Greek Pension System Fiche

European Commission
Economic Policy Committee
Ageing Working Group

Ageing Projections Exercise 2012

NATIONAL
ACTUARIAL AUTHORITY

1. OVERVIEW OF THE GREEK PENSION SYSTEM

In July 2010, the Greek Parliament adopted a comprehensive pension reform. The reform simplified the highly fragmented pension system; enhanced transparency and fairness, postpones the retirement age and decreases the generosity of benefits. The new universally binding rules on entitlements, contributions, accumulation rules and indexation of pension rights apply to the main pension funds. The pension reform is applied pro-rata to all current and future workers since the beginning of 2011. The main elements of the reform are:

(i) The introduction of a new basic pension of EUR 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 accrual rates in the old system varied significantly across pension funds. The new 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), reducing the system's over-generosity. Taking into account the top up of the basic pension, this is particularly the case for medium- and high-wage earners.

(iii) The old system allowed retirement on a full pension at age 60 and in some cases even earlier. The reform increases the statutory retirement age to 65. The minimum age for retirement is set at 60. If a person retires between 60 and 65 without having a full contributory period, their pension will be reduced by 6 percent per year before reaching 65 years of age.

(iv) The full contributory period will increase from the current 35 years (or even lower, for some categories) to 40 years.

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

(vi) Equalisation of retirement age of men and women in both the private and public sector by 2013.

(vii) Indexation of benefits will not exceed HICP inflation.

(viii) Pensionable earnings will be calculated based on the full-earnings history. In the old system only five years (with the best earnings) of the 10 last years before retirement were used to determine pensionable earnings.

(ix) A substantial revision of the list of heavy and arduous is forthcoming, aiming at reducing substantially the coverage clearly less than 10% of the employees.

The new 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.

Section 1 show the main features of the Greek pension system and explains the pension reform measures in detail. Section 2 shows the detailed projection results. Section 3 provides an overview of the used data and the modelling framework. Additional information on the parametric changes and the projection model is provided in the Annex.

1.1. Description

The Greek pension system comprises:

- Main pension provision – includes 10 social insurance schemes, which cover, on a mandatory basis, salaried employees and self-employed persons grouped in certain professions/occupations;
- Auxiliary pension provision – includes a number of social insurance schemes, each of which corresponds to a main social security scheme and runs in parallel with it; and
- Social solidarity grant provision (EKAS), a means-tested scheme, which covers residents of Greece who get no or low income.
- In Greece, almost 99% of the total pension expenditure concerns the above three public provision arrangements.

Table 1 shows the main and auxiliary pension schemes by type of occupation/profession.

TABLE 1
Correspondence of main and auxiliary pension schemes

	Main Scheme	Occupational type	Auxiliary Scheme
I.	IKA	Private sector employees	ETEAM
			TEAIT (9 sub-schemes of which TEAYEK is the largest)
I.a.	DEH	Public electricity company employees	TAYTEKO (sub-scheme TEAP-DEH)
I.b.	OTE	Hellenic Telecommunication Organization employees	TAYTEKO (sub-scheme TEAP-OTE)
I.c	BANKS	Bank Employees	ETEAM, ETAT
II.	OAEE	Self-employed	-
III.	Public Sector (PS)	Civil servants	TEADY (3 sub-schemes of which TEADY is the largest)
			MTPY
		Firefighters-Policemen-Air Force-Army-Navy	TEAPASA-MTA-MTN-MTS
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 DEH, OTE, and Banks are managed by IKA, effective 1.1.2011.

1.1.1. Main pension provision

The most important laws over social security system before the latest reform were 2084/1992, 3029/2002 and 3655/2008. Each one of them gradually merged all main and auxiliary schemes to a limited number. They also unified pension formula and retirement ages (equalized for male and female) for all insurants who were employed after 1992.

The new social security system introduced by laws 3863/2010 and 3865/2010, constitutes the most significant reform in recent years. This reform introduces a new, transparent system to strengthen the link between contributions and benefits and aims at reducing the projected increase in public pension expenditure between 2009 and 2060 to below 2.5% of GDP through the gradual increase in retirement age and the application of a uniform pension calculation method among all pension schemes (with minor exceptions in terms of population). At the same time, this reform leads to a significant and substantial correction in the financial course of the social security system over the next 50 years. The new measures apply to the public sector and all primary insurance schemes except OGA.

The main pension schemes are funded mainly by contributions, social resources and other income sources.

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 schemes 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 schemes in which discrete groups of employees would contribute, like electricians, bakers, people working in banks.

As mentioned above, 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 the employer and employee, while in some cases there is also social funding coming from a source adjacent to the respective employment of the insured in each scheme.

Therefore, the auxiliary and main pension provisions are distinct in the sense of different funding. At the same time, though, they are closely bound together since receiving a primary pension in the respective scheme serves as a prerequisite of receiving the auxiliary pension as well.

The auxiliary pension provision in Greece serves as an extra income of great importance especially for those receiving main pensions in the minimum rates and has helped support many pensioners by amending their financial status and subsistence levels.

Nevertheless, the defragmentation of the auxiliary pension provision bore the need of drastically reducing the number of auxiliary pension schemes so that they could be better organized, managed and financially monitored. Initially, in 1992 L.2084 unified the pension formula for all people first insured after 1/1/1993, since each scheme had its own provisions until then. Then, the ever-anticipated reduction came in action through L3655/2008, which merged and incorporated many of these schemes into newfound ones, according to the type of professions of their insured population (refer to Table 1).

Merging and incorporating helped the organization of the auxiliary pension provision but have not yet resulted in homogeneous IT systems because of the volume of data that was scattered and the different ways these were recorded through different software.

1.1.3. Social solidarity grant provision

Any person aged 60 or older who legally resides in Greece and satisfies the following financial criteria is entitled to a social solidarity grant (EKAS):

- ✓ overall net annual income from salaries and pensions must not exceed €8,472.09 (in 2011);
- ✓ total annual personal taxable income must not exceed €9,884.11 (in 2011); and
- ✓ total annual family taxable income must not exceed €15,380.90 (in 2011).

The amount of grant payable is €230.00 a month with net income up to €7,715.65; €172.50 with net income from €7,715.65 to €8,018.26; €115.00 with net income from €8,018.26 to €8,219.93; €57.50 with net income from €8,219.93 to €8,472.09.

The social solidarity grant is financed via government budget.

Table 2a below shows the evolution of the statutory retirement age, earliest retirement age and penalties for early retirement over the projection period 2010-60.

TABLE 2a
Statutory retirement age, earliest retirement age and penalties for early retirement

		2010	2020	2030	2040	2050	2060
Men - with 20 contribution years	statutory retirement age	65	65	65+	65+	65+	65+
	earliest retirement age	60	60	60+	60+	60+	60+
	penalty in case of earliest retirement age	1/200	1/200	1/200	1/200	1/200	1/200
Men - with 40 contribution years	statutory retirement age	58-60*	60	60+	60+	60+	60+
	earliest retirement age	-	-	-	-	-	-
	penalty in case of earliest retirement age	-	-	-	-	-	-
Women - with 20 contribution years	statutory retirement age	60*	65	65+	65+	65+	65+
	earliest retirement age	55*	60	60+	60+	60+	60+
	penalty in case of earliest retirement age	1/200	1/200	1/200	1/200	1/200	1/200
Womenen - with 40 contribution years	statutory retirement age	58-60*	60	60+	60+	60+	60+
	earliest retirement age	-	-	-	-	-	-
	penalty in case of earliest retirement age	-	-	-	-	-	-

* This retirement age concerns the majority of new pensioners. It varies between schemes.

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 2012" life expectancy projections, are materialized, then the table 2a will be revised as follows:

TABLE 2b
Statutory retirement age, earliest retirement age and penalties for early retirement**

		2010	2020	2030	2040	2050	2060
Men - with 20 contribution years	statutory retirement age	65	65	66,8	67,6	68,4	69,4
	earliest retirement age	60	60	61,8	62,6	63,4	64,4
	penalty in case of earliest retirement age	1/200	1/200	1/200	1/200	1/200	1/200
Men - with 40 contribution years	statutory retirement age	58-60*	60	61,8	62,6	63,4	64,4
	earliest retirement age	-	-	-	-	-	-
	penalty in case of earliest retirement age	-	-	-	-	-	-
Women - with 20 contribution years	statutory retirement age	60*	65	66,8	67,6	68,4	69,4
	earliest retirement age	55*	60	61,8	62,6	63,4	64,4
	penalty in case of earliest retirement age	1/200	1/200	1/200	1/200	1/200	1/200
Womenen - with 40 contribution years	statutory retirement age	58-60*	60	61,8	62,6	63,4	64,4
	earliest retirement age	-	-	-	-	-	-
	penalty in case of earliest retirement age	-	-	-	-	-	-

* This retirement age concerns the majority of new pensioners. It varies between schemes.
** Estimated according to the "Europop 2012" life expectancy projections

The reform 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.
Annex 1 shows in more detailed way the legislated changes in retirement ages.

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

The year 2010 brought about vast reforms in the social security system in Greece. Those reforms were included in the projection exercise. New legislation implemented in the main and auxiliary pension provisions after September 2011 has not been incorporated in this exercise since the cut-off date for valuating reforms was this particular date.

1.2.1. Main pension provision

A summary of main provisions of the new social security legislation (Law 3863/2010), which applies to all main pension schemes apart from OGA, 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 past credits accumulating from

1.1.2011. The full monthly pension (12 times a year) is the flat amount of 360 € in 2011 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 65. 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 14 times a year, at the age of 65 which thus provides an important social safety net.

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 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 use to vary significantly across pension schemes. The new system introduces accrual rates, 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. The new statutory accrual rates are significantly lower than those in the old system (ranging from 2 to 3 percent), reducing the system's over-generosity. Taking into account the amount beyond the basic pension, this is particularly the case for medium- and high-wage earners.

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 3
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:

The retirement age threshold for a full pension is set at 65 with at least 15 years of past credits and at 60 with the minimum career span necessary for retirement the 40 years. Minimum retirement age is set at 60 and this includes early pensions as well. Also the retirement age thresholds for both men and women become the same. Additionally, a transitional period is provided for those retiring from 2011 to 2015, with gradual increase of minimum work years and age thresholds.

Arduous and hazardous professions

A substantial revision of the list of heavy and arduous professions entitled to a lower retirement age (of at least 60 years) has been introduced with the aim to substantially reduce the coverage to significantly less than 10% of the employees. This measure will produce further savings in pension spending. However, it is to be noted that this measure has not been taken into account in the projections, as it was legislated after September 2011.

Average pensionable salary:

The career length, for the calculation of pensionable salary is increased gradually, reaching the full career length, starting in 2015. Before the last reform only the last five years to the utmost (best 5 years of the last ten years of service) were being taken into consideration for the pensionable salary calculation for insured employees of the private or the public sector. The law thus equalized the rules of the pensionable salary calculation between the public and private sector employees and the self employed.

Pension increases:

According to the reform law, pension increases over time are 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:

Following the reform, the minimum and maximum amounts provided under the main pension schemes were revised. For IKA for example, the annual amount of the minimum old age pension is 5,947.20€ (2010 value), while the annual amount of the maximum old age pension is 33,280.80€ (2010 value), including family benefits.

Disability pensions:

The law introduced stricter conditions and regular re-examination of eligibility for disability pensions, both those already granted and those to be granted in the future, so as to avoid cases of disability pension dispensation under false pretenses.

Especially:

- Disability pensions will be under tight scrutiny by a committee of independently and randomly chosen doctors. This committee will be re-examining all existing and new disability pensioners.
- Also a new and more precise disability percentage table will be introduced.

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 insureds:

The increase in retirement age and in years of service for the system's current insureds is effective 1/1/2011. Any clauses providing for pension awards irrespective of age threshold and years of service are fully abolished starting on 1/1/2011, except for employees hired before 1/1/1983 to the Public Sector or the so called "special funds".

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

- The first part will be using the arrangements before the reform for as many years as he worked before 1.1.2011.
- The second part will be using the reformed arrangements for as many years as he worked after 1.1.2011.

Other measures to control expenditures include:

i. Abolition of the 13th and 14th salary (replaced by an annual allowance of 1,000€, if the annual salary is lower than 36,000€) in the public sector and abolition of the 13th and 14th pension of all pensioners, (replaced by an annual allowance of 800€, if the annual pension is lower than 30,000€ and the pensioner's age is 60 and over).

ii. Zero nominal increase in pensions up to 2014.

iii. The new 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

Legislative provisions not included in the projections exercise:

Legislative provisions not included in the projections exercise (refer to page 3 for a table of the schemes mentioned below)	
1	Imposing a ceiling on existing pensioners' benefit including also family allowances
2	Contribution as a % of the companies' annual revenue for OAEE , effective 1-1-13
3	40% reduction in the monthly main pension exceeding 1,000 €, for pensioners who have not attained the age of 55, effective 1-11-11
4	20% reduction in the monthly main pension exceeding 1.200 € to pensioners aged 55 and over, effective 1-11-11
5	30% reduction in the monthly auxiliary pension of ETEAM retirees to the part exceeding 150 €, effective 1-11-11
6	20% reduction in the monthly auxiliary pension of MTPY retirees, effective 1-11-11
7	15% reduction in the monthly auxiliary pension of TAYTEKO sub-schemes TEAPDEH, TEAPOTE, TEAPELTA, TEAPETBA, and ETAT retirees, effective 1-11-11
8	New calculation method for MTPY dividend
9	Application of uniform salary scale for civil servants

Financing:

Table 4 shows the financing breakdown arrangements between employee and employer following the 2010 reform measures for each one of the main pension schemes.

Table 4
Financing breakdown of main pension schemes

Scheme	Group	Financing party	Contribution rate
IKA	General	Employees	6.7% (in 2010) gradually increases to 7.6% (in 2015)
		Employers	13.3% (in 2010) gradually increases to 15.4% (in 2015)
	Arduous/Construction	Employees	8.9% (in 2010) gradually increases to 9.9% (in 2015)
		Employers	14.7% (in 2010) gradually increases to 16.7% (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	13.3%
	TAN (Lawyers)	Self-Employed	20% on the insurance class
		Employees	6.67%
		Employers	13.3%
	TSAY(Doctors)	Self-Employed	20% on the insurance class
		Employees	6.67%
		Employers	13.3%
OTE		Employees	6.67%
		Employers	13.3%
DEH	General	Employees	6.67%
		Employers	13.3%
	Arduous	Employees	8.87%
		Employers	14.7%
	Hazardous	Employees	9.17%
		Employers	18.33%
BANKS		Employees	6.67%
		Employers	13.3%
OGA		Employees	7% on the insurance class
		State	14% on the insurance class

1.2.2. Auxiliary pension provision

The 2010 major reform changes in the main pension system have not directly altered the legislation of the auxiliary pension system. There has, however, been an indirect

effect which has been calculated in the projections. In order for a person to be eligible for an auxiliary pension in Greece, he or she has to be eligible for the main pension from the corresponding main pension scheme. As the statutory retirement ages have risen for the main pension schemes in 2010, the statutory retirement ages for the auxiliary pension schemes have been driven upwards as well. On top of that, the 2010 reform in the main pension adjusts the age thresholds according to life expectancy from the year 2021 and onwards, which leads the age thresholds to become even higher as life expectancy rises. Finally, pensionable earnings have to be calculated taking into account the whole career earnings, (starting from 2015 gradually), increased by the change in the Consumer Price Index and with a maturity rate to be fixed every year through the passing of a Law. (art.3,par.2 L.3863/2010)

2. PENSION PROJECTION RESULTS

2.1. 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).

TABLE 5
Eurostat (ESSPROS) vs. Ageing Working Group definition of pension expenditure (% GDP)

	2003	2004	2005	2006	2007	2008	2009
1.Eurostat total pension expenditure	11.5	11.7	12.1	12.0	12.1	12.5	13.2
2.Eurostat public pension expenditure	11.4	11.6	12.0	11.9	12.0	12.4	13.1
3 Public pension expenditure (AWG)	-	-	-	-	-	13.1	
4 Difference(2) - (3)	-	-	-	-	-	-0.7	-

2.1.1. Main pension provision

Eight main pension schemes are modeled in detail, with a total benefit expenditure of 10.8%, of GDP in 2010. These eight schemes cover 96% of the main pension schemes benefit expenditure, since the overall expenditure for the main pension schemes in that year was 11.3% 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 eight schemes modeled are:

IKA-ETAM (IKA) : Employees of the private sector
OAEE : Self-employed
Public Sector : Employees of the public sector
OGA : Agricultural sector
ETAA : Self-Employed Individuals (Engineers, Doctors, Lawyers)
OTE : Hellenic Telecommunications Organization Personnel and its subsidiaries
DEH : Public Power Corporation Personnel
BANKS : Employees of the banks sector (All banks which have been merged to the IKA-ETAM scheme)

In order to guarantee the full (100%) coverage in the projections, there has been a loading (0.50% of GDP for the year 2010) on the amount of total benefits and a loading (0.13% of GDP for the year 2010) on the amount of total contributions, of

the modeled main pension schemes for NAT (Seamen) and ETAPMME (Media Personnel), which are not explicitly modeled.

2.1.2. Auxiliary pension provision

Seven auxiliary pension schemes are modeled, the pension expenditure of which sum up to 83% (1.5% of GDP) of the total auxiliary benefit expenditure for the year 2010.

The seven schemes modeled are:

ETEAM – Employees (majority of private sector)
TEAYEK (the largest sector of TEAIT – Private employees)
TEAPDEH (the largest sector of TAYTEKO – Public Power Corporation employees)
TEAPOTE (a large sector of TAYTEKO –Hellenic Telecommunications Organization employees)
TEADY – Public Sector Employees
TEAPOKA - Public Sector Employees
MTPY - Public Sector Employees
A loading on the amount of total benefits (0.3% of GDP in 2010) and on the amount of total contributions (0.24% of GDP in 2010) is added for the rest of the funds which are not explicitly modeled.

2.2. Overview of projection results

TABLE 6
Projected gross public pension spending and contributions (% of GDP)

Expenditure	2005	2010	2020	2030	2040	2050	2060	Peak year
Main pension	-	11.3	11.3	11.4	11.9	12.4	11.8	2049
Auxiliary pension	-	1.8	2.1	2.3	2.7	2.7	2.5	2044
Solidarity grant (EKAS)	-	0.4	0.4	0.4	0.3	0.3	0.3	2010
Total	-	*13.6*	*13.7*	*14.1*	*14.9*	*15.4*	*14.6*	2049
Contributions	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**	**Peak year**
Main pension	-	5.2	5.6	6.3	6.3	6.3	6.3	2058
Auxiliary pension	-	1.4	1.3	1.4	1.4	1.4	1.4	2026
Total	-	*6.6*	*6.9*	*7.7*	*7.7*	*7.7*	*7.7*	

Following are the main points in relation to Table 6:

- ✓ Overall, the total public pension expenditure, including EKAS, amounted to 13.5% of GDP in 2010 while the equivalent amount for 2060 reaches 14.6%. This represents a total increase of 1.1% of GDP over the projection period 2010-60.
- ✓ The expenditure of the main pension provision in 2010 amounted to 11.3% of GDP while the equivalent amount for 2060 is 11.8%. This represents a total increase of 0.5% of GDP over the projection period 2010-60, while it reaches its maximum value of 12.4% of GDP in 2049.

- ✓ The expenditure of the auxiliary pension provision increases by 0.7% of GDP between 2010 and 2060, while it reaches its maximum value of 2.8% of GDP in 2044.

- ✓ The total amount of contributions from employers and employees to the public pension schemes increase from 6.6% of GDP in 2010 to 7.7% of GDP in 2060, primarily due to the increased contributions of the main pension provisions (according to the legislation).

NOTE : Revenues from third parties like social funding, state contributions, government grants, income from property and other revenues are not included in this study.

2.2.1. Main pension provision

It is clear that the aforementioned reform measures resulted in the increase of the projected expenditure of the main pension provision up to the year 2060 being only slight. The reform measures which had a significant impact on those results include the unification of all eligibility rules for the age threshold, the pension indexation and the career length between all schemes.
Another important factor is the introduction of the link of the statutory age thresholds with the life expectancy, from 2021 onwards.

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Analysis by scheme:

TABLE 7a
Projected gross public main pension spending by scheme (% of GDP)

Pension scheme	2010	2020	2030	2040	2050	2060	Peak year *
Total pension expenditure	**11.3**	**11.3**	**11.4**	**11.9**	**12.4**	**11.8**	**2049**
IKA	3.3	3.2	3.7	4.4	5.4	5.8	2060
OAEE	1.3	1.8	2.1	2.2	2.3	2.3	2060
OGA	2.2	1.9	1.4	1.3	1.2	0.9	2011
PS	2.7	2.4	2.3	2.2	1.9	1.2	2014
ETAA	0.4	0.5	0.6	0.7	0.7	0.7	2048
OTE	0.4	0.4	0.3	0.2	0.1	0.1	2011
DEH	0.4	0.4	0.3	0.2	0.1	0.1	2013
BANKS	0.2	0.2	0.2	0.1	0.1	0.1	2011
Loading	0.5	0.5	0.5	0.5	0.5	0.5	2060

The decrease in the pension expenditure of the PS, OGA, BANKS, DEH and OTE schemes is almost counterbalancing the increase of the pension expenditure of IKA, OAEE and ETAA scheme. The transition of insured population from the PS and OGA schemes to IKA contributes to the increase of the expenditure in the IKA scheme. For the PS and OGA, the pension expenditure between 2010 and 2060, is dropping due to the transition of employed population to IKA. The public sector will be shrinking in the years to come, with people working for more than 35 years immediately retiring, and a gradual reduction of 17% of the active population up to 2014. Hence, a new, reduced, number of civil servants will shape within the next four years, and is expected to be kept constant to 2060. So, the insured are transferred to the private

employees sector (IKA). Also, the agricultural population is declining gradually and moves to the private employees (IKA) and the scheme for the self-employed (OAEE).

As a consequence the IKA scheme accrues more active people, and later pensioners as well, from the schemes mentioned above. The pension expenditure between 2010 and 2060 here increases. This increase however is lower from what came to be from the previous valuation of the pre-reform system, because it is held down by the stricter eligibility which leads to a reduced increase of the coverage (eligibility).

The same increase is apparent in OAEE and ETAA pension schemes. On one hand, in OAEE, there is a transition of population from OGA. On the other hand, in ETAA, despite there is no transition of population, the increase is due to the limited effect of the reform on the scheme. This is due to the already high effective retirement ages and prolonged careers, the self employed scientists of the scheme, already had before the new law.

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.

2.2.2 Auxiliary pension provision

It follows from Table 6 that the auxiliary pension expenditure as percentage of GDP increases between 2010 and 2044 and then decreases. Following is a number of the main reasons of the above results:

- ✓ From 2052 onwards, the increase of expenditure is de-escalating through implementation of further higher retirement ages because of the increase in life expectancy (2.5% of GDP) in 2060.
- ✓ The evolution of the pension expenditure is contained by the common pension formula applied to the all post-1993 insured persons, the effect of which is more apparent towards the end of the projection period.
- ✓ ETEAM, which accounts for almost half the auxiliary pension system, is a relatively new scheme which will mature between 2035 and 2050. Hence, an increase in benefit is expected. This effect is obviously leveling off after 2055.
- ✓ New people entering the system between 2017 and 2037 improve the contribution amounts and stay in the system longer because of the increased age thresholds legislated to take effect after 2021.
- ✓ Increased age thresholds effective 2010 will keep people in the system for longer periods than before.
- ✓ Life expectancy extends the stay of certain age pensioners groups in the system, thus driving expenditure upwards.

Analysis by scheme:

TABLE 7b Projected gross public auxiliary pension spending by scheme (% of GDP)							
Pension scheme	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**	**Peak year**
Total pension expenditure*	**1.8**	**2.1**	**2.3**	**2.7**	**2.7**	**2.5**	**2044**
ETEAM	0.8	1.0	1.1	1.4	1.5	1.4	2052
MTPY	0.3	0.2	0.2	0.3	0.2	0.1	2038
TEADY	0.2	0.2	0.3	0.3	0.3	0.2	2043
TEAPOTE	0.1	0.0	0.0	0.0	0.0	0.0	2011
TEAYEK	0.1	0.1	0.1	0.2	0.2	0.1	2044
TEAPOKA	0.0	0.0	0.0	0.0	0.0	0.0	2013
TEAPDEH	0.1	0.1	0.1	0.1	0.0	0.0	2018
Loading	0.3	0.4	0.4	0.5	0.5	0.5	2051

*includes MTPY

The decomposition of expenditure by scheme reveals some of the legislation adopted for the auxiliary pension system.

Firstly, the law adopted in 1992, which, as mentioned above, distinguishes between all people first insured before and after 1/1/1993. For the people firstly insured in any scheme after this date, the pension formula is calculated as 20% * contributory period /35*pensionable earnings. This leads all schemes to a gradual decrease in spending, when most people firstly insured before the aforementioned date will leave the system.

Secondly, the public sector (MTPY – TEADY - TEAPOKA) will be shrinking in the years to come, with people working for more than 35 years immediately retiring, and a gradual reduction of 17% of the active population up to 2014 will take place. Hence, a new, reduced, number of civil servants will shape within the next four years, and is expected to be kept constant up to 2060. The wave of retirees of the years 2011-2015 keeps the expenditure at a higher level until 2040. After they leave the system, the new pension calculation formulae will already be in effect. For the public sector, taking into account the decreased number of contributors in present years and the 2010 main pension reform -which adjusts the age thresholds according to life expectancy from the year 2021 and on- leads to the decrease of the benefit expenditure towards the end of the projection.

As far as disability benefits are concerned, a counter-check of all the existent pensioners and a centralized issuance of new disability pensions are legislated, to avoid counterfeit cases.

The benefit expenditure of ETEAM is also increasing due to the additional number of entrants. It refers to people who were formerly insured in the public sector and will be joining the private sector in the future.

Note that, the density factor (rate of accumulating contributions and thus pensionable rights) used in ETEAM and TEAYEK, which make up for almost half the auxiliary pension system, is much higher than that provided by the scheme -based on statistical data. Finally, the new legislation implemented the last two months for the auxiliary schemes has not been incorporated in this exercise since the cut-off date for reforms was September 2011.

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

$$\frac{Pension\ Exp.}{GDP} \approx \overbrace{\frac{Population\ 65+}{Population\ 20-64}}^{Dependency\ Ratio} \times \overbrace{\frac{Number\ of\ Pensioners}{Population\ 65+}}^{Coverage\ Ratio} \times \overbrace{\frac{Population\ 20-64}{Working\ People\ 20-64}}^{1/\,Employment\ Rate} \times \overbrace{\frac{Average\ Pension}{\frac{GDP}{Hours\ Worked\ 15-74}}}^{Benefit\ Ratio} \times \underbrace{\frac{Working People\ 20-64}{Hours\ Worked\ 15-54}}_{1/\,labour\ intensity} \times \underbrace{\frac{Hours\ Worked\ 15-54}{Hours\ Worked\ 15-74}}_{Residual}$$

The next table 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 reciprocal of the employment rate and the labor intensity. The impact of all these components to the GDP change between 2010 and 2060 varies according to the importance of each one of them.

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

i) Limited the coverage ratio by imposing much stricter criteria for old pension acquisition and increasing the normal retirement age by as many years as the life expectancy is estimated to be increased.
ii) Improved the employment effect.
iii) Reduced the benefit ratio.

TABLE 8
Factors behind the change in public main pension expenditures between 2010 and 2060
(in percentage points of GDP)

	2010-20	2020-30	2030-40	2040-50	2050-60	2010-60	Average annual change
Public pensions to GDP	0.2	0.4	0.8	0.5	-0.9	1.0	0.020
Dependency ratio effect	1.9	2.3	3.6	2.9	-0.2	10.4	0.202
Coverage ratio effect	-1.2	-0.9	-0.8	-0.5	0.0	-3.4	-0.070
Employment ratio effect	-0.9	-0.3	-0.2	-0.4	0.0	-1.9	-0.038
Benefit ratio effect	0.4	-0.5	-1.4	-1.4	-0.7	-3.6	-0.073
Labour intensity effect	0.0	0.0	0.0	0.0	0.0	0.1	0.002
Residual*	0.0	-0.2	-0.3	-0.2	0.0	-0.6	0.002

GRAPH 1: Factors affecting the overall change in public pension expenditures between 2010 and 2060

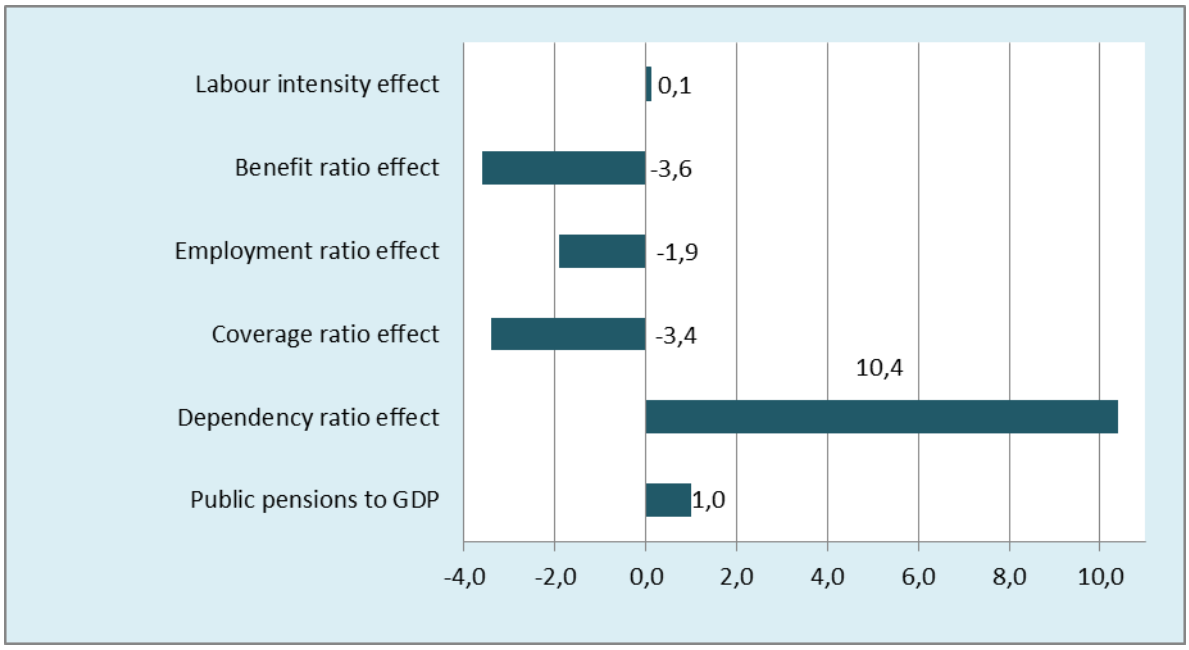


Table 9 shows the evolution of the overall replacement rates for the main and auxiliary pension provision over the projection period 2010-60.

TABLE 9
Replacement rate at retirement (RR) and coverage by pension scheme (in %)

	2010	2020	2030	2040	2050	2060
Main and auxiliary schemes (RR)*	-	48.1	46.1	46.2	52.4	49.6
Main schemes (RR)	-	42.0	38.1	39.1	45.2	43.1
Auxiliary schemes (RR) **	-	14.1	13.2	11.8	10.8	11.2
Coverage *	100.0	100.0	100.0	100.0	100.0	100.0

*excluding loadings, ** does not include MTPY

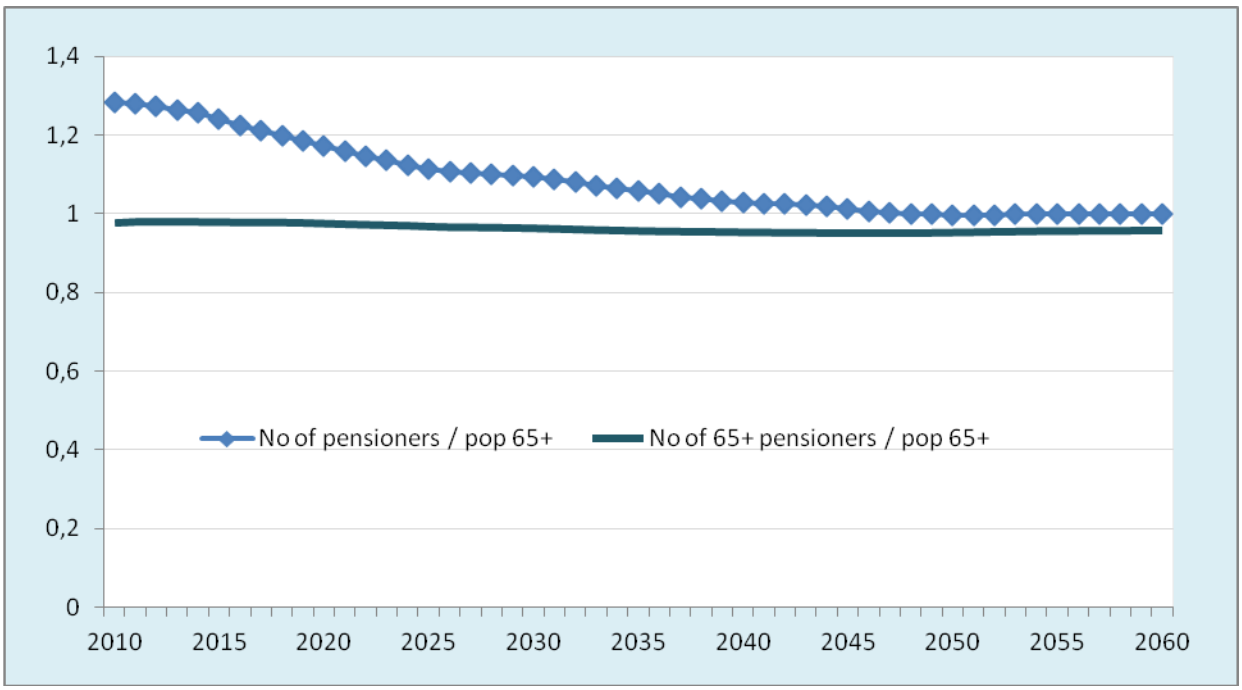
It follows from Table 9 that the replacement rate for the main pension provision is expected to drop due to the significant reduction of accrual rates until 2040. Afterwards, there is an increase due to the increase of the contributory period.

In relation to the auxiliary pension, the 2010 reform along with legislation that distinguishes contributors into two main categories (L.2084/1992) cause a reduction of the replacement rates up to 2050. Afterwards, there is an increase due to the increase of the contributory period.

The combined replacement rate of the main – which includes both the basic and proportional pension parts – and auxiliary pension, appears also to decrease until 2031 and to be recovering afterwards.

From Graph 2 below, it is evident that the ratio of pensioners to the population aged 65+ and the ratio of pensioners aged 65+ to the population aged 65+ converge from 2045 and over.

GRAPH 2



Ratio of pensioners to the population aged 65+

Table 10 analyses the projection of the population of various groups of pensioners and working people which bring out the pattern of the system evolution. The support ratio (contributors/pensioners) remains stable up to 2027 and is then following a downward trend up to 2045. Therefore, when the insured populations start retiring after1.1.2011the system will find a new equilibrium.

TABLE 10

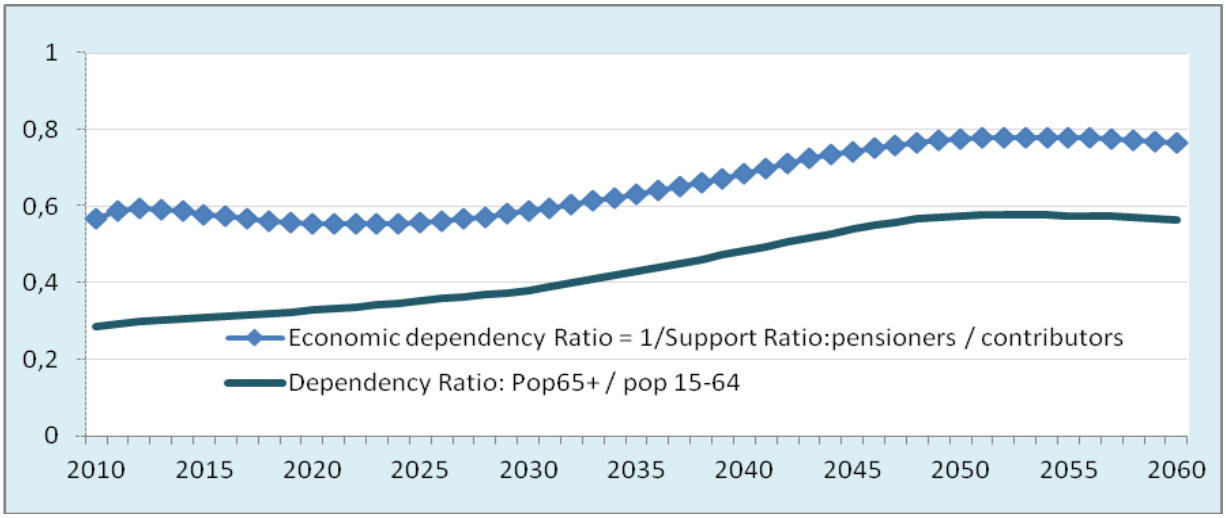
Number of pensioners and contributors in the Public scheme (in 1000), population over 65 and total employment (in 1000) and related ratios (%)

	2005	2010	2020	2030	2040	2050	2060
Number of pensioners (I)	-	2767.6	2846.1	3024.9	3388.4	3639.2	3521.9
Number of people aged 65+ (II)	1989.8	2157.7	2428.1	2767.7	3291.7	3649.1	3521.3
Ratio of (I) and (II)	-	1.3	1.2	1.1	1.0	1.0	1.0
Number of contributors (III)	-	4887.8	5129.0	5149.0	4937.9	4687.8	4590.0
Employment(IV)	4361.2	4564.5	4769.4	4781.7	4584.4	4350.5	4259.3
Ratio of (III) and (IV)	-	1.1	1.1	1.1	1.1	1.1	1.1
Support ratio (Ratio of (III) and (I))	-	1.8	1.8	1.7	1.5	1.3	1.3

Graph 3 depicts a similar evolution of the economic dependency ratio and the dependency ratio is apparent after the transitional period 2010-2015. Moreover,

during the period 2035-2060, after the full establishment of the new system, a parallel evolution is observed. Both illustrate the consistency of the study as far as active people and pensioners in comparison to population are concerned.

GRAPH 3
Projected economic and Demographic dependency ratio



Tables 11 and 12 show the evolution of the total number of pensioners and female pensioners respectively, expressed as a percentage of the total inactive population.

TABLE 11
Pensioners (all schemes) to inactive population ratio by age group (%)

	2005	2010	2020	2030	2040	2050	2060
Age group -54	-	5.8	3.0	2.0	1.7	1.6	1.5
Age group 55-59	-	53.4	40.4	23.5	23.6	21.4	21.0
Age group 60-64	-	63.9	61.6	52.0	38.5	31.1	30.7
Age group 65-69	-	98.4	86.8	83.1	76.2	70.7	74.5
Age group 70-74	-	93.4	91.8	95.7	95.2	95.1	93.4
Age group 75+	-	106.5	110.2	107.9	108.6	107.4	104.7

After the transitional period (from 2010 until 2014), new pensioners that still retire according to old eligibility criteria adapt gradually to the new legislation, thus moving to older age groups.

TABLE 12 Female pensioners to inactive population ratio by age group (%)							
	2005	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Age group -54	-	5.4	3.0	2.1	1.7	1.6	1.4
Age group 55-59	-	42.3	27.9	18.0	19.2	17.4	16.6
Age group 60-64	-	49.6	49.4	42.4	30.5	26.2	25.6
Age group 65-69	-	90.2	77.5	78.1	71.6	67.4	72.4
Age group 70-74	-	84.5	85.8	91.8	93.4	93.9	94.2
Age group 75+	-	108.3	108.9	107.6	108.7	108.4	106.5

For female pensioners the shift is most apparent because of the increased female employment rates and the new eligibility requirements.

The social security in Greece includes pensioners who were insured before 1993, receiving pension from more than one scheme. It is not obligatory to be insured in more than one fund after 1.1992, but it used to be in some cases for the ones insured before. In addition, some insured receiving old age pensions may receive survivor's pension as well. This is the reason why pensioners appear to overwhelm the number of inactive people aged 75.

Tables 13a(i) and 13b show the special factors which concern the new pensioners under the main and auxiliary pension provision respectively. The earnings related part of the new pension is analyzed to its components which are:

- ✓ II. Average contributory period
- ✓ III. Average pensionable earnings
- ✓ IV. Average accrual rates
- ✓ VI. The number of new pensioners

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

TABLE 13a (i) Projected and disaggregated new public pension expenditure						
New pension	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
I. Projected new pension old age earnings related expenditure (millions EUR)	-	859.5	1429.8	1880.6	2439.7	4266.4
II. Average contributory period	-	28.9	31.0	33.2	36.6	38.1
III. Monthly average pensionable earnings	-	18785.3	25546.5	35801.5	53057.0	74860.5
IV. Average accrual rates	-	2.08	1.65	1.46	1.39	1.46
V. Sustainability/Adjustment factor	-	-	-	-	-	-
VI. Number of new pensioners ('000)	-	77.8	112.1	110.0	90.5	103.9
VII. Average number of months paid the first year	12.0	12.0	12.0	12.0	12.0	12.0
VIII. Product of II. III. IV. V. VI. VII	-	877.8	1465.1	1914.8	2443.9	4311.1
I.-VIII.	-	-18.3	-35.2	-34.2	-4.2	-44.6

A further analysis on the results of Table 13a(i) is performed on Table 13a(ii), which shows that the difference between the total amount of the old age pension and the earnings related part, is attributed to the non-earnings related components as follows:

- ✓ XI. The amount added up from pension allowances
- ✓ XII. The amount added due to minimum pensions
- ✓ XIII. The amount of reductions due to maximum amounts of pensions
- ✓ XIV. The family allowances
- ✓ XV. The reductions due to early retirement
- ✓ XVI. The basic pension of the "TEVE" scheme (TEVE is a sub-scheme of OAEE)

TABLE 13a (ii) Projected and disaggregated new public pension expenditure						
New pension	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
IX. Projected new pension old age expenditure (millions EUR)	-	1120.0	2012.8	2899.4	3940.7	6143.9
X. Non Earnings Related new minimum pension (in Mil) **:**	-	200.2	481.2	976.8	1475.3	1968.0
XI. Allowance (Christmas. Easter. Holiday) (in Mil) **: Total Pensions allowances**	-	45.5	99.0	121.9	133.1	93.1
XII. Minimum (in Mil.) **: Total amount added due to minimum pensions**	-	5.4	5.1	0.1	0.0	0.0
XIII. Maximum (in Mil.) : Total amount reduction due to maximum pensions	-	-0.5	-2.8	-1.6	-2.2	-87.9
XIV. Family (in Mil.) **: Total amount added due to family allowances on pensions**	-	13.1	18.9	4.0	1.1	1.5
XV, Red (in Mil) **: Total amount of reductions due to early retirements**	-	-34.9	-61.9	-90.3	-109.5	-160.7
XVI. Teve basic pension (in Mil) **: Total amount of TEVE basic pension (Only for OAEE)**	-	18.4	8.2	0.0	0.0	0.0
XVII. Sum of X-XVII	-	247.3	547.8	1010.9	1497.9	1813.9
IX.-I.	-	260.5	583.0	1018.8	1501.0	1877.5

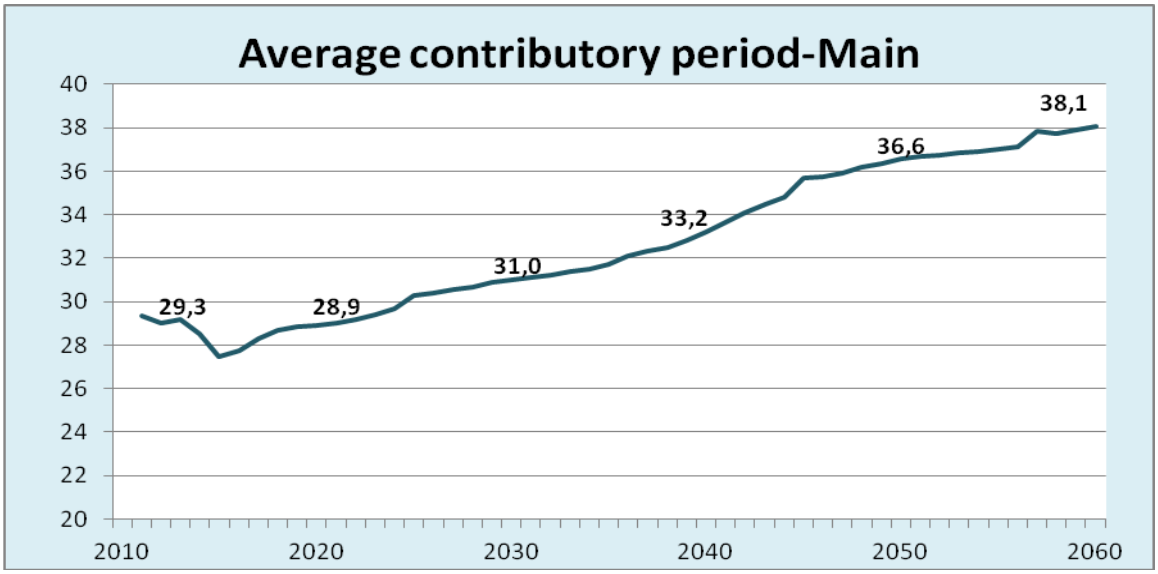
TABLE 13b Projected and disaggregated new public pension expenditure*						
New pension	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
I Projected new pension old age earnings related expenditure (mil EUR)	-	151	365	477	600	896
II. Average contributory period	-	25.1	28.2	31.4	35.1	37.5
III. Average pensionable earnings	-	18.442	23.962	32.908	44.466	64.306
IV. Average accrual rates	-	1.0%	0.8%	0.7%	0.6%	0.5%
V. Number of new pensioners ('000)	-	31.0	58.9	60.1	57.8	58.1
Va. Average number of months paid the first year	-	14	14	14	14	14
Scaling to 12 months per year	-	1.15	1.15	1.17	1.17	1.17
V. Min benefit - calculated benefit	-	0.05	0.04	0.08	0.01	0.00
VI. Product of II, III, IV, V, Scaling	-	158	386	480	597	898
I-VIII	-	-7	-21	-3	3	-2

* without MTPY

Regarding Table 13b, two lines have been added to successfully reproduce the calculations which lead to the confirmation needed. The line presenting the number of months is used because different schemes pay a different number of monthly pensions yearly (i.e. 12, 14 etc.), yet the annual pensionable salary is calculated 12 times a year. Also, to conclude the calculation, the difference between the calculated and minimum pension, where applicable, has to be added.

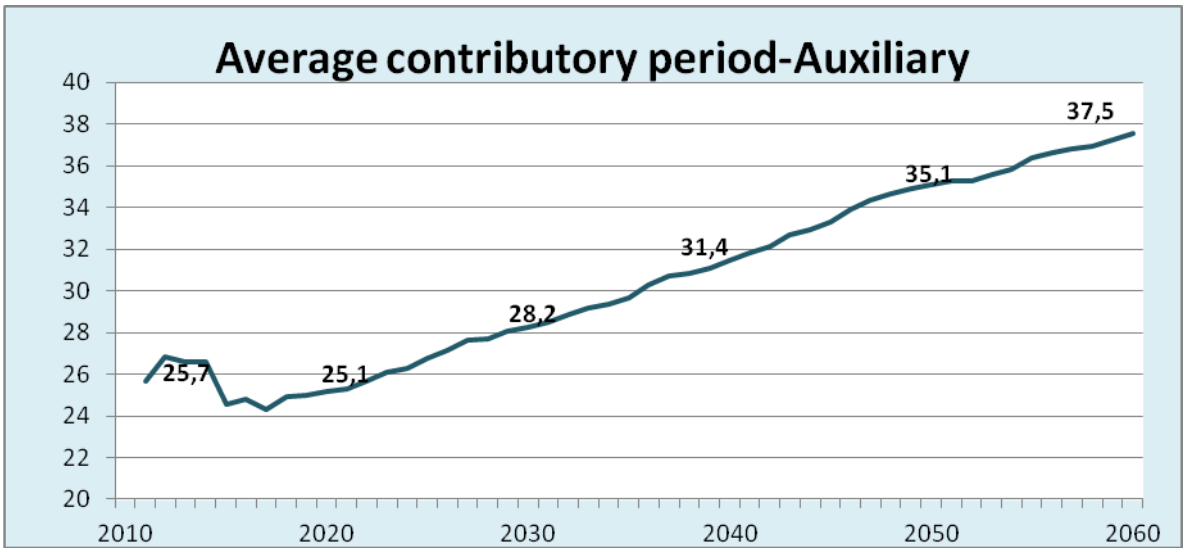
Graphs 4a and 4b show the evolution of the average year of service for new pensioners for the main and auxiliary pension provision respectively. Special periodical peak points are mainly attributed to the projected effect of the aforementioned life expectancy factor.

GRAPH 4a



Graph 4a depicts the increase of the average contributory period due to the new eligibility requirements and the improvement of macroeconomic assumptions.

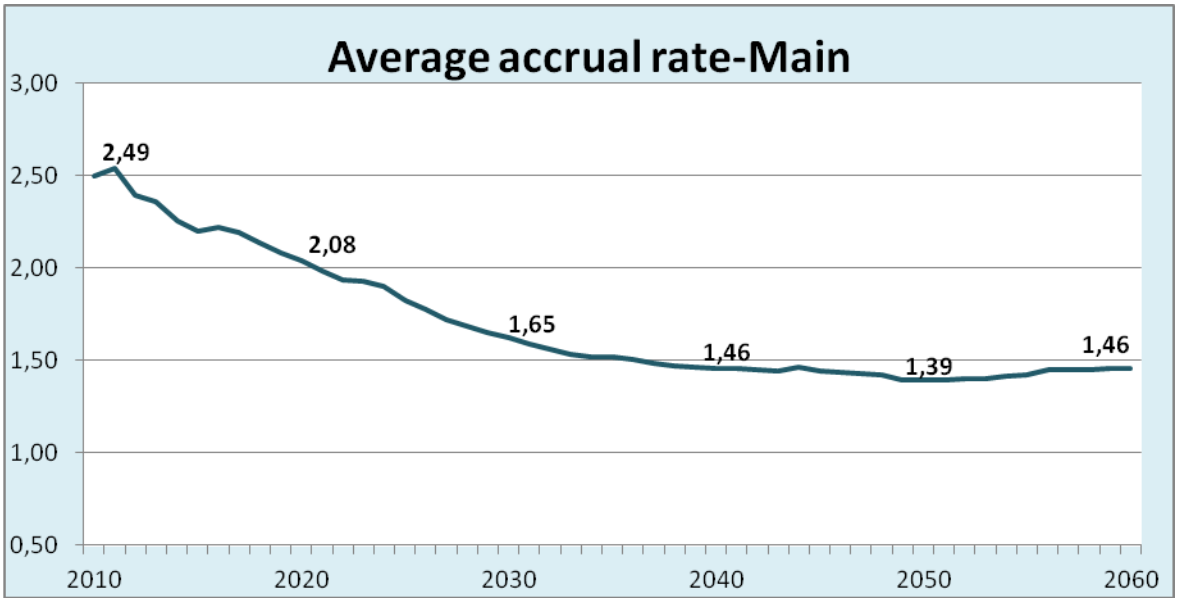
GRAPH 4b



The indirect impact of the reform of main pension is obvious on auxiliary pensions. The average years of service for new pensioners of auxiliary pension branches increase gradually due to the extending of the working life (pension entitlement only if entitlement has been established for the main pension).

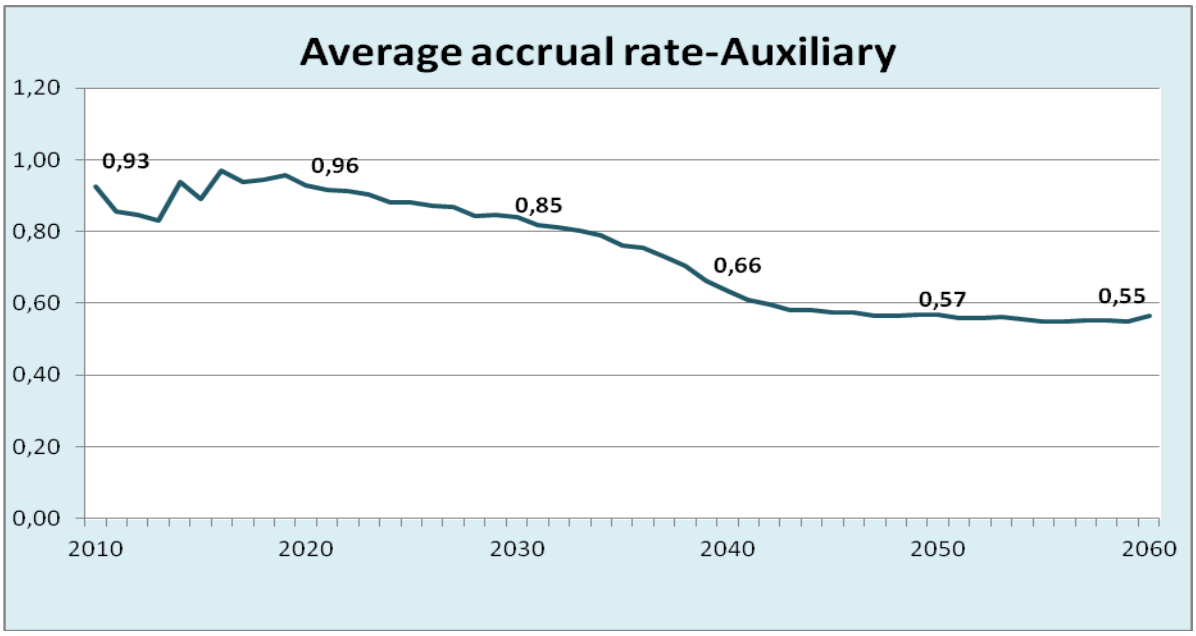
Graphs 5a and 5b show the evolution of the average annual accrual rate for new pensioners for the main and auxiliary pension provision respectively.

GRAPH 5a



The average accrual rate appears to be dropping until 2050 due to the transition to the new system where reduced accrual rates are imposed (legislation). Since accrual rates depend on the career length, after the maturity of the system, years 2050 to 2060, stabilization follows.

GRAPH 5b

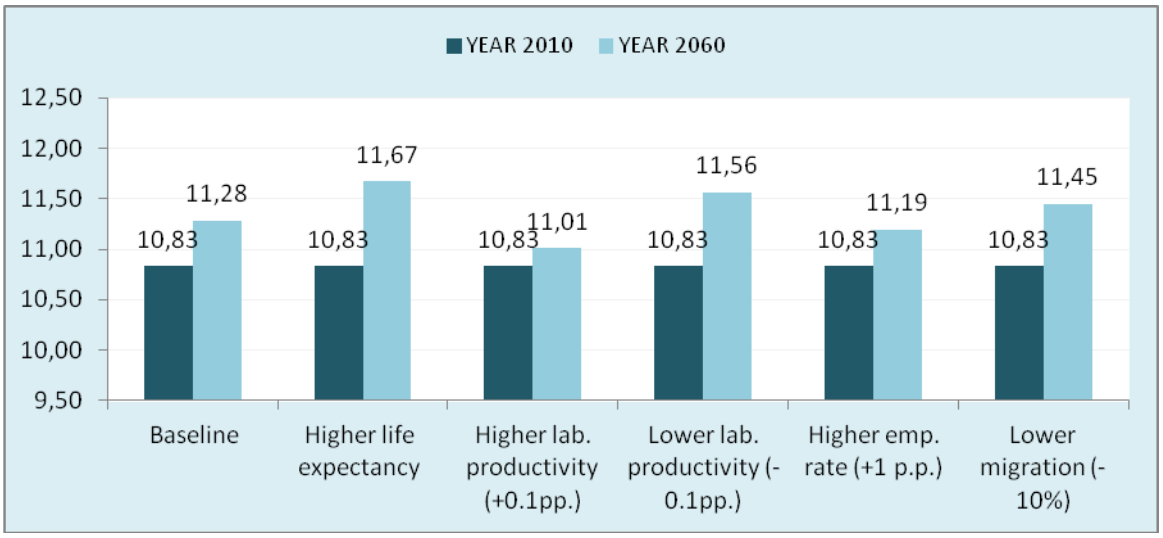


The average annual replacement rate is gradually reduced up to the year 2050 and then stabilizes at 0.55. This is due to legislation in 1992 whereby for insureds from 1/1/93 onwards, reducing the annual replacement rates is common to all members (regardless of type of employment).

2.4. Sensitivity analysis

Table 14a and Graph 6a depict the pension expenditures under different scenarios (as % of GDP) for the main pension provision.

GRAPH 6a



On the "Higher Life Expectancy" scenario an increase on the pension spending by 0.39 p.p. of GDP compared to the baseline projection in 2060 is observed. It is the highest positive impact from the benefits' side. 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 expenditures on "Higher Labour Productivity" are projected to drop by 0.27 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 expenditures by 0.28 p.p. of GDP until 2060 compared to the baseline scenario. It is important to state that pensions are not linked to labor productivity growth but are indexed by Consumer Price Index. As a consequence, the higher productivity scenario leads to higher pension amounts and the lower productivity scenario leads to lower pension amounts in comparison to the baseline scenario.

In addition, pension expenditures on "Lower Migration scenario" are projected to be 0.17 p.p. higher than the baseline. It implies lower labour force, lower GDP and lower social security contributions.

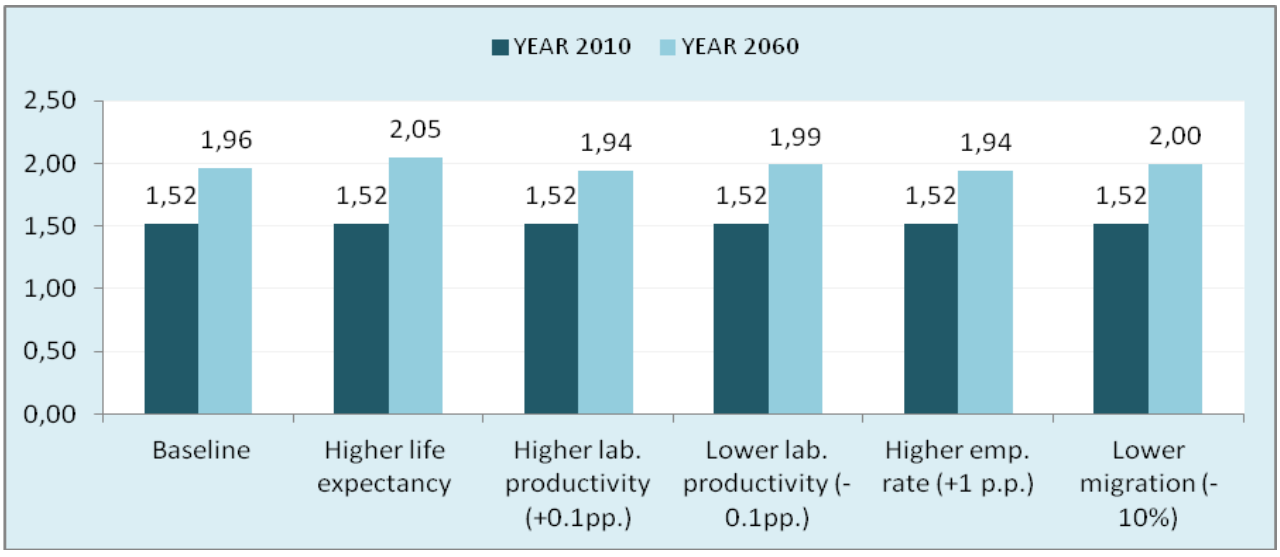
Finally the "Higher Life Expectancy" scenario has the smallest difference compared to the baseline mainly due to the reform which enforced rewarding in the system.

Table 14b and Graph 6b show the projected auxiliary pension expenditure under the various scenarios.

TABLE 14a
Public main pension expenditures under different scenarios

	2010	2020	2030	2040	2050	2060
Public Pension Expenditure						
Baseline	10.83	10.80	10.93	11.39	11.85	11.28
Higher life expectancy	10.83	10.82	10.89	11.53	12.08	11.67
Higher lab. productivity (+0.1pp.)	10.83	10.78	10.83	11.21	11.61	11.01
Lower lab. productivity (-0.1pp.)	10.83	10.81	11.03	11.57	12.09	11.56
Higher interest rate (+0.5 pp.)	-	-	-	-	-	-
Lower interest rate (-0.5 pp.)	-	-	-	-	-	-
Higher emp. rate (+1 p.p.)	10.83	10.71	10.77	11.23	11.69	11.19
Higher emp. of older workers (+5 pp.)	-	-	-	-	-	-
Lower migration (-10%)	10.83	10.82	11.00	11.51	12.02	11.45
Total Pension Expenditure						
Baseline	10.83	10.80	10.93	11.39	11.85	11.28
Higher life expectancy	10.83	10.82	10.89	11.53	12.08	11.67
Higher lab. productivity (+0.1pp.)	10.83	10.78	10.83	11.21	11.61	11.01
Lower lab. productivity (-0.1pp.)	10.83	10.81	11.03	11.57	12.09	11.56
Higher interest rate (+0.5 pp.)	-	-	-	-	-	-
Lower interest rate (-0.5 pp.)	-	-	-	-	-	-
Higher emp. rate (+1 p.p.)	10.83	10.71	10.77	11.23	11.69	11.19
Higher emp. of older workers (+5 pp.)	-	-	-	-	-	-
Lower migration (-10%)	10.83	10.82	11.00	11.51	12.02	11.45

GRAPH 6b



It follows from Graph 6b that the results of the sensitivity scenarios under the auxiliary pension provision are consistent with those under the main pension provision. In particular, the higher life expectancy, lower labour productivity and lower migration result in higher pension expenditure in 2060 compared to the baseline scenario. By contrast, the higher labour productivity and higher

employment rate scenarios result in lower pension expenditure in 2060 compared to the baseline scenario.

TABLE 14b
Public auxiliary pension expenditures under different scenarios *

	2010	2020	2030	2040	2050	2060
Public Pension Expenditure						
Baseline	1.52	1.70	1.91	2.21	2.23	1.96
Higher life expectancy	1.52	1.70	1.88	2.21	2.27	2.05
Higher lab. productivity (+0.1pp.)	1.52	1.70	1.90	2.18	2.20	1.94
Lower lab. productivity (-0.1pp.)	1.52	1.71	1.93	2.23	2.26	1.99
Higher interest rate (+0.5 pp.)	-	-	-	-	-	-
Lower interest rate (-0.5 pp.)	-	-	-	-	-	-
Higher emp. rate (+1 p.p.)	1.52	1.69	1.89	2.18	2.20	1.94
Higher emp. of older workers (+5 pp.)	-	-	-	-	-	-
Lower migration (-10%)	1.52	1.71	1.93	2.24	2.27	2.00
Total Pension Expenditure						
Baseline	1.52	1.70	1.91	2.21	2.23	1.96
Higher life expectancy	1.52	1.70	1.88	2.21	2.27	2.05
Higher lab. productivity (+0.1pp.)	1.52	1.70	1.90	2.18	2.20	1.94
Lower lab. productivity (-0.1pp.)	1.52	1.71	1.93	2.23	2.26	1.99
Higher interest rate (+0.5 pp.)	-	-	-	-	-	-
Lower interest rate (-0.5 pp.)	-	-	-	-	-	-
Higher emp. rate (+1 p.p.)	1.52	1.69	1.89	2.18	2.20	1.94
Higher emp. of older workers (+5 pp.)	-	-	-	-	-	-
Lower migration (-10%)	1.52	1.71	1.93	2.24	2.27	2.00

* includes MTPY

2.5. Description of the changes in comparison with the 2006 and 2009 projections

Comparison between the first and the third line refers to the 2001 study, prior to the implementation of law 3029/2002 and law 3655/2008, and the 2009 study, after the implementation of the above laws.

Comparison of the first and third line with the fourth line refers to the impact of the recent reform. The ratios show that it is a multi-level reform, aimed at improving all factors that adversely affect pension expenditure. The main factor appears to be the decrease in coverage ratio through the increase in employment of higher age groups. Another important factor in the reduction of pension expenditure is the decrease of benefits as a result of the inclusion of all work years in the calculation of the pensionable salary, as well as the implementation of lower accrual rates leading to an important decrease of the benefit ratio. Along with the decrease of the coverage, employment and benefit ratios, the dependency ratio effect due to ageing is nearly offset.

TABLE 15
Overall change in public pension expenditure to GDP under the 2001, 2006, 2009 and 2012 projection exercises

	Public pensions to GDP	Dependency ratio	Coverage ratio	Employment effect	Benefit ratio	Labour intensity	Residual (incl. Interaction effect)
2001 *	12.2	9.9	1.4	-3.6	4.0	0.0	0.5
2006 **	4.69	7.12	-0.02	-1.07	-1.13	0.0	-0.21
2009 ***	12.41	12.71	-0.42	-0.61	0.83	0.0	-0.10
2012 ****	1.01	10.41	-3.44	-1.87	-3.55	0.077	-0.61

* 2001-2050; ** 2004-2050; *** 2007-2060; **** 2010-2060

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.

3. DESCRIPTION OF THE PENSION PROJECTION MODEL AND ITS BASE DATA

3.1. Institutional context

The 2012 projections for the main pension provision were undertaken by the National Actuarial Authority of Greece and the results with respect to the main pension schemes were peer reviewed by ILO experts.

The projections for the auxiliary pension provision have been prepared by the Athens University of Economics and Business under the guidance and supervision of the National Actuarial Authority. The National Actuarial Authority also performed a thorough peer review of the results produced externally.

3.2. 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/EUROPOP2010 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.

Labour Force, employment:

Assumptions on labour force participation rates, employment rates are in line with the AWG/ EUROPOP2010 data. There are also some assumptions made regarding each scheme's employed population evolution. In starting year, the proportion of employees for every scheme on the total employees given by AWG, remains constant for the 50 years of projection. However there are schemes with different treatment such as the:

- ✓ PUBLIC SECTOR: The insured population is decreasing until 2014 and remains constant for the rest year of projections.
- ✓ OGA: Active population is shrinking by 1% yearly.
- ✓ IKA-ETAM and OAEE: The evolution of employees is assumed proportional to the evolution of the overall employees given by AWG, adding up the population, per sex, who move from OGA and Public Sector.

Wages and Benefit Indexation:

The wage growth for IKA, OAEE, Public Sector, BANKS, OTE, ETAA and DEH is obtained by the product of Consumer Price Index and labour productivity. For OGA the wage growth is identical to the pension indexation, according to legislation. In addition, benefit indexation is according to Consumer Price Index (which is the maximum possible value of this index) for all schemes with effect from 1.1.2015 and there will be no nominal increase in pension up to 2015. Salary valorization is adjusted by the CPI and labour 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. The evolution of the National Wage used in the valuation was provided to the National Actuarial Authority by the AWG.

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 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.

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 2024, 2036, 2045 and 2057.

Other assumptions:

It is worth to point out that the new entrants of Public sector, Banks, OTE, and DEH 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 their scheme in order to follow the salary evolution and retirement behavior. Moreover, according to the macroeconomic assumptions, there will be a recovery by 2020 and it is assumed that people will accumulate faster year of credits in IKA and ETEAM.

3.3. Data used to run the model

Data used to run the model for the main and auxiliary pension provision was provided by each pension scheme separately and by the Hellenic Statistical Authority. The database included person-by-person information, from which all required inputs, such as average contribution period, average salary, 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.

Where there was lack of data in a certain area of main/auxiliary pensions, an effort was made to extract these data by the respective auxiliary/main pensions.

3.4. Reforms incorporated in the model

The reforms incorporated in the modeling exercises for the main and auxiliary pension provision, are those described in section 1.2 of this report.

3.5. 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 schemes. It thus helps to provide the quantitative basis for making policy decisions on social security pension schemes. The model estimates future cost on the basis of the cohort decomposition method and various statuses of a person and associated values (average salary, 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, Technical guide (Version 1.1 11/2002).

Regarding the projections for the auxiliary pension provision, an overview of the model used by the Athens University of Economics and Business is provided in Annex 2.

PROJECT TEAM

The actuarial projections included in this report were conducted by the following people:

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