, the transition period where workers could vest rights before the new system's age thresholds application, lasted from 2010 to 2015 in the 2012 round, while in the 2015 round it lasted from 2010 to 2013. The above-mentioned changes were abruptly applied on 31/12/2012 have caused differences between the results of the two rounds, considering that a large number of workers have been blocked in the system.
- ✓ Concurrently, the number of unemployed people was higher in 2013 than in 2010, which caused the faster-than-expected retirement of people who couldn't find jobs but were vested. Thus, in the 2015 round the first projection period has more retirements than the 2012 round corresponding projection period. The employed people (contributors) left will take more time to become vested.
- ✓ The first part of the projection includes new pensioners that are allowed to retire at a lower age with very few years of service, resulting in low pensions, which do not get cut. In the middle and last parts of the projections of both rounds the increase in statutory retirement ages and required years of service produces higher new pension amounts. However, in the 2015 round these pension amounts have been subjected to cuts.
- ✓ The 2012 round projections include Christmas, Easter, and vacation allowances. The 2015 round projections do not include those allowances, as well as the serious pension cuts legislated from 2011 onwards.
- ✓ The difference in benefit ratios between the two projections rounds derives mainly from :
  - Pensions cuts, the abolition of the allowances of 800€ for main pension and the abolition of 13th and 14th auxiliary pensions. These apply also to new pensions.
  - BR2012 yields by division with the pensions. BR2015 yields by division with the pensioners. Also in 2012 projection round the economy-wide wage was much higher than that of 2015 projection round (i.e 29,2 vs. 15,6 for 2013).
  - Auxiliary benefits indexation according to the legal provision
 
$$\gamma_t = \min([1 + g_{t-2} - r]SF_t - 1, \text{inflation}_{t-1})$$
 where  $g$  : notional rate of return,  $r$  : discount rate=1,3%,  $SF$  : sustainability factor = Contributions previous year/Benefits previous year.  
This indexation can take negative values.
  - Combined transition to the new main & auxiliary pension system. Especially the auxiliary reform produces gradually much lower pensions.

### 3.2.2. Main pension provision

The expenditure of the main pension provision in 2013 amounted to 13,7% of GDP, while the respective amount for 2060 is 12,3%. This represents a total decrease of 1,4% of GDP over the projection period 2013-60.

The major drivers which had significant impact on the projections include the unification of all eligibility rules for the age thresholds, the accrual rates, the career length prolongation and the linkage between age thresholds and life expectancy, from 2021 onwards.

#### Analysis by main pension fund:

TABLE IIIa : Projected gross public main pension spending by fund (% of GDP)							
Pension fund	2013	2020	2030	2040	2050	2060	Peak year
<b>Total pension expenditure</b>	<b>13,7</b>	<b>13,4</b>	<b>12,4</b>	<b>12,1</b>	<b>12,4</b>	<b>12,3</b>	<b>2014</b>
IKA-ETAM	5,2	5,1	4,7	4,7	5,4	5,6	2058
OAEE	1,7	1,8	2,0	2,2	2,3	2,5	2060
OGA	2,1	1,6	1,3	1,1	1,0	1,0	2013
PS	3,2	3,3	2,8	2,6	2,2	1,7	2020
ETAA	0,5	0,6	0,7	0,7	0,8	0,9	2060
TAP-DEH	0,4	0,4	0,3	0,2	0,1	0,1	2014
Uninsured of OGA	0,1	0,1	0,1	0,1	0,0	0,0	2024
Loading	0,5	0,5	0,5	0,5	0,5	0,5	2014

A decrease in the pension expenditure of IKA-ETAM (the largest pension fund) is observed up to 2038 due to the transition to the new system, while from 2040 (where the system has almost mature) gradually increases due to the increase of years of service.

One of the reasons for the increase of IKA's share in the base year's total pension expenditure is the fact that the pension cutbacks did not affect IKA as much as other funds, since IKA has lower pension amounts. Also, this time the "noble" funds were incorporated in the IKA results, while in the previous round they were separate.

Increase is apparent in OAEE and ETAA pension funds. The increase is due to the limited effect of the reforms on these funds due to the already high effective retirement ages and prolonged careers. The self employed already had prolonged careers before the application of the new thresholds.

Benefit expenditure for public sector and TAP-DEH decreases during the projection period. The effect of life expectancy dominates over the increase of years of service. The public sector will be shrinking in the years to come, with people working for more than 35 years immediately retiring. The new public servants from 1.1.2011 are insured to the private employees sector fund.

The agricultural population is declining gradually and moves to the private employees fund, therefore OGA benefit expenditure decreases.

As a consequence the private employees sector fund (IKA-ETAM) accrues more active people, and later pensioners as well, from the funds mentioned above. Therefore, future pension expenditure of IKA-ETAM is furthermore burdened.

In general the stricter rules of the new eligibility criteria and the reduction of the benefit ratio, due to the decrease of the accrual rates, restrain the total projected benefit expenditure.

**NOTE :** Pensioners with two or more pensions are entitled to only one basic pension component (as per L.3863). This, however, was not taken into account in the above estimations, which makes results conservative.

### 3.2.3. Auxiliary pension provision

It follows from table IIIb that the auxiliary pension expenditure as percentage of GDP decreases between 2013 and 2060. Specifically the projected benefit expenditure for auxiliary pensions decreases rapidly from 2,1% in 2013 to 1,6% in 2016 and 1,4% in 2027 where is stabilizes.

A number of main reasons for the results follows:

- ✓ NDC system will be applied as of 2015.
- ✓ Auxiliary pensions will operate with sustainability factor ensuring annually balanced results.
- ✓ Invalidity and survivor pension expenditure will also decrease due to the new benefits regulation.
- ✓ Increased age thresholds effective as of 2013 will keep people in the system for longer periods than before (career prolongation).
- ✓ Age thresholds will correlate with life expectancy.

### Auxiliary pension:

TABLE IIIb							
Projected gross public auxiliary pension spending by fund (% of GDP)							
Pension fund	2013	2020	2030	2040	2050	2060	Peak year
Total pension expenditure	2,1	1,7	1,6	1,6	1,6	1,6	2013
ETEA	1,5	1,2	1,2	1,2	1,2	1,2	2014
Loading	0,6	0,5	0,5	0,5	0,5	0,5	2015

The peak year for ETEA is 2013 as a result of the massive retirements (due to the continuous reforms of the previous years and high unemployment). However, the expenditure was restrained because of consecutive pension cuts introduced up to 2012. In 2014 an extra decrease occurred due to the first application of sustainability factor from 1/7/2014. From 2015, with the implementation of the new NDC system the expenditure is expected to drop further.

For other funds ("loading") the peak year for pension expenditure is 2015. The implementation of the NDC system is expected to further drop expenditure.

### 3.2.4. Projection results by scheme

Table 7 gives the analysis of the expenditure results by pension scheme.

Pension scheme	Projected gross public pension spending by scheme (% of GDP)						
	2013	2020	2030	2040	2050	2060	Peak year *
Total public pensions	16,2	15,5	14,4	14,1	14,4	14,3	2014
<i>of which earnings related:</i>							
Old age and early pensions	9,7	9,8	9,1	8,6	8,5	8,4	2014
Disability pensions	0,7	0,7	0,7	0,6	0,6	0,6	2014
Survivors' pensions	2,0	1,8	1,8	1,6	1,4	1,1	2013
Other pensions	:	:	:	:	:	:	:
Loading (Main and auxiliary)	1,1	1,0	0,9	0,9	0,9	0,9	2013
<i>of which non-earnings related (including minimum pension and minimum income guarantee):</i>							
Old age and early pensions	1,68	1,23	1,11	1,59	2,13	2,20	2058
Disability pensions	0,40	0,32	0,26	0,26	0,29	0,30	2013
EKAS	0,45	0,39	0,39	0,39	0,39	0,39	2013
Other pensions (survivors)	0,22	0,18	0,17	0,19	0,25	0,31	2060
<i>of which</i>							
country-specific scheme 1	:	:	:	:	:	:	:
country-specific scheme 2	:	:	:	:	:	:	:
country-specific scheme 3	:	:	:	:	:	:	:

Old-age earnings related benefits as a percentage of GDP declines from 9,7% at 2013 to 8,4% in 2060.

Old-age non-earnings related benefits, decline from 1,68% at 2013 to 1,11% to 2030 and then increases again at 2,20% at the end of the projection.

At the start of the projection old-system minimum pensions still exist, which gradually are decreasing. Concurrently, as of 1.1.2015, the component of the basic pension (€360) proportional to the time elapsed in the new system, (from 1.1.2011 onwards), which is included in the pension, gradually increases until it reaches 100%. Therefore the last part of the non-earning related projection is stabilized.

Survivors' pensions, earnings related benefits are decreasing. The corresponding non-earnings related benefits follow a similar trend to the relevant old-age benefits, for the same abovementioned reasons.

Moreover, in the first part of the projection the survivors receive 70% of the pension, because the pensioners were insured before 1993, while gradually the new survivors replace the existing survivors with pensions that are 50% of the original pensions, resulting in a decrease. Another contributing reason to the decrease is that the earnings-related part of the pensions is gradually being replaced by a decreasing earnings-related part and an increasing non-earnings-related part (basic pension). In the first part of the projection the non-earnings-related part consists of the small portion that completes the minimum pension which gradually diminishes.

It should also be noted that there is a degree of conservatism in the valuation, because, according to the legislation, pensioners receive one basic pension even if they receive more pensions, while in the valuation each pension includes a basic pension.

For disability pensions, earnings-related expenditure remains relatively stable throughout the period (0,7% of GDP up to 2030 and 0,6% afterwards). Non-earnings-related expenditure declines from 0,4% of GDP at 2013 to 0,26% and then increases at 0,30% at the end of the projection.

### 3.3. Description of main driving forces behind the projection results and their implications for main items from a pension questionnaire

This part provides more details about the development of public pension expenditures (Table 8a and Table 8b). It uses a standard arithmetic decomposition of a ratio of pension expenditures to GDP into the dependency, coverage, benefit ratio, employment rate and labour intensity.

$$\frac{\text{Pension Exp}}{\text{GDP}} = \frac{\overbrace{\text{Population 65+}}^{\text{DependencyRatio}}}{\text{Population 20-64}} \times \frac{\overbrace{\text{Number of Pensioners (Pensions)}}^{\text{CoverageRatio}}}{\text{Population 65+}} \times \frac{\overbrace{\text{Average income from pensions (Average Pension)}}^{\text{Benefit Ratio}}}{\text{GDP}} \times \frac{\overbrace{\text{Population 20-64}}^{\text{Labour Market / LabourIntensity}}}{\text{Hours Worked 20-74}} \quad [1]$$

The coverage ratio is further split with the scope of investigating the take-up ratios for old-age pensions and early pensions as below:

$$\frac{\overbrace{\text{Number of Pensioners}}^{\text{CoverageRatio}}}{\text{Population 65+}} = \frac{\overbrace{\text{Number of Pensioners 65+}}^{\text{CoverageRatio Old-Age}}}{\text{Population 65+}} + \left( \frac{\overbrace{\text{Number of Pensioners } \leq 65}^{\text{CoverageRatio Early-Age}}}{\text{Population 50-64}} \times \frac{\overbrace{\text{Population 50-64}}^{\text{Cohorteffect}}}{\text{Population 65+}} \right) \quad [2]$$

The labour market indicator is further decomposed according to the following:

$$\frac{\overbrace{\text{Population 20-64}}^{\text{Labour Market / LabourIntensity}}}{\text{Hours Worked 20-74}} = \frac{\overbrace{\text{Population 20-64}}^{1/\text{Employment Rate}}}{\text{Working People 20-64}} \times \frac{\overbrace{\text{Working People 20-64}}^{1/\text{Labourintensity}}}{\text{Hours Worked 20-64}} \times \frac{\overbrace{\text{Hours Worked 20-64}}^{1/\text{Career shift}}}{\text{Hours Worked 20-74}} \quad [3]$$

The decomposition, which is calculated using both data on pensions (Table 8a) and pensioners (Table 8b), is shown below.

The next tables describes the disaggregation of the total cost to its major components with respect to the main pension provision. These are: the benefit ratio, the dependency ratio, the coverage ratio and the ratio of labor market and labor intensity. The impact of all these components to the GDP change between 2013 and 2060 varies according to the importance of each one of them.

Pension expenditure as a percentage of GDP is lower at the end of the projection period.

It is evident that the major strike of the dependency ratio due to ageing is tackled by the reform.

In particular:

- i) The coverage ratio change by -0,9/pensions and -3,2/pensioners pp of GDP, which mainly comes from an impressive decrease of coverage ratio early-age (-19,3/pensions -19,1/pensioners). This results due to the enforcement of much

stricter criteria for old-age pension acquisition and the increase of the retirement ages by as many years as the life expectancy is estimated to be increased.

- ii) Improved employment effect.
- iii) Reduced the benefit ratio.

TABLE 8a

Factors behind the change in public pension expenditures between 2013 and 2060 using pension data (in percentage points of GDP) - pensions							
	2013-20	2020-30	2030-40	2040-50	2050-60	2013-60	Average annual change
Public pensions to GDP	-0,7	-1,1	-0,3	0,3	-0,1	-1,9	0,298
Dependency ratio effect	1,7	3,0	3,8	2,6	-0,6	10,6	0,211
Coverage ratio effect	-0,9	-1,6	0,1	0,2	1,3	-0,9	-0,020
Coverage ratio old-age*	0,0	0,5	0,6	0,6	1,4	3,0	0,063
Coverage ratio early-age*	-3,5	-10,6	-1,6	-1,6	-2,0	-19,3	-0,453
Cohort effect*	0,2	-1,0	-3,8	-4,1	1,1	-7,5	-0,167
Benefit ratio effect	0,8	0,0	-2,2	-1,9	-1,0	-4,4	-0,096
Labour Market/Labour intensity effect	-2,3	-2,2	-1,6	-0,4	0,2	-6,2	-0,132
Employment ratio effect	-2,2	-1,8	-1,3	-0,2	0,0	-5,5	-0,115
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0	0,000
Career shift effect	-0,1	-0,4	-0,3	-0,2	0,2	-0,8	-0,017
Residual	-0,2	-0,3	-0,4	-0,2	-0,1	-1,0	0,336

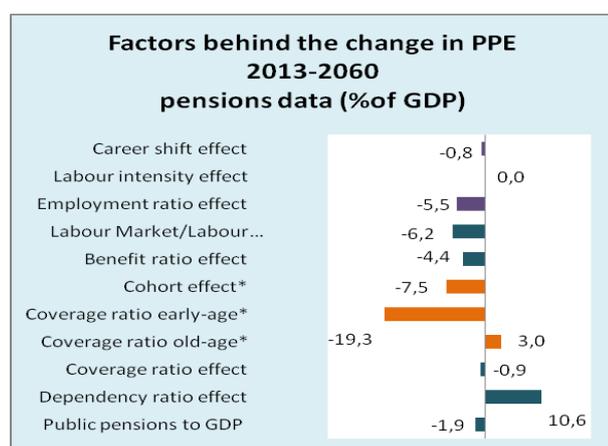
\* Sub components of the coverage ratio effect do not add up necessarily.

TABLE 8b

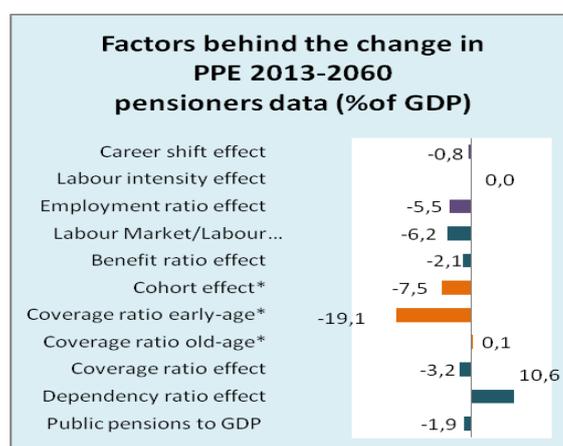
Factors behind the change in public pension expenditures between 2013 and 2060 using pensioners data (in percentage points of GDP) - pensioners							
	2013-20	2020-30	2030-40	2040-50	2050-60	2013-60	Average annual change
Public pensions to GDP	-0,7	-1,1	-0,3	0,3	-0,1	-1,9	0,298
Dependency ratio effect	1,7	3,0	3,8	2,6	-0,6	10,6	0,211
Coverage ratio effect	-1,4	-2,0	-0,4	-0,3	0,9	-3,2	-0,069
Coverage ratio old-age*	-0,7	-0,4	0,1	0,1	1,0	0,1	0,002
Coverage ratio early-age*	-3,9	-9,1	-1,8	-1,6	-2,6	-19,1	-0,441
Cohort effect*	0,2	-1,0	-3,8	-4,1	1,1	-7,5	-0,167
Benefit ratio effect	1,3	0,3	-1,7	-1,4	-0,6	-2,1	-0,048
Labour Market/Labour intensity effect	-2,3	-2,2	-1,6	-0,4	0,2	-6,2	-0,132
Employment ratio effect	-2,2	-1,8	-1,3	-0,2	0,0	-5,5	-0,115
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0	0,000
Career shift effect	-0,1	-0,4	-0,3	-0,2	0,2	-0,8	-0,017
Residual	-0,2	-0,3	-0,3	-0,2	0,0	-1,0	0,260

\* Sub components of the coverage ratio effect do not add up necessarily.

GRAPH 2a



GRAPH 2b



Benefit ratio and coverage ratio effects behind the change in pension expenditure differ considerably, when calculated in terms of pensions or pensioners because a large number of pensioners receive an auxiliary pension as well, causing the difference observed in the results.

Table 9 shows the evolution of the overall replacement rates for the main and auxiliary pension provision over the projection period 2013-60.

TABLE 9

Replacement rate at retirement (RR), benefit ratio (BR) and coverage by pension scheme (in %)							
	2013	2014	2020	2030	2040	2050	2060
Public scheme (BR)	65,6	66,6	67,4	68,4	60	54,1	51,7
Public scheme (RR)	:	38,7	32,8	30,4	25,3	22,3	22,3
Coverage	100	100	100	100	100	100	100
Public scheme old-age earnings related (BR)	57,8	59,3	62,8	64,4	52,9	45,3	43,7
Public scheme old-age earnings related (RR)	:	45,0	36,1	35,5	27,9	25,5	26,7
Coverage	74,5		73,9	72,6	75,4	76,9	76,8
Private occupational scheme (BR)	:		:	:	:	:	:
Private occupational scheme (RR)	:		:	:	:	:	:
Coverage	:		:	:	:	:	:
Private individual scheme (BR)	:		:	:	:	:	:
Private individual scheme (RR)	:		:	:	:	:	:
Coverage	:		:	:	:	:	:
Total (BR)	65,6	66,6	67,4	68,4	60	54,1	51,7
Total (RR)	:	40,7	36,5	36,2	32,1	29	27,5

The replacement rate (RR) is expected to drop due to :

- i) the significant reduction of accrual rates of main pension. Although the length of the careers increases, the respective accrual rates are lower than the old ones.
- ii) the gradual application (pro-rata period) of the NDC system.

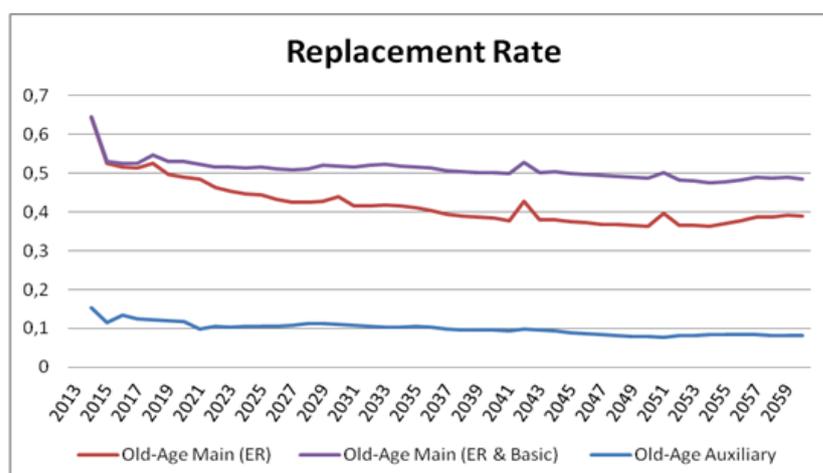
The benefit ratio (BR) for the main and auxiliary pension provision is also expected to drop due to the new legislation (accrual rates, NDC system).

Since the basic pension is a pension component, if RR was calculated taking into account the earnings-related part and basic pension, then RR would result in higher levels than the above presented.

Table 9a shows the replacement rates for main and auxiliary pension at retirement, taking into account both earnings-related part and basic pension.

TABLE 9a	Replacement rate at retirement (RR), earnings & non-earnings related (in %)					
	2014	2020	2030	2040	2050	2060
Main Pension	64,42	53,02	51,85	50,20	48,60	48,51
Auxiliary Pension	15,26	11,66	11,12	9,49	7,82	8,29

**GRAPH 3** shows the Replacement Rate development of main old-age pension and auxiliary old-age pension.



### Dependency Ratios

Table 10 analyses the impact of demographic factors on financial sustainability of public pension schemes.

	2013	2020	2030	2040	2050	2060
Number of pensioners (thousand) (I)	2632,6	2534,6	2445,8	2684,4	2767,9	2684,0
Employment (thousand) (II)	3553,6	3895,9	4122,4	4076,5	3702,5	3470,4
Pension System Dependency Ratio (SDR) (I)/(II)	74,1	65,1	59,3	65,9	74,8	77,3
Number of people aged 65+ (thousand) (III)	2239,9	2356,5	2595,9	2935,6	3087,4	2821,0
Working age population 15 - 64 (thousand) (IV)	7190,4	6818,5	6233,0	5460,4	4849,1	4639,2
Old-age Dependency Ratio (ODR) (III)/(IV)	31,2	34,6	41,6	53,8	63,7	60,8
System efficiency (SDR/ODR)	2,4	1,9	1,4	1,2	1,2	1,3

The number of pensioners and pensions covered by public schemes gradually declines up to 2030 (due to reforms legislated over the previous years) and afterwards increases again (due to the projected increase of life expectancy). Linkage between statutory retirement age and life expectancy also tends to “shift” new pensioners towards higher retirement ages. Pension system dependency ratio (SDR) follows the same trend. Old-age dependency ratio (ODR) increases up to 2050 mainly because working population 15-64 decreases fast, while the number of people aged 65+ increases.

Moreover the number of pensions per capita declines up to 2030 because the number of pensions in the period 2013-2030 decreases by an average of 0,5% per year, while the number of employees increases by an average of 0,9% per year.

On the contrary at the remaining part of the projection (2031-2060) the number of pensions per capita increases, because the number of pensions increases by an average of 0,4% per year, while the number of employees decreases by an average of 0,6% per year.

## Pensioners compared with inactive and total population

Tables 11a and 11b show the evolution of the total number of pensioners, as a percentage of the total inactive population and as percentage of the total population respectively. Tables 12a and 12b provide the same information for female pensioners.

	Pensioners (public scheme) to inactive population ratio by age group (%)					
	2013	2020	2030	2040	2050	2060
Age group -54	5,5	4,1	2,9	2,5	2,2	2,0
Age group 55-59	50,2	66,9	24,9	26,0	25,5	24,8
Age group 60-64	61,9	68,2	50,8	48,3	45,5	38,2
Age group 65-69	76,1	76,0	77,8	84,4	81,9	86,9
Age group 70-74	82,2	83,9	90,7	91,9	93,0	96,0
Age group 75+	105,4	98,8	96,2	97,6	98,1	102,7

	Pensioners (public schemes) to total population ratio by age group (%)					
	2013	2020	2030	2040	2050	2060
Age group -54	2,2	1,5	1,0	0,8	0,8	0,7
Age group 55-59	22,4	18,6	5,7	5,1	4,9	4,7
Age group 60-64	44,4	37,0	19,4	14,9	11,9	9,7
Age group 65-69	70,6	66,5	58,6	55,3	46,9	47,4
Age group 70-74	80,4	82,7	88,0	88,1	88,3	90,5
Age group 75+	105,4	98,8	96,2	97,6	98,1	102,7

	Female pensioners (public scheme) to inactive population ratio by age group (%)					
	2013	2020	2030	2040	2050	2060
Age group -54	5,6	4,1	3,0	2,6	2,2	1,9
Age group 55-59	43,3	60,1	20,8	23,5	22,4	20,0
Age group 60-64	49,9	61,2	42,7	34,8	36,6	31,6
Age group 65-69	64,5	68,7	72,4	72,5	71,0	80,1
Age group 70-74	74,2	76,4	86,2	86,7	87,9	95,4
Age group 75+	103,1	95,3	93,4	95,9	95,8	102,2

	Female pensioners (public scheme) to total population ratio by age group (%)					
	2013	2020	2030	2040	2050	2060
Age group -54	2,6	1,8	1,2	1,0	0,9	0,8
Age group 55-59	25,8	25,0	7,0	6,3	5,9	5,2
Age group 60-64	39,7	39,8	20,6	14,0	12,4	10,4
Age group 65-69	61,7	61,7	56,7	51,0	43,6	46,8
Age group 70-74	73,3	75,8	84,3	83,6	84,1	90,6
Age group 75+	103,1	95,3	93,4	95,9	95,8	102,2

The number of unemployed people was high, which caused the faster-than-expected retirement of people who couldn't find jobs but were vested. The first projection period has more retirements than the middle since the employed people (contributors) left (especially women) will take more time to become vested.

L.3863/2010 gives **vesting to employees insured before 1.1.1993 , especially women**, at smaller ages, most of which will retire by 2020, while the rest will retire at latest about 2035. The employees who would normally retire in the 2020-2040 span will need a higher retirement age due to the reforms and the lack of some service years because of unemployment.

As the statutory age of retirement during the projection increases the pensioners move to higher age groups. Some law clauses allow women to retire in low ages, resulting to increased coverage ratios in the 55-59 and 60-64 age brackets up to 2020. Subsequently the coverage ratios in the 65-69 and 70-74 age brackets from 2020 to 2030 increase, (pensioners to population).

Also, in the last part of the projection, the number of pensioners in the 60-64 bracket is low due **to the extinction of all favorable vesting by 2035** and the much higher normal retirement age of the reforms.

New pensioners in the 70+ age brackets are fewer than the corresponding deaths due to the reforms. The life expectancy increases will also cause a decrease of the pensioners in the 65+ age brackets.

Even though the contributions and the pension expenditures of NAT and ETAP-MME were included in the valuation as loadings, the existing and future pensioners were not included and not taken into account in the corresponding fields. It is noted that the existing pensioners are in the order of 78,000 of which about 1/3 are women of average attained age of 72. In 2020 this group of women will represent approximately 2%-3% of the 75+ female population. From the existing old-age and invalid pensioners (female widows), as well as from the contributors new relevant pensioners will be produced and will improve the coverage ratio for 75+ after 2020.

#### NOTE

The Greek national projection model is based on the number of pensions and not on the number of pensioners. The number of pensioners was estimated approximately, based on data of "HELIOS" system for base year.

#### **New Pensions expenditure**

- **Main Pensions**

Table 13a shows the special factors which concern the new pensioners under the main pension provision. Tables 13b and 13c give the same factors for male and female pensioners.

The earnings related part of the new pension is analyzed to its components which are:

- ✓ Average contributory period
- ✓ Average pensionable earnings
- ✓ Average accrual rates
- ✓ The number of new pensioners

The product of these factors is equal approximately to the amount of the new earnings related pension.

TABLE 13a	Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions)						
	2014	2015	2020	2030	2040	2050	2060
New pension							
I Projected new pension expenditure (millions EUR)	826,1	772,8	772,4	666,8	1591,3	2145,7	2950,3
II. Average contributory period	30,5	29	30,6	33,8	35,1	36,3	37,6
III. Monthly average pensionable earnings	1492,8	1334,5	1358,8	1558,4	2427,3	3471,6	4905,8
IV. Average accrual rates (%)	2,2	2,3	2,0	1,8	1,4	1,4	1,4
V. Sustainability/Adjustment factor	1	1	1	1	1	1	1
VI. Number of new pensioners ('000)	66,9	72,8	75,1	58,1	108,3	104,5	93,1
VII Average number of months paid the first year	12	12	12	12	12	12	12
Monthly average pensionable earnings / Monthly economy-wide average wage	1,15	0,98	0,96	0,88	0,94	0,9	0,89

TABLE 13b	Disaggregated new public pension expenditure (old-age and early earnings-related pensions) - MEN						
	2014	2015	2020	2030	2040	2050	2060
New pension							
I Projected new pension expenditure (millions EUR)	483,3	430,4	462,3	394,4	878,7	1134,3	1526
II. Average contributory period	32,3	31,1	31,9	34,7	35,2	36,4	37,8
III. Monthly average pensionable earnings	1549,0	1434,1	1468,8	1646,2	2554,7	3684,4	5332,1
IV. Average accrual rates (%)	2,3	2,3	2,1	1,9	1,5	1,4	1,4
V. Sustainability/Adjustment factor	1	1	1	1	1	1	1
VI. Number of new pensioners ('000)	34,9	34,6	39,3	31	55,4	51,9	44,2
VII Average number of months paid the first year	12	12	12	12	12	12	12
Monthly average pensionable earnings / Monthly economy-wide average wage	1,20	1,06	1,04	0,93	0,98	0,96	0,96

TABLE 13c	Disaggregated new public pension expenditure (old-age and early earnings-related pensions) - WOMEN						
	2014	2015	2020	2030	2040	2050	2060
New pension							
I Projected new pension expenditure (millions EUR)	342,8	342,4	310,2	272,4	712,6	1011,4	1424,3
II. Average contributory period	28,6	27,2	29,3	32,8	34,9	36,2	37,5
III. Monthly average pensionable earnings	1431,6	1244,3	1237,9	1457,7	2293,8	3261,7	4519,6
IV. Average accrual rates (%)	2,2	2,2	2,0	1,8	1,4	1,4	1,4
V. Sustainability/Adjustment factor	1	1	1	1	1	1	1
VI. Number of new pensioners ('000)	32,0	38,2	35,8	27,1	52,9	52,6	48,8
VII Average number of months paid the first year	12	12	12	12	12	12	12
Monthly average pensionable earnings / Monthly economy-wide average wage	1,11	0,92	0,88	0,83	0,88	0,85	0,82

The accrual rates at the beginning of the projection are affected from the old system which had high accrual rates (ranging from 2 to 3 percent), while gradually as the new system applies accrual rates decrease (pro rata for those insured before 1/1/2011). According to L.3863/2010 accrual rates for earnings related part of pension cannot exceed 1,5% for 40 years. The average accrual rate, appears to drop due to the transition to the new system. Since accrual rates depend on the career length, after the maturity of the system stabilization follows.

The first part of the projection includes new pensioners with vested rights (all funds except OGA and only for insureds before 1.1.1993) that are allowed to retire at a lower age with very few years of service, especially females. In the middle part of the

projection these cases have been greatly reduced and pensioners need more service and higher retirement age. In the last part of the projection there are no females that retire at low ages with few years of service which causes a significant increase in the female past credit.

Indicative clauses extensively used by women are given below which affect the development of the female contributory period.

i) Women insured in IKA-ETAM before 1.1.1993, with at least 4.500 service days

The insured is entitled pension upon completing the age limit in force in the year of attaining age 60.

YEAR of attaining age 60 for full pension & 55 for reduced	SERVICE DAYS Required for retirement	AGE LIMIT Required for full pension	AGE LIMIT Required for reduced pension
2010	4.500	60	55
2011	4.500	61	56
2012	4.500	62	57
2013	4.500	67	62

Insured women with vested rights to an old-age reduced pension before 31.12.2010 (i.e. at that date had the age of 55 and 4.500 service days, of which at least 100 per year during the last 5 years), keep the right to a full pension at the age of 60.

ii) Women insured in IKA-ETAM before 1.1.1993/ mothers of minor children

In order to vest pension rights it is required to have at least 5.500 service days and the age limit in force in the year of completion of the 5.500 service days provided that the child is a minor at the completion of the 5.500 service days.

5.500 service days completed in YEAR	SERVICE DAYS Required for retirement	AGE LIMIT Required for full pension	AGE LIMIT Required for reduced pension
2010	5.500	55	50
2011	5.500	57	52
2012	5.500	60	55
2013	5.500	67	62

Transition period's eligibility rules are applied mainly from 2013 to 2020 and in this period no further justification on thresholds due to life expectancy (according to legislation) has been applied. However from 2021 to 2030 age thresholds are increased by two years due to life expectancy and transition period phases out. This affects the contributory period in accordance.

iii) Women in Public Sector insured from 01/01/83 up to 31.12.1992

	Year of vesting rights (1)	Years of service & pension payment age limit (2)	Years of service & reduced pension payment age limit (3)
Women without children or with adult children	2010	25/60	25/55
	2011	25/61	25/56
	2012	25/63	25/58
	2013	15/67	15/62
Women with underage children	2010	25/50	-
	2011	25/52	-
	2012	25/55	-
	2013	15/67	15/62

(1) : It is the year that 25 years of service are completed

(2) : Years of service and age limit required for full pension

(3) : Years of service and age limit required for reduced pension

## NOTE :

- 1) In 2014 the new retirement age increases allowed very few new OGA pensioners, which caused an increase in the weighted-average pensionable salary. In 2015 a normal number of OGA insureds retired, and their pensionable salary, which is lower than other funds, caused the return of the weighted-average pensionable salary to normal levels. The lower average pensionable salary causes a corresponding decrease in the average pension amount.
- 2) For the employees insured before 1.1.1993 who retire after 1.1.2015, for the part of the pension based on the service prior to 1.1.2011, the pensionable salary is the average of the best 5 of the last 10 career years. For those employees insured after 1.1.1993 and before 1.1.2011 who retire after 1.1.2015, for the part of the pension based on the service prior to 1.1.2011, the pensionable salary is the average of the last 5 career years.

- **Auxiliary Pensions**

Table 13d shows the special factors which concern the new pensioners under the auxiliary pension provision.

Tables 13e and 13f give the same factors for male and female pensioners.

New pension is analyzed to its components which are:

- ✓ The number of new pensioners
- ✓ Average contributory period
- ✓ Average accrual rates
- ✓ Average pensionable earnings

TABLE 13d	Disaggregated new public pension expenditure AUXILIARY FUNDS (old-age and early earnings-related pensions)					
	2014	2020	2030	2040	2050	2060
New pension						
Projected new pension expenditure (millions EUR)	130,9	96,3	58,3	223,3	283,1	416,1
Number of new pensions (in 1000)	43,7	39,6	20,2	61,5	63,9	61,6
Average contributory period (in years)	27,9	27,3	30,1	32,3	33,9	34,6
Average accrual rate	0,006	0,005	0,004	0,003	0,003	0,003
Notional-accounts contribution rate ( c)						
Annuity factor (A)						
Monthly average pensionable earning	1506,1	1545,9	2066,5	2716	3634,6	5066,4
Sustainability/adjustment factors	0,98	1,01	1,01	0,99	1,00	1,01
Average number of months paid the first year	12	12	12	12	12	12
Monthly average pensionable earnings / Monthly economy-wide average wage	1,2	1,1	1,2	1	0,9	0,9

TABLE 13e	Disaggregated new public pension expenditure AUXILIARY FUNDS (old-age and early earnings-related pensions) - MEN					
	2014	2020	2030	2040	2050	2060
New pension						
Projected new pension expenditure (millions EUR)	77,7	58,7	29	115,7	133,3	181,2
Number of new pensions (in 1000)	22,9	22,3	9,5	28,9	28,6	25,6
Average contributory period (in years)	29,3	27,4	30,5	33,1	33,8	34,5
Average accrual rate	0,006	0,005	0,004	0,004	0,003	0,003
Notional-accounts contribution rate ( c)						
Annuity factor (A)						
Monthly average pensionable earning	1618,4	1662,3	2086,2	2834,6	3780,2	5310,7
Sustainability/adjustment factors	0,98	1,01	1,01	0,99	1,00	1,01
Average number of months paid the first year	12	12	12	12	12	12
Monthly average pensionable earnings / Monthly economy-wide average wage	1,2	1,2	1,2	1,1	1	1

TABLE 13f	Disaggregated new public pension expenditure AUXILIARY FUNDS (old-age and early earnings-related pensions) - WOMEN					
	2014	2020	2030	2040	2050	2060
New pension						
Projected new pension expenditure (millions EUR)	53,3	37,6	29,4	108,3	150	234,9
Number of new pensions (in 1000)	20,7	17,4	10,6	32,6	35,3	36
Average contributory period (in years)	26,3	27,3	29,7	31,6	34	34,7
Average accrual rate	0,006	0,005	0,004	0,003	0,003	0,003
Notional-accounts contribution rate ( c)						
Annuity factor (A)						
Monthly average pensionable earning	1381,8	1397,1	2049	2611	3517	4892,4
Sustainability/adjustment factors	0,98	1,01	1,01	0,99	1,00	1,01
Average number of months paid the first year	12	12	12	12	12	12
Monthly average pensionable earnings / Monthly economy-wide average wage	1,1	1	1,2	1	0,9	0,9

The direct impact of the reforms is obvious on auxiliary pensions also. The average years of service for new pensioners increase gradually (for both males and females) due to the extending of the working life.

The average accrual rate declines from 0,5% in 2020 to 0,3% at 2060. This is due to the phase out of the pro-rata calculation period and the full transition to NDC system.

### 3.4. Financing of the pension system

Table IV shows the financing breakdown arrangements between employee and employer for each one of the main pension schemes. For auxiliary pensions the relevant contribution rate is 6% (3% for employees and 3% for employers) with an extra 2% rate for the arduous workers.

Table IV Financing breakdown of main pension schemes			
Scheme	Group	Financing party	Contribution rate
IKA-ETAM	General	Employees	7,54% (in 2013) gradually decreases to 7,30% (in 2015)
		Employers	15,36% (in 2013) gradually decreases to 14,80% (in 2015)
	Arduous/Construction	Employees	9,74% (in 2013) gradually decreases to 9,50% (in 2015)
		Employers	16,76% (in 2013) gradually decreases to 16,20% (in 2015)
OAEE		Self-Employed	20% on the insurance class
PS		Employees	6,67%
ETAA	TSMEDE (Engineers)	Self-Employed	20% on the insurance class + 12% on the insurance class for special supplement
		Employees	6,67% + 12% on the insurance class for special supplement
		Employers	13,33%
	TAN (Lawyers)	Self-Employed	20% on the insurance class
		Employees	6,67%
		Employers	13,33%
	TSAY (Doctors)	Self-Employed	20% on the insurance class
		Employees	6,67%
		Employers	13,33%
DEH	General	Employees	6,67%
		Employers	13,33%
	Arduous	Employees	8,87%
		Employers	14,73%
	Hazardous	Employees	10,97%
		Employers	16,03%
OGA		Employees	7% on the insurance class
		State	14% on the insurance class

Table 14 presents the evolution of contributions, number of contributors and employment.

	Revenue from contribution (Millions), number of contributors in the public scheme (in 1000), total employment (in 1000) and related ratios (%)					
	2013	2020	2030	2040	2050	2060
Public contribution	18641,6	20669,8	27629,1	38880,0	57266,3	79533,1
Employer contribution	5185,7	6117,2	8383,4	12588,4	17827,7	24727,7
Employee contribution	6025,5	7076,4	9170,4	12887,1	17537,8	23940,6
State contribution	6392,4	6346,5	8601,7	11322,5	19105,1	27049,1
Loading	1038,1	1129,7	1473,6	2081,9	2795,7	3815,7
Number of contributors (I)	4188,2	4603,4	4882,4	4831,3	4389,0	4113,4
Employment (II)	3553,6	3895,9	4122,4	4076,5	3702,5	3470,4
Ratio of (I)/(II)	1,2	1,2	1,2	1,2	1,2	1,2

### 3.5. Sensitivity analysis

Table 15 shows the evolution of total pension expenditure under different scenarios for total public pension expenditure.

TABLE15	Public and total pension expenditure under different scenarios (p.p. deviation from the baseline)					
	2013	2020	2030	2040	2050	2060
Public Pension Expenditure						
Baseline	16,2	15,5	14,4	14,1	14,4	14,3
Higher life expectancy (2 extra years)	0,0	0,0	0,1	-0,1	0,2	0,2
Higher lab. productivity (+0.25 pp.)	0,0	-0,1	-0,3	-0,5	-0,6	-0,7
Lower lab. productivity (-0.25 pp.)	0,0	0,0	0,3	0,5	0,6	0,6
Higher emp. rate (+2 pp.)	0,0	-0,2	-0,3	-0,2	-0,2	-0,1
Higher emp. of older workers (+10 pp.)	0,0	-0,1	-0,3	-0,2	-0,1	0,0
Lower migration (-20%)	0,0	0,0	-0,1	-0,1	-0,1	0,1
Risk scenario	0,0	0,0	0,2	0,6	0,9	0,9
Policy scenario: linking retirement age to increases in life expectancy	:	:	:	:	:	:
Total Pension Expenditure						
Baseline	16,2	15,5	14,4	14,1	14,4	14,3
Higher life expectancy (2 extra years)	0,0	0,0	0,1	-0,1	0,2	0,2
Higher lab. productivity (+0.25 pp.)	0,0	-0,1	-0,3	-0,5	-0,6	-0,7
Lower lab. productivity (-0.25 pp.)	0,0	0,0	0,3	0,5	0,6	0,6
Higher emp. rate (+2 pp.)	0,0	-0,2	-0,3	-0,2	-0,2	-0,1
Higher emp. of older workers (+10 pp.)	0,0	-0,1	-0,3	-0,2	-0,1	0,0
Lower migration (-20%)	0,0	0,0	-0,1	-0,1	-0,1	0,1
Risk scenario	0,0	0,0	0,2	0,6	0,9	0,9
Policy scenario: linking retirement age to increases in life expectancy	:	:	:	:	:	:

On the “Higher Life Expectancy” scenario an increase on the pension spending by 0,2 p.p. of GDP compared to the baseline projection in 2060 is observed. As far as the driving forces are concerned, it comes from the combination of a higher old-age dependency ratio and a sooner increase of retirement age according to mortality assumptions.

Moreover, on the “Higher/Lower Labour productivity” scenarios, the impact is relatively symmetric. Pension expenditure on “Higher Labour Productivity” is projected to drop by 0,7 p.p. of GDP until 2060 compared to the baseline scenario. Basically, the increase of the average pension, caused by the higher wage growth, is offset by the increase in GDP side. Conversely, the “Lower Labour Productivity” scenario, leads to the opposite direction result. In other words, the drop in wages and thus GDP is larger than the drop of average pension, raises pensions expenditure by 0,6 p.p. of GDP until 2060 compared to the baseline scenario.

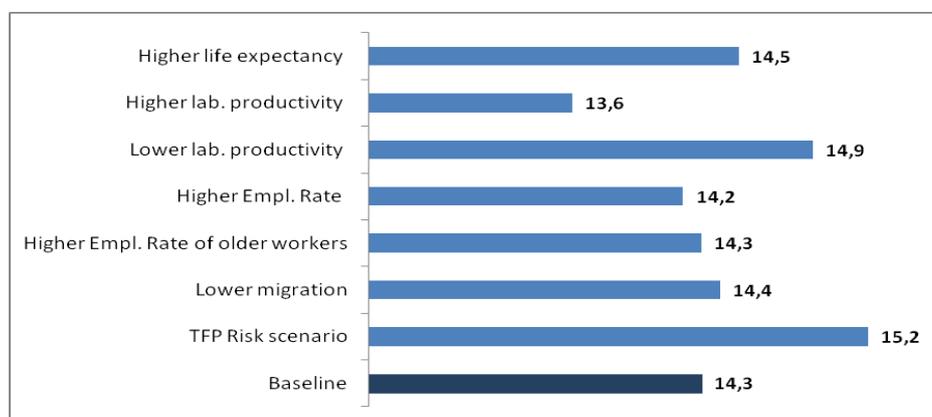
For the same reasons as “Higher Labour productivity” scenario, pension expenditure on “higher employment rate scenario” is projected to drop by 0,1 p.p. of GDP until 2060 compared to the baseline scenario.

On the “Higher emp. of older workers” scenario, a decrease of pension expenditure appears in the middle of projection compared to the baseline scenario, while at final years this phases out.

Pension expenditure on “Lower Migration” scenario is increased by 0,1 p.p. of GDP compared to the baseline projection in 2060

On the “TFP Risk” scenario, an increase of pension expenditure by 0,9 p.p. of GDP appears in 2060, compared to the baseline scenario.

**GRAPH 4** shows pension expenditure under different scenarios (as % of GDP)



### 3.6. Description of the changes in comparison with the 2006, 2009 and 2012 projections

Comparison between the first and the second line refers to the 2006 study, prior to the implementation of law 3029/2002 and law 3655/2008. The 2009 study was prepared after the implementation of the above laws. The major reform to the system introduced with law 3863/2010 was incorporated in 2010 study. This study takes into account legislation after 3863/2010 which resulted to the increase of statutory retirement age by two years and, the transition of auxiliary pension to NDC system and the pension cuts.

Overall change in public pension expenditure to GDP under the 2006, 2009, 2012 and 2015 projection exercises							
TABLE 16	Public pensions to GDP	Dependency ratio	Coverage ratio	Employment effect	Benefit ratio	Labour intensity	Residual (incl. Interaction effect)
2006 *	:	:	:	:	:	:	:
2009 **	:	:	:	:	:	:	:
2012 ***	1,01	10,41	-3,44	-1,87	-3,55	0,08	-0,61
2015****	-1,92	10,64	-0,90	-5,46	-4,37	0,00	-1,86

\* 2004-2050; \*\* 2007-2060; \*\*\* 2010-2060; \*\*\*\* 2013-2060

Note: In 2006 the Hellenic Republic did not prepare comprehensive projections for the Ageing Working Group. In 2009 the projections incorporated separate results of four main pension schemes (IKA, OAEE, Public Sector and OGA) and aggregate results for the rest of the main and auxiliary pension schemes.

## 4. DESCRIPTION OF THE PENSION PROJECTION MODEL AND ITS BASE DATA

### 4.1. Institutional context

The 2015 round projections for the main and auxiliary pension provision were undertaken by the National Actuarial Authority of Greece.

### 4.2. Assumptions and methodologies applied

#### General Population:

General population starts with the current data and it is projected applying the mortality, fertility and migration assumptions, which are in line with AWG/EUROPOP2013 data. In addition, existing pensioners and new pensioners are projected according to the mortality rates of AWG, retirement rates, invalidity rates, family statistics and legal provisions of each pension scheme.

#### Labor Force, employment:

AWG/EUROPOP2013 assumptions on labor force participation rates, employment rates have been taken into account. According to the analytical data of the funds the base year total number of insured workers is higher than that of AWG/EUROPOP2013 given. However the evolution of employees is assumed proportional to the evolution given by AWG. There are also some other assumptions made, regarding three scheme's employed population evolution.

- ✓ PUBLIC SECTOR: The insured population is decreasing until 2016, remains constant for the rest next 16 years of projections, and thereafter follows the evolution of total employment.
- ✓ OGA: Active population is shrinking by 0,8% yearly.
- ✓ IKA-ETAM: The evolution of employees is assumed proportional to the evolution given by AWG, adding up the population, per sex, who move from OGA and Public Sector.

#### Wages:

The wage growth for all funds is obtained by the product of inflation and labor productivity. No negative growth is applied.

Salary valorization is adjusted by the inflation and labor productivity. Needless to say that this adjustment is higher than the actual increase in the salaries observed in the past years, leading to overestimation of pension expenditure.

Also wage growth is applied for the pension cuts bounds indexation.

#### Benefit Indexation:

Main pensions benefit indexation is fully linked to a uniform adjustment index which cannot exceed CPI. In particular, the index is equal to the minimum of CPI and the sum of 50% CPI and 50% GDP growth [min (50% GDP growth +50% CPI, CPI)]. No nominal increase in pensions up to 2015 applied.

The percentages of indexation actually applied in the projections are as follows :

	2013-2015	2016	2017	2018	2019	2020	2021-2060
Benefits indexation rate	0,0%	0,3%	0,5%	1,4%	2,0%	1,8%	2,0%

The formula for auxiliary pensions benefit indexation according to legal provision is

$$\gamma_t = \min\left(\left[1 + g_{t-2} - r\right]SF_t - 1, \text{inflation}_{t-1}\right),$$

where

g : notional rate of return,

r : discount rate=1,3%,

SF : sustainability factor = Contributions previous year/Benefits previous year.

This indexation can take negative values.

#### Age thresholds:

According to the law the age thresholds will be re-determined according to the change in life expectancy of the country's population with the age of 65 years as point of reference. That will come into effect as of 1.1.2021 and upon its first implementation the change within the 2010 - 2020 ten-year period shall be taken into account.

In the projections, age thresholds are increased by the integral part of the estimated increase in life expectancy. Age thresholds are increased by one additional year on 2021, 2030, 2042 and 2051.

#### Other assumptions:

It is worth to point out that the new entrants of Public Sector enter IKA from 1.1.2011. Thus the pension expenditure will be undertaken by IKA. For simplicity reasons, it is assumed that new entrants will remain in Public Sector in order to follow the salary evolution and retirement behavior.

### 4.3. Data used to run the model

Data used to run the model for the main and auxiliary pension provision was provided by each pension fund separately and by HDIKA. The database included person-by-person information, from which all required inputs, such as average contribution period, average wage, average pension, average contribution amount, entry age, density of payments, number of insured people and family statistics, were disaggregated by age, sex, group of similar characteristics, and by legal provisions.

### 4.4. Reforms incorporated in the model

The reforms incorporated in the modeling exercises for the main and auxiliary pension provision, are those described in the previous sections of this report.

### 4.5. General description of the model

The present version of ILO pension model has been developed to support actuarial reviews or studies of statutory social security pension funds. It thus helps to provide the quantitative basis for making policy decisions on social security pension funds. The model estimates future cost on the basis of the cohort decomposition method and various statuses of a person and associated values (average wage, average pensions) are provided year by year. To the extent possible, a distribution is considered for income level. For each generation, the transition of a status of a person (active person, inactive person, pensioners) is mapped onto the next year's status by using actuarially assumed transition probabilities (mortality rate, retirement rate, invalidity rate) and applying the eligibility conditions and pension formula. This cycle is iterated until the end of the projection period. By summarizing age-specific

results, global future costs are obtained. For the basics of the calculation, it can be referred to the ILO Pension Model.

#### **4.6. Additional features of the projection model**

The general description of features of the projection model is given in previous paragraphs.

## Methodological annex

- **Economy-wide average wage at retirement**

The economy-wide average wage at retirement on base year, is the wage at the age corresponding to the effective retirement age. In the projection it was evolved in accordance to the economy-wide average wage evolution.

Table A1	Economy-wide average wage at retirement evolution (in thousand euros)					
	2014	2020	2030	2040	2050	2060
economy-wide average wage	15,5	17,0	21,2	31,1	46,1	66,4
Economy-wide average wage at retirement	19,1	20,8	26,0	38,2	56,6	81,5

- **Pensions vs Pensioners**

The number of pensioners was estimated approximately, based on data of "HELIOS" system for base year.

- **Pensions taxation**

Pension taxes were not projected as they depend on the income of every source.

- **Disability pension**

Invalidity pensions are under tight scrutiny by a committee of independently and randomly chosen doctors (KEPA authority). Also a new and more precise disability percentage table was introduced. As a result the number of disability pensions decreased in 2013 compared to 2010 by 23%.

Invalidity incident rates are based on data from funds (new invalidity pensions awarded from KEPA). Following the preferred trend the rates are projected to gradually decrease in the early years of projection, Disability rates by age groups (%) for the three representative funds are given in table A2.

TABLE A2	Disability rates by age groups (%)								
	2013			2020			2030-2060		
	IKA-ETAM	OAE	PS	IKA-ETAM	OAE	PS	IKA-ETAM	OAE	PS
Age group -54	0,002	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001
Age group 55-59	0,013	0,006	0,003	0,008	0,004	0,003	0,007	0,004	0,003
Age group 60-64	0,019	0,008	0,005	0,012	0,005	0,004	0,011	0,005	0,004
Age group 65-69	0,022	0,008	0,006	0,014	0,006	0,005	0,012	0,006	0,005
Age group 70-74	0,022	0,008	0,006	0,014	0,006	0,005	0,012	0,006	0,005

- **Survivors pensions**

Survivors pensions are estimated using statistics provided from funds.

- **Non-earnings related**

- a) **Minimum pension**

The minimum monthly pension for those insured from 1.1.2011 is equal to 15 daily wages of unskilled labor worker with the exception of public sector and OGA insured. For public sector, minimum pension is linked to the relevant salary scale.

- b) **Basic pension**

The amount of pension that does not correspond to insurance contributions will be granted starting 1.1.2015, with years of service accumulating from 1.1.2011. The full monthly pension (12 times a year) is the flat amount of 360 € in 2015 according to the legislation.

For the insured parties whose pension constitutes the aggregate of two components, the basic pension is calculated proportionately on the basis of the ratio between the years of insurance from 1.1.2011 onwards and the total period of insurance.

When insufficient or no pension rights at all have been accrued during one's working life, the individual is entitled to the means tested basic pension amount, payable 12 times a year, at the age of statutory retirement (uninsured OGA).

Both a) and b) Non-earnings related pensions are indexed by the benefits indexation.

- **Contributions**

Contribution rates in some funds decrease slightly up to 2015 and then are assumed to be constant over the projection horizon (TABLE IV).

- **Alternative pension spending decomposition**

Table A3 and Table A4 are equivalent to Table 8a and Table 8b. Tables contained in the body of the country fiche will continue to be calculated by dividing into sub-intervals so to have smaller residual effect (interaction effect).

	2013-20	2020-30	2030-40	2040-50	2050-60	2013-60
Public pensions to GDP	-0,7	-1,1	-0,3	0,3	-0,1	-1,9
Dependency ratio effect	1,8	3,8	6,2	5,4	-1,3	15,9
Coverage ratio effect	-0,9	-1,6	0,1	0,2	1,3	-0,9
Coverage ratio old-age*	0,0	0,6	0,7	0,7	1,8	3,7
Coverage ratio early-age*	-3,4	-7,4	-0,6	-0,6	-0,6	-12,5
Cohort effect*	0,2	-1,1	-3,8	-3,1	0,6	-7,1
Benefit ratio effect	0,8	-0,1	-2,5	-1,9	-0,9	-4,5
Labour Market/Labour intensity effect	-2,2	-1,9	-1,3	-0,3	0,2	-5,6
Employment ratio effect	-2,1	-1,6	-1,1	-0,2	0,0	-5,0
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0
Career shift effect	-0,1	-0,4	-0,4	-0,2	0,2	-0,9
Residual	-0,3	-1,2	-2,7	-3,1	0,6	-6,8

	2013-20	2020-30	2030-40	2040-50	2050-60	2013-60
Public pensions to GDP	-0,7	-1,1	-0,3	0,3	-0,1	-1,9
Dependency ratio effect	1,8	3,8	6,2	5,4	-1,3	15,9
Coverage ratio effect	-1,4	-1,8	-0,4	-0,2	0,8	-3,1
Coverage ratio old-age*	-0,7	-0,4	0,1	0,1	1,1	0,2
Coverage ratio early-age*	-3,8	-6,3	-0,8	-0,6	-0,8	-12,4
Cohort effect*	0,2	-1,1	-3,8	-3,1	0,6	-7,1
Benefit ratio effect	1,4	0,3	-2,1	-1,6	-0,6	-2,6
Labour Market/Labour intensity effect	-2,2	-1,9	-1,3	-0,3	0,2	-5,6
Employment ratio effect	-2,1	-1,6	-1,1	-0,2	0,0	-5,0
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0
Career shift effect	-0,1	-0,4	-0,4	-0,2	0,2	-0,9
Residual	-0,4	-1,4	-2,7	-3,0	0,9	-6,5

## References

- Actuarial Mathematics of social security pensions, Iyer S., Geneva, ILO/ISSA, 1999.
- Ageing Projections Exercise 2012, Greek Pension System Fiche, National Actuarial Authority of Greece, 2012, <http://www.eaa.gr>
- The 2015 Ageing Report: Underlying Assumptions and Projection Methodologies, European Commission, DG for Economic and Financial Affairs, 2014, [http://ec.europa.eu/economy\\_finance/publications/european\\_economy/2014/ee8\\_en.htm](http://ec.europa.eu/economy_finance/publications/european_economy/2014/ee8_en.htm)

## Project Team

The actuarial studies conducted by the following :

Project Team		National Actuarial Authority of Greece
Georgios	Chelidonis	
Effrosyni	Kouskouna	
Ioannis	Letsios	
Marianna	Papamichail	
Georgia	Venetsanakou	
Angeliki	Zoulaki	