

Romania

Country fiche on pension projections prepared for the Economic Policy Committee

November 2014

Bucharest

PART I. OVERVIEW OF THE PENSION SYSTEM

1.1. Description of the Romanian pension system

The Romanian Pension System, governed by Law no. 263/2010, which entered into force on January 1st, 2011, consists of three pillars:

Pillar I, the mandatory public pension scheme, administered by the state is a PAYG scheme, governed by the following principles: uniqueness, mandatory contributiveness, equal rights, redistribution, social solidarity. This scheme includes old age pension, early retirement pension, partial early retirement pension, disability pension and survivor pension based on intergenerational solidarity.

Pillar II, the mandatory private pension scheme, is a defined contribution scheme, with a minimum investment guarantee, based on individual accounts (part of the individual contribution from the public pension system is accumulated in such individual accounts); The access has begun in 2007; the scheme is compulsory for all eligible persons aged up to 35 and voluntary for age group 35-45. Portfolio size by July 2013: 5.93 million participants, total assets equivalent of 2,700 million euros

Pillar III the voluntary private pension scheme is a defined contribution scheme with voluntary participation, based on individual accounts. Investment guarantees are permitted by the law, but not mandatory. The participants can contribute cumulatively to more than one voluntary pension funds, but the cumulated contributions to the funds are limited to 15% of the gross monthly cumulated income. In order to be eligible for a facultative pension, each participant must exceed 90 monthly contributions, the age of 60 and a minimum cumulated amount. The amount representing the contributions to voluntary pension fund is tax deductible for both participant and employer within the limits of an amount representing RON equivalent of 400 EUR per fiscal year. Portfolio size by July 2013: 303.3 thousand participants, total assets equivalent of 160 million euros

➤ **The social allowance for pensioners** addresses the public system pensioners, resident in Romania, regardless of the retirement application date, if their monthly pension quantum is below the ceiling set by the law (2013 - 350 RON, the equivalent of approx. 79 euro). This social allowance was introduced by the pension Law no. 263/2010. Before this measure, there was no supplement for the pension benefits. The short evolution of the entitlements was:

Year	2010	2011	2012	2013
Number of beneficiaries (thou)	419.1	413.5	421.5	391.3
Average level of monthly allowance (euro)	21.54	21.52	20.67	21.32

➤ Eligibility requirements

The old age pension is granted to the insured that cumulatively fulfill the conditions of standard retirement age (set according to the date of birth and gradually increasing to 65 for men and 63 for women) and the minimum contribution period (15 years, by gradual increase until January 2015). The full contribution period will gradually increase up to 35 years (for men, until 2015, for women until 2030). December 2014: standard retirement age: 59 years /11 months (F) – 64 years/11 months (M), minimum contributory period 14 years /10 months for

both male and female, full contributory period 29 years/10 months (F) – 34 years/10 months (M)

For active military police corps and special public servants within national defense, public order and national security, the standard retirement age will increase gradually up to 60 (55 years and 11 months in December 2014), with a 30-year-full contribution period and a minimum contribution period of 20 years, in 2030.

Any insured participant can benefit of reduced statutory retirement age if they completed contribution periods in one of the following circumstances:

- worked under special or hard working conditions;
- completed a period of contribution as disabled, the disablement having been prior to the quality of insured;
- is a blind person who was certified to have been under this condition at least one third of the full contribution period.

Early retirement pension can be granted up to 5 years before the insured person reaches the standard retirement age, provided they completed the full contributory period required by the law and exceeded it with a minimum of 8 years. **Partial early retirement pension** is granted to the insured persons who completed the full contribution period required by the law and exceeded it with less than 8 years. In case of partial early retirement pension, the quantum is calculated by diminishing the old-age pension benefit by 0.75% for each month of anticipation before complying with the old-age pension requirements. At the time when the old age pension requirements are fulfilled, the early pension is transformed into old age pension.

When the accumulated contribution period is calculated in order to register for early retirement, the following are not taken into account:

- the period over which while the insured benefited of a disability pension;
- the years spent full time on higher education courses, in which the individual graduated with a diploma;
- the time served in the military, or while having been called under arms or taken prisoner;
- the time spent studying in a military / police school institution, as a pupil or student.

Numeric example (table 1 below): As one can see, the [partial] early retirement pension can be granted only upon completing full contributory period plus more [respectively, less] than 8 years, a person with only 20 years of contribution can't retire before the statutory retirement age. Also, for a person with 40 years of contribution (duration that exceeds the required full contributory period), the earliest time they can retire is 5 years before the statutory retirement age. The afferent penalty occurs only in case of partial early retirement, i.e. if this 40 year-contribution exceeds with less than 8 years the full contributory period. As this happens only after the moment when the full contributory period (which increases until 2015 for men and 2030 for women) reaches 32 years, the penalty would apply, in our example, as from 2023 for women and 2010 for men. Thus, the quantum would be 5 years x 12 months per year x 0.75% = 45%, until the person reaches the statutory retirement age.

Table 1: Statutory retirement age, earliest retirement age and penalties for early retirement

		2013	2020	2030	2040	2050	2060
Men - 20 contrib years	statutory retirement age	64.7	65	65	65	65	65
	earliest retirement age	64.7	65	65	65	65	65
	penalty in case of earliest retirement age	Not eligible for early retirement					
	bonus in case of late retirement	Not eligible for early retirement					
Men - 40 contrib years	statutory retirement age	64.7	65	65	65	65	65
	earliest retirement age	59.7	60	60	60	60	60
	penalty in case of earliest retirement age	45%	45%	45%	45%	45%	45%
	bonus in case of late retirement	-	-	-	-	-	-
Women - 20 contrib years	statutory retirement age	59.7	61.4	63	63	63	63
	earliest retirement age	59.7	61.4	63	63	63	63
	penalty in case of earliest retirement age	Not eligible for early retirement					
	bonus in case of late retirement	Not eligible for early retirement					
Women - 40 contrib years	statutory retirement age	59.7	61.4	63	63	63	63
	earliest retirement age	54.7	56.4	58	58	58	58
	penalty in case of earliest retirement age	0	0	45%	45%	45%	45%
	bonus in case of late retirement	-	-	-	-	-	-

The **survivor pension** is paid to children up to the age of 16 (or until they complete their studies) and to the surviving spouse (at their reaching of the standard retirement age). If the surviving spouse is also entitled to their own pension, they can choose the more advantageous of the two. The quantum of the survivor pension (percentage of the deceased's old age pension): 50% for a single survivor, 75% for two survivors, 100% for at least 3 survivors.

The **disability pension** is payable to the persons who lost their capacity to work, totally or partially (at least half). As from 2012, the eligibility for the disability pension is no longer conditioned by the contribution period fulfilled, but only by the degree of disability. The quantum of the disability pension is the result of the point value multiplied by the sum of the number of points accumulated during the contributory period and the number of "potential" points, i.e. the total points to be accumulated between the full contribution period and the stage already achieved. The monthly number of potential points equals to 0.70 / 0.55 / 0.35, depending on the degree of disability.

➤ The **Social security contributions quotas** are: 10.5% for the employee (including also the quota corresponding to private pensions funds of 4.5% in 2014, growing up to 6%, by 0.5 p.p. per year and remaining stable afterwards) and 15.8% (recently legislated decrease as from 20.8%) for the employer;

➤ **Employees can cumulate wages with pension benefits.** Note that, for public sector employees, before October 1st, 2014, cumulating pension with wage was allowed only if the level of the pensions benefits did not exceed the economy-wide average wage.

➤ **Calculation of pensions**

Pensions are computed according to a point formula, by multiplying the average annual number of points achieved by the insured with the value of one pension point. For **2014**, the value of the pension point was set at **790.7 RON (178.93 euro)**. The value of the correction index, to be applied only once, at retirement, was set to 1.07, for persons who apply for retirement as of January 1st, 2014

➤ **Point value indexation**

- commencing with the 1st of January 2013, the pension point value will be annually indexed with 100% of inflation rate plus 50% of real average gross wage growth of the previous year. If one of the above mentioned indicators is negative, only the positive value will be considered;
- starting with 2021, the pension point value will be annually indexed with 100% inflation rate plus 45% of the real average gross wage growth of the previous year. The percentage attached to the real average gross wage growth will be gradually reduced by 5% each year;
- starting with 2030, the pension point value will be indexed annually only by 100% inflation rate.

PART II. Overview of the Demographic and labour forces projections

2.1 Demographic development

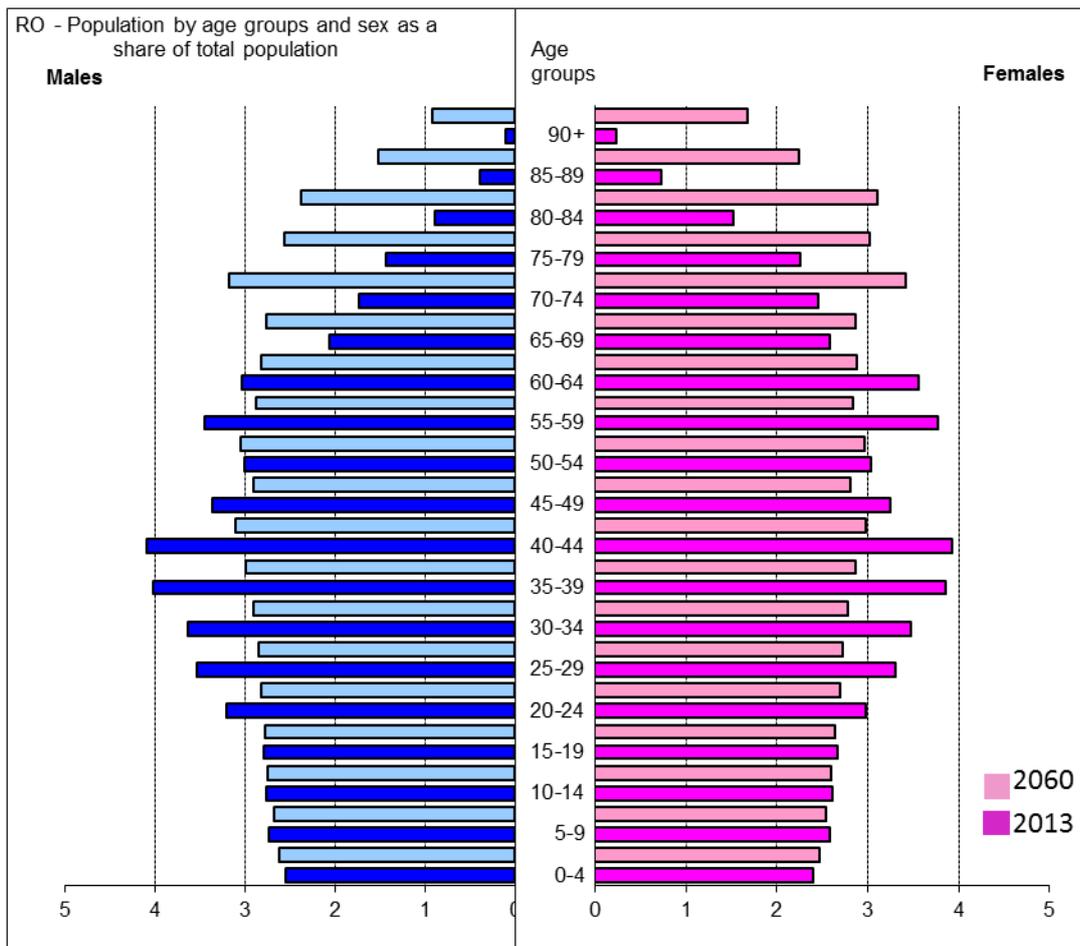
Similarly with the evolutions in other European Union member states, the pace of the ageing expenditure growth is influenced in Romania by a pronounced inverting of the age pyramid.

Table 2 – Main demographic variables evolution

Demography	2013	2020	2030	2040	2050	2060	Peak year
Population (thousand)	19990	19664	18964	18435	17949	17409	2013
Population growth rate (%)	-0.3	-0.2	-0.4	-0.3	-0.3	-0.4	2016
Old-aged dependency ratio (pop65/pop15-64)	24,1	28,8	32,7	41,8	48,7	51,8	2060
Ageing of the aged (pop80+/pop65+)	23.6	24.6	26.3	30.6	32.5	39.9	2060
Men - Life expectancy at birth	71.2	73.0	75.5	77.8	79.9	81.8	2060
Men - Life expectancy at 65	14.5	15.5	16.9	18.2	19.5	20.7	2060
Women - Life expectancy at birth	78.2	79.7	81.6	83.5	85.1	86.7	2060
Women - Life expectancy at 65	17.7	18.6	20.0	21.3	22.6	23.8	2060
Men - Survivor rate at 65+	71.1	74.8	79.4	83.2	86.3	88.9	2060
Men - Survivor rate at 80+	34.1	39.6	47.4	54.7	61.4	67.3	2060
Women - Survivor rate at 65+	86.4	88.2	90.3	92.0	93.4	94.6	2060
Women - Survivor rate at 80+	56.5	61.4	67.6	72.9	77.6	81.5	2060
Net migration (thousand. of pers.)	-9.2	0.4	-24.7	11.6	7.1	2.4	2039
Net migration over population change	0.1	0.0	0.3	-0.3	-0.1	0.0	2028

In Romania, the life expectancy at birth for men is estimated to grow by approximately 10.6 years on the projection horizon, from 71.2 in 2013 to 81.8 in 2060. For women, the life expectancy at birth is estimated to grow by 8.5 years, from 78.2 in 2013 to 86.7 in 2060, this reflecting a slight convergence of life expectancy between men and women.

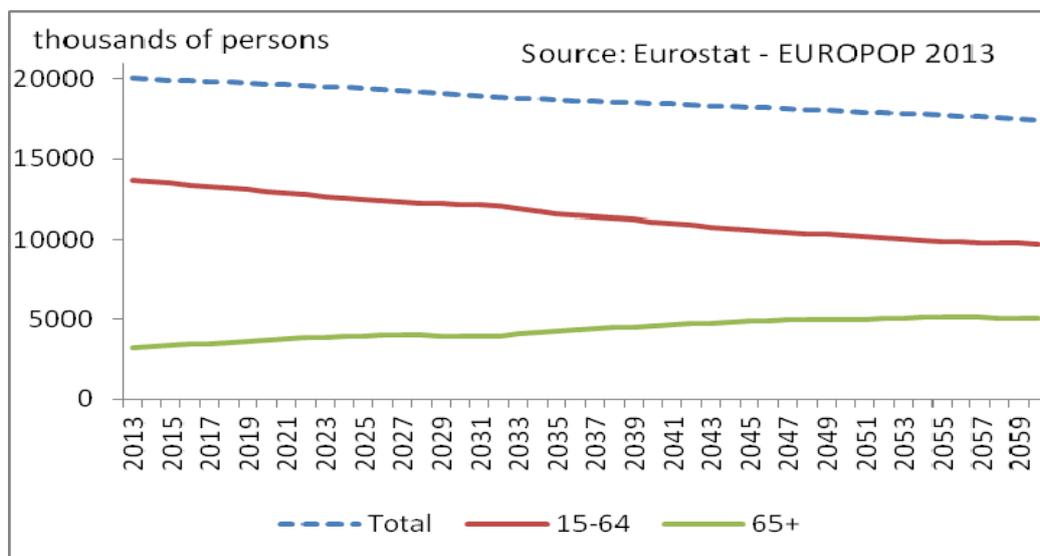
Structure of population: 2013–2060



The demographic changes will alter the structure of population in Romania. The extent and the pace of the ageing of population depend on the future trends in life expectancy, fertility and migration.

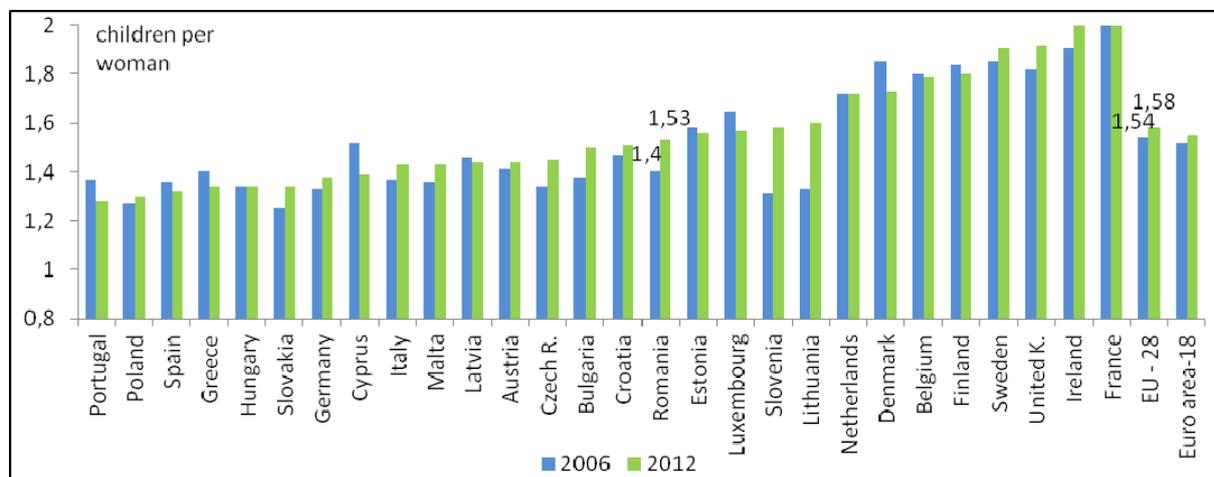
The magnitude and speed of aging population will change the ratio between retirement age and the working age population, so that the labour market will undergo significant changes in its age structure, with an overall negative impact. The ratio between the persons aged 65 and more and those at working age (15-65 years) increases substantially. Thus, in the view of the coming years, the resources of the public pension system will diminish as compared to the expenditures thereof. This trend, of constant growth in the pension expenditures, will reverse after 2040, when the volume of new pension system entries will become stabilized. Consequently, the pension expenditure will stop its growth. The Pension System will be balanced also due to the exit from the life cycle of the baby-boom generation. These will enter the pension system around 2030 and will begin to exit as from 2040.

Development of population



The results of the demographic projections made by Eurostat for Romania (EUROPOP 2013), reflect a significant drop of the volume of population, by 2.6 million persons, in 2060, as compared to 2013.

Fertility rate



Sursa: Eurostat

The ageing of the population in Romania is also a consequence of the low fertility. In 2012 the fertility rate was 1.53 children per woman, below the optimal level of reproduction. The level estimated by Eurostat for the Romanian fertility rate in 2060 is 1.83.

Although the young population decreases as result of the constant reduction in the number of women at the fertile age, there are still some positive signs, coming from the augmentation of the fertility rate.

2.2 Labour forces

Table 3 – 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	43.0	46.3	50.0	48.4	47.8	48.7	2026
Employment rate for workers aged 55-64	41.4	44.7	48.3	46.9	46.3	47.2	2026
Share of workers aged 55-64 on the total labour force	96.3	96.7	96.5	96.8	96.9	96.8	2051
Labour force participation rate 65-74	20.9	15.3	14.8	15.9	14.9	14.7	2013
Employment rate for workers aged 65-74	20.9	15.3	14.8	15.9	14.9	14.7	2013
Share of workers aged 65-74 on the total labour force	100.0	99.9	99.9	99.9	99.9	99.9	2013
Median age of the labour force	40.0	41.0	43.0	42.0	41.0	41.0	2030

Table 3 reflects an increase in the employment rate and labour force participation rate of persons aged 55-64 and 65-74 until 2030-2040. Afterwards, the weight begins to drop, toward the end of the projection horizon, as result of the cycle ending for the so-called baby-boom phenomenon.

Table 4a - 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)	23.3	23.6	23.6	23.6	23.6	23.6	2015
Average effective exit age (CSM) (II)	63.8	64.0	64.0	64.0	64.0	64.0	2014
Average effective working career (CSM) (II)-(I)	40.6	40.4	40.4	40.4	40.4	40.4	2013
Contributory period	32.6	34.0	34.6	34.7	35.4	35.8	2060
Contributory period / Average working career	0.8	0.8	0.9	0.9	0.9	0.9	2060
Duration of retirement *	15.1	16.2	17.6	18.9	20.3	21.5	2060
Duration of retirement / average working career	37.2	40.1	43.5	46.8	50.2	53.2	2060
Percentage of adult life spent at retirement **	24.8	26.0	27.7	29.1	30.6	31.9	2060
Early / late exit ***	1.4	1.2	1.4	1.0	0.9	0.8	2013

*Calculated as the difference between the life expectancy at average effective exit age and the average effective exit age itself.

**Calculated as the ratio between the duration of retirement and the life expectancy diminished by 18 years.

***Is the ratio of those who retired and aged less than the statutory retirement age and those who retired and are aged more than the statutory retirement age.

Table 4b – 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)	26.3	26.0	26.0	26.0	26.0	26.0	2013
Average effective exit age (CSM) (II)	63.4	62.4	62.6	62.6	62.6	62.6	2013
Average effective working career (CSM) (II)-(I)	37.2	36.4	36.6	36.6	36.6	36.6	2013
Contributory period	29.0	30.6	31.4	32.0	32.5	32.8	2060
Contributory period / Average working career	0.8	0.8	0.9	0.9	0.9	0.9	2060
Duration of retirement *	19.3	21.1	21.7	23.0	24.3	25.6	2060
Duration of retirement / average working career	51.9	58.0	59.3	62.9	66.5	70.0	2060
Percentage of adult life spent at retirement **	29.8	32.2	32.7	34.0	35.3	36.5	2060
Early / late exit ***	0.6	0.5	0.9	0.7	0.6	0.7	2029

The growing life expectancy for females and males leads to a longer period of life spent at retirement (+6,3 years for females and +6,4 for males), so that further pressure is added on the pension system. The private pensions system (Pillar II) has been implemented in order to reduce this potential burden over the public system and to ensure the necessary financial resources for the pensioners.

The assumptions related to the average labour market entry and exit ages model are relatively constant. Consequently, the average effective duration of the career will also be a constant. However, the contribution period grows over the projection horizon by approximately 3.2 years for males and 3.8 years for females – indicating a diminution of the early retirement effect.

The difference between the contribution period and the average effective duration of the career is explained by the fact that some persons still work, while also receiving social assistance from the State, like the disabled individuals who undergo physical examination periodically in order to assess whether they will be able to re-enter, at some point, the work force. Furthermore, the methodology used for employment by the international labour office also includes categories like day-workers and part-time employees. All these categories are considerable in Romania, they are still registered as active on the labour market but usually don't pay social contributions (it's not compulsory).

PART III - PROJECTION RESULTS

III.1 Extent of the coverage of pension schemes in the projection

The table below shows the pension expenditure in % of GDP between 2006 and 2013, according to Eurostat's ESSPROS database and the data provided by Romania to the Ageing Working Group.

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

	2006	2007	2008	2009	2010	2011	2012	2013
1. Eurostat total pension expenditure	6.0	6.4	7.6	9.4	9.4	9.2		
2. Eurostat public pension expenditure	6.0	6.4	7.6	9.4	9.4	9.2		
3. Public pension expenditure AWG	6.0	6.3	7.6	9.4	9.4	9.1	8.7	8.4
4. Difference (2)-(3)	0	0.1	0	0	0	0.1		
<i>5. Expenditure categories not considered in the AWG definition</i>								
<i>5.1.</i>								
<i>5.2.</i>								

III.2 Overview of the projection results

Following the imbalances due to the economic crisis (the fall of GDP, resulting in the raise of the pension expenditures' weight; the pension benefits having been reduced by 15% as a measure of austerity, later reinstated, on the background of recovery), the long run trend seems to be the return to a constant level. Furthermore, the development of the second pillar and the beginning of the pension payments thereof will gradually relieve the stress that would have accumulated on the public pension pillar under the old circumstances.

Table 6: Projected gross and net pension spending and contributions (% of GDP)

	Expenditure	2010	2013	2020	2030	2040	2050	2060	Peak
Gross public pension expenditures		9.4	8.4	8.3	8.2	8.6	8.5	8.2	2042*
Occupational pensions									
Private pensions									
<i>Mandatory private</i>		0	0	0	0.1	0.4	0.7	0.8	2060
<i>Non-mandatory private</i>									
Total pension expenditure		9.4	8.4	8.3	8.3	9.0	9.2	9.0	2051*
Net public pension expenditure		9.0	7.9	7.9	7.8	8.2	8.1	7.8	2052*
Net total pension expenditure		9.0	7.9	7.9	7.9	8.6	8.8	8.6	2042*
Contributions		2010	2013	2020	2030	2040	2050	2060	Peak year
Public pensions contributions		5.9	5.6	6.2	6.2	6.2	6.4	6.6	2060
Total pension contributions		6.3	6.3	7.8	8.4	8.6	9.0	9.3	2060

*Peak year for period 2013-2060. For period 2010-2060, peak year is 2010

After the considerable increase of the total expenditure incurred with the gross public pensions, during the first decade of this century, an increase due to the necessary convergence toward a European life standard, the pension expenditures have reached a significant weight in GDP. Therefore, a pension reform became necessary in order to stabilize this increase. As of 2010, the principle behind the pension indexation has changed, so that the growth has become smaller than the nominal GDP growth.

The macro assumptions indicate a correlation between the average wage' and the GDP's developments. This contradicts the former projection exercise that forecasted that the average wage would double between 2040 and 2060, while the GDP would increase by only 76%. In this context, a limitation of the pension expenditures, as percentage of GDP, is also estimated. As we expect an improvement in the collection of contributions, it is expected that contributions will increase, both as regards the number and the amounts. Hopefully, as from 2030 on, the black or grey parts of the economy will become negligible.

Table 7: Projected gross public pension spending: by scheme (as % of GDP)

	2010	2013	2020	2030	2040	2050	2060	Peak year
Total public pensions	9.4	8.4	8.3	8.2	8.6	8.5	8.2	2042*
of which earnings-related								
Old age and early pensions	7.7	7.1	7.0	6.8	7.3	7.3	7.0	2044*
Disability pensions	1.1	0.8	0.8	1.0	0.9	0.8	0.7	2030*
Survivor pensions	0.5	0.4	0.4	0.4	0.4	0.4	0.4	2055*
Others pensions								
of which non-earnings related								
Minimum pensions	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2051*

*Peak year for period 2013-2060. For period 2010-2060, peak year is 2010

The application of the pension reform has already begun to produce improvements, as the weight of the old age pensions in GDP has decreased. Furthermore, the strict criteria imposed for the disability pension eligibility have led to a considerable reduction of the afferent expenditures. On the long-run, the disability, survivor and social pension expenditures are forecasted to become stabilized, while the old age pension expenditures will gradually diminish, as percentage of GDP, due to the indexation formula. A peak of the old-age pension expenditures is anticipated as the baby-boomers retire. Noticeable, the disability pensions transform into old age pensions, once the standard retirement age is reached.

III.3 Description of main driving forces

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

$$\begin{aligned}
 \frac{\text{PensionExp}}{\text{GDP}} &= \overbrace{\frac{\text{Population}_{65+}}{\text{Population}_{20-64}}}^{\text{DependencyRatio}} \times \overbrace{\frac{\text{Numberof Pensioners(Pensions)}}{\text{Population}_{65+}}}^{\text{CoverageRatio}} \\
 &\times \overbrace{\frac{\text{Averageincomefrompensions(AveragePension)}}{\text{GDP}}}^{\text{Benefit Ratio}} \times \overbrace{\frac{\text{Population}_{20-64}}{\text{Hours Worked}_{20-74}}}^{\text{Labour Market /LabourIntensity}} \quad [1]
 \end{aligned}$$

Note: 'Average pension' = social security pension expenditure divided by the number of pensioners

Two further sub-decompositions have been added in the 2015 exercise:

$$\begin{aligned}
 & \overbrace{\frac{\text{Number of Pensioners}}{\text{Population 65+}}}^{\text{Coverage Ratio}} = \\
 & = \overbrace{\frac{\text{Number of Pensioners 65+}}{\text{Population 65+}}}^{\text{Coverage Ratio Old-Age}} + \left(\overbrace{\frac{\text{Number of Pensioners } \leq 65}{\text{Population 50-64}}}^{\text{Coverage Ratio Early-Age}} \times \overbrace{\frac{\text{Population 50-64}}{\text{Population 65+}}}^{\text{Cohort effect}} \right) \quad [2]
 \end{aligned}$$

$$\begin{aligned}
 & \overbrace{\frac{\text{Population 20-64}}{\text{Hours Worked 20-74}}}^{\text{Labour Market / Labour Intensity}} = \\
 & \overbrace{\frac{\text{Population 20-64}}{\text{Working People 20-64}}}^{1/\text{Employment Rate}} \times \overbrace{\frac{\text{Working People 20-64}}{\text{Hours Worked 20-64}}}^{1/\text{Labour intensity}} \times \overbrace{\frac{\text{Hours Worked 20-64}}{\text{Hours Worked 20-74}}}^{1/\text{Career shift}} \quad [3]
 \end{aligned}$$

Furthermore, the same decomposition is proposed, but taking into consideration the number of pensions, instead of the number of pensioners.

On the overall projection horizon, the public pension expenditures, as percentage of GDP, diminishes by 0.5 percentage points.

Obviously, the main pressure related to the increase of the pension expenditures comes from the dependency ratio, as result of the population ageing, which will dramatically change the ratio between the active and the old-age population. This peak of the dependency is forecasted to be reached during the decade 2030-40, when the generations born in 1967-1970, representing the Romanian „baby boom” phenomenon, will exit the labour supply.

Moreover, the coverage ratio will also decrease over time. The growth in the number of pensioners will be exceeded by the augmentation of the volume of people aged 65+. The main determination comes from the heightening of the statutory retirement age. This will diminish the number of pensioners below the age of 65, relative to the population 50-64; Also, an additional decline of the coverage ratio takes place in the last years of the projection horizon, when the total population will drop as well. The decreasing population also impacts on the number of disability pensions, which also goes down, as well as on the number of survivor pensions, which stagnates.

The effects of the ratio between the labour market and the labour intensity will have a limited impact on the expenditures, as percentage of the GDP. This factor is forecasted to remain, practically, constant along the projection horizon.

The benefit ratio will constantly drop, as labour productivity will grow faster than the pension benefits. For this reason, the decade 2020-2030 will be characterized by an important reduction of the benefit ratio (almost one third of its total diminution until 2060): the pension reform decelerates the increase of the average pension benefits, while the resuming of the economic growth will lead to lower benefit ratios.

Table 8a: Factors behind the change in public pension expenditures between 2013 and 2060 (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	-0.1	0.0	0.4	-0.1	-0.3	-0.2	-0.003
Dependency ratio effect	1.6	1.1	2.3	1.4	0.6	6.9	0.141
Coverage ratio effect	-0.5	0.2	-0.8	-0.7	-0.6	-2.5	-0.054
Coverage ratio – old age	-0.1	0.3	-0.3	-0.2	-0.3	-0.6	-0.014
Coverage ratio – early age	0.1	-0.3	0.3	0.1	-0.5	-0.3	-0.007
Cohort effect	-1.2	0.3	-2.0	-2.0	-0.9	-5.7	-0.128
Benefit ratio effect	-0.9	-1.3	-0.9	-0.6	-0.2	-4.0	-0.086
Labour market / Labour intensity effect	-0.1	0.2	-0.1	0.0	-0.1	0.0	-0.001
Employment ratio effect	-0.2	0.2	0.1	0.0	-0.1	0.0	0.000
Labour intensity effect	0.0	0.0	0.0	0.0	0.0	0.0	0.000
Career shift effect	0.0	0.0	-0.2	0.0	0.0	0.1	0.001
Residual	-0.1	-0.1	-0.2	-0.1	0.0	-0.6	-0.003

Table 8b: Factors behind the change in public pension expenditures between 2013 and 2060 (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	-0.1	0.0	0.4	-0.1	-0.3	-0.2	-0.003
Dependency ratio effect	1.6	1.1	2.3	1.4	0.6	6.9	0.141
Coverage ratio effect	-0.4	0.2	-0.8	-0.7	-0.6	-2.4	-0.052
Coverage ratio – old age	-0.1	0.3	-0.2	-0.2	-0.3	-0.4	-0.008
Coverage ratio – early age	0.1	-0.3	0.3	0.1	-0.5	-1.4	-0.010
Cohort effect	-1.2	0.3	-2.0	-2.0	-0.9	-5.7	-0.128
Benefit ratio effect	-1.0	-1.3	-0.9	-0.6	-0.2	-4.1	-0.089
Labour market / Labour intensity effect	-0.1	0.2	-0.1	0.0	-0.1	-0.1	-0.001
Employment ratio effect	-0.2	0.2	0.1	0.0	-0.1	0.0	0.000
Labour intensity effect	0.0	0.0	0.0	0.0	0.0	0.0	0.000
Career shift effect	0.0	0.0	-0.2	0.0	0.0	0.1	0.001
Residual	-0.1	-0.1	-0.2	-0.1	0.0	-0.6	-0.003

Replacement rate (RR)

The replacement rate at retirement represents the first pension as percentage of the last wage. The replacement rate level, within the public scheme, will steadily go down over the projection horizon, even after the stabilization of the point value indexation formula. As the pension formula will change, in order to reflect the shift from the first to the second tier, the average number of pension points is considered to decline over time. On the other hand, the additional pension benefits resulted from the participation in Pillars II and III, as well as the correction index applied when the quantum of the first pension is calculated, compensate the diminution resulted from the formula.

The following table extracted from the model shows the reformed PAYG pillar formulae. As one can see, both the basic replacement rate and the incremental replacement rate (which is the accrual rate) are different between switchers and non-switchers, with switchers having lower rates for both from the reformed PAYG. In the monopillar table, the incremental replacement rate (given by the wage growth, the full length of service and the pension correction index) multiplied by the minimum statutory length of service gives the basic replacement rate. In the multi-pillar table, shown here, the incremental replacement rate for the switchers diminishes proportionally to the ratio between the quota of contribution remained for the first pillar and the total quota of contribution (also including the contribution to 2nd pillar).

Benefit Formula Parameters for Old age

	Switchers						Non-Switchers					
	2014	2020	2030	2040	2050	2060	2014	2020	2030	2040	2050	2060
Men												
Required Years of Service for Basic Replacement Rate	15	15	15	15	15	15	15	15	15	15	15	15
Basic Replacement Rate	18.1%	17.7%	17.7%	17.8%	17.8%	17.9%	18.1%	17.7%	17.7%	17.7%	17.7%	17.7%
Incremental Replacement Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
Maximum Replacement Rate	300%	300%	300%	300%	300%	300%	300%	300%	300%	300%	300%	300%
Women												
Required Years of Service for Basic Replacement Rate	15	15	15	15	15	15	15	15	15	15	15	15
Basic Replacement Rate	21.1%	19.8%	17.7%	17.8%	17.8%	17.9%	21.1%	19.8%	17.7%	17.7%	17.7%	17.7%
Incremental Replacement Rate	1.2%	1.1%	1.0%	1.0%	1.0%	1.0%	1.4%	1.3%	1.2%	1.2%	1.2%	1.2%
Maximum Replacement Rate	300%	300%	300%	300%	300%	300%	300%	300%	300%	300%	300%	300%
Men												
Years in Final Average Wage	33	33	33	33	33	33	33	33	33	33	33	33
Wages are Valorized to Inflation												
Wages are Valorized to Nominal Wage Growth	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Women												
Years in Final Average Wage	28	29	31	31	31	31	28	29	31	31	31	31
Wages are Valorized to Inflation												
Wages are Valorized to Nominal Wage Growth	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

The shift takes into account that the switch implies the separation of the total contribution rate 26.3% (employers 15.8% plus employee 10.5%) into 20.3 % for the public pillar and 6% for the second pillar.

According to the point value indexation formula, the average wage growth will be taken into account less and less and, as from 2030 on, will not be considered at all. Thus, on the overall pensions, the average value will be outpaced by the economy-wide average wage. The ratio between these two indices is reflected by the benefit ratio (BR). The increase of the career's length, as result of the pension reform, will lead to the fall of the benefit ratio. Another element, which is relevant from the perspective of the wage, as development and dynamics, which are faster than the dynamics of pension benefits, is the distinctiveness of the Romanian labour market. Thus, the considerable weight of the lower-wage employees, from the primary sector, will be modified over time, by the pronounced shift toward the tertiary sector.

Table 9: Replacement rate at retirement and coverage by pension scheme (in %)

	2013	2020	2030	2040	2050	2060
Public scheme(RR)	35.6	36.6	35.9	34.4	34.1	33.7
Public scheme(BR)	37.0	34.0	28.6	25.6	23.7	23.4
Coverage	100.0	100.0	100.0	100.0	100.0	100.0
Public scheme– old-age earnings related (RR)	35.6	36.6	35.9	34.4	34.1	33.7
Public scheme– old-age earnings related (BR)	40.9	37.8	32.5	28.9	26.9	26.4
Coverage	76.6	76.7	73.2	75.0	76.0	75.8
Private individual scheme (RR)		1.0	2.4	3.7	4.4	4.7
Private individual scheme (BR)						
Coverage		1.4	17.3	45.7	65.8	75.9
Total (RR)	35.6	36.7	38.0	38.1	38.5	38.4
Total (BR)	37.0	34.0	29.0	26.9	25.8	25.8

The number of pensioners is expected to steadily augment, on the background of the pronounced ageing of the population. The peak value is expected to be reached in 2042 (6697.5 thou); afterwards it will begin to diminish, as the total volume of population will decrease (as from nearly 20 million in 2013 to 18.4 million in 2040 and 17.4 million in 2060). On the other hand, the employment will continuously go down, so that the ratio between these two will worsen, as from 0.7 currently, to 1.0 in 2050. Nevertheless, the ratio between the number of persons aged over 65 (in constant raise) and the working-age population (which will diminish by circa 30% in 2060, as compared to the base year) will deteriorate during the entire projection horizon.

Table 10: System Dependency Ratio and Old-age Dependency Ratio

	2013	2020	2030	2040	2050	2060
Number of pensioners (I)	5391.6	5787.6	6267.1	6688.3	6605.0	6199.9
Employment (II)	8406.0	8085.8	7416.8	6768.9	6260.8	5962.4
Pension System Dependency Ratio (SDR) (I)/(II)	64.1	71.6	84.5	98.8	105.5	104.0
Number of people aged 65+ (III)	3276.6	3715.9	3951.9	4624.2	4987.9	5033.3
Working age Population 15-64 (IV)	13587.9	12881.7	12102.8	11056.0	10235.6	9721.0
Old-age Dependency Ratio ODR (III/IV)	24.1	28.8	32.7	41.8	48.7	51.8
System efficiency SDR / ODR	2.7	2.5	2.6	2.4	2.2	2.0

As the labor force will decline sharply, more elderly people will choose to continue their career, moreover that the health condition at their age will improve as compared to nowadays. The better health and the higher life expectancy will also lead to the diminution of the number of disability and survivor pensioners. On the other hand, the estimated diminution of the total employment will dramatically contribute to the decline of the support ratio. The rate of the contributors within the total employment will increase over time, as the “grey” economy will be combated and gradually eliminated.

Table 11a: Pensioners (public schemes) to inactive population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	6.7	7.7	8.3	8.0	6.9	7.1
Age group 55-59	124.2	130.7	132.8	133.2	127.4	123.9
Age group 60-64	110.1	141.3	130.6	131.6	126.1	120.5
Age group 65-69	123.6	115.2	120.3	110.3	105.5	99.8
Age group 70-74	121.7	97.9	115.1	103.7	101.4	96.0
Age group 75+	94.1	104.0	98.8	105.5	101.2	97.6

Table 11b: Pensioners (public schemes) to population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	3.1	3.6	4.1	4.0	3.5	3.6
Age group 55-59	55.4	55.0	53.1	54.7	53.0	51.4
Age group 60-64	77.7	89.3	78.2	80.1	76.8	73.6
Age group 65-69	97.1	93.5	96.4	88.0	84.5	80.1
Age group 70-74	96.9	87.5	103.1	91.9	90.8	85.9
Age group 75+	94.1	104.0	98.8	105.5	101.2	97.6

Table 12a: Female pensioners (public schemes) to inactive population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	6.5	7.4	8.2	7.7	6.8	6.9
Age group 55-59	125.2	125.5	127.2	126.9	120.0	116.7
Age group 60-64	99.9	134.0	118.2	118.4	113.0	107.2
Age group 65-69	109.8	114.5	120.7	110.0	105.7	99.7
Age group 70-74	100.0	89.8	120.0	107.4	106.1	100.9
Age group 75+	94.4	98.5	98.5	113.1	111.8	108.3

Table 12b: Female pensioners (public schemes) to population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	3.4	3.9	4.5	4.3	3.8	3.9
Age group 55-59	70.6	67.3	64.9	66.0	63.4	61.6
Age group 60-64	77.4	98.6	83.6	84.3	80.9	76.9
Age group 65-69	87.3	96.1	101.9	92.9	89.6	84.8
Age group 70-74	81.0	80.1	109.8	98.3	97.7	93.0
Age group 75+	94.4	98.5	98.5	113.1	111.8	108.3

For the age groups -54 and 55-59, the ratios will not vary significantly over time. However, there are noticeable decreases for the age groups 60-64. This diminution is not related to the total inactive population, but strictly to the number and, hence, the weight of the pensioners within the population in this age group, consequence of the pension reform: the statutory retirement age increases, the eligibility for disability pension is supposed to stricter criteria and the early retirement is discouraged. On the other hand, as the socio-economic situation of the recent Romanian emigrants around the world will become more stable, it is conceivable that they will accommodate their retired parents to their new country of residence.

Noticeable, the pensioners' structure on age and gender has been more difficult for the categories of pensioners that we could project only outside the model: the special military/police/intelligence pensions, farmers, social pensions. For these groups, we don't have the age/gender structure. When the age structure of these categories has been approached, the projection assumptions have taken into consideration, on the one hand, the age structure of the old-age pensioners and, on the other hand, the very old age of the farmers and the young pensioners coming from the military (whose statutory retirement age is lower). Therefore, we also suggest the following replica of table 11b, taking into consideration only the categories projected inside the model:

Table 11b - bis: Old-age, disability and survivor pensioners (public schemes) to population ratio by age group (%)

	2013	2020	2030	2040	2050	2060
Age group -54	3.0	3.5	4.0	3.9	3.4	3.5
Age group 55-59	52.8	52.2	51.7	53.3	51.5	49.9
Age group 60-64	72.6	85.4	76.3	78.7	75.3	71.8
Age group 65-69	86.1	87.8	93.0	86.4	82.8	78.3
Age group 70-74	89.3	82.1	99.8	89.5	88.5	83.6
Age group 75+	65.6	86.0	94.5	104.0	100.1	96.6

With regard to the new pension decomposition, the table below illustrates the evolution of the new public pension expenditures in relation to the average number of new retirees, the point value and the number of pension points.

Table 13a: Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions) – Total

New pension	2013	2020	2030	2040	2050	2060
I. Projected new pension expenditure old age and early retirement (millions EUR)	205.6	340.4	507.3	791.0	962.9	1130.6
II. Number of new pensions ('000)	179.8	203.2	197.1	205.6	166.1	135.7
Average annual pension	2.3	3.4	5.1	7.7	11.6	16.7
III. Standard contributory period	31.4	33.2	35.0	35.0	35.0	35.0
IV. Point value (EUR)	172.5	224.3	290.6	354.2	431.8	526.4
V. Average pension points at retirement	34.7	33.0	33.7	32.7	32.4	32.0
VI. Average number of months paid the first year	6	6	6	6	6	6
VII. Correction index	1	1.25	1.54	1.94	2.42	2.88
VIII. II*IV*V*VI*VII/III	205.6	340.4	507.3	791.0	962.9	1130.6
IX. Average contributory period	30.6	32.4	33.1	33.3	34.0	34.3
X. Average pension points accrued per year (V/IX)	1.13	1.02	1.02	0.98	0.95	0.93
Monthly average pensionable earnings / Monthly economy-wide average wage	1.08	1.11	1.09	1.11	1.11	1.11

Table 13b: Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions) – Male

New pension	2013	2020	2030	2040	2050	2060
I. Projected new pension expenditure old age and early retirement (millions EUR)	107.1	182.9	287.1	425.2	524.1	610.0
II. Number of new pensions ('000)	87.1	108.8	105.7	105.2	86.0	69.7
Average annual pension	2.5	3.4	5.4	8.1	12.2	17.5
III. Standard contributory period	34.1	35.0	35.0	35.0	35.0	35.0
IV. Point value (EUR)	172.5	224.3	290.6	354.2	431.8	526.4
V. Average pension points at retirement	40.5	34.9	35.5	34.3	34.1	33.6
VI. Average number of months paid the first year	6	6	6	6	6	6
VII. Correction index	1	1.25	1.54	1.94	2.42	2.88
VIII. $II \cdot IV \cdot V \cdot VI \cdot VII / III$	107.1	182.9	287.1	425.2	524.1	610.0
IX. Average contributory period	32.6	34.0	34.6	34.7	35.4	35.8
X. Average pension points accrued per year (V/IX)	1.25	1.03	1.03	0.99	0.96	0.94
Monthly average pensionable earnings / Monthly economy-wide average wage	1.12	1.15	1.11	1.15	1.15	1.16

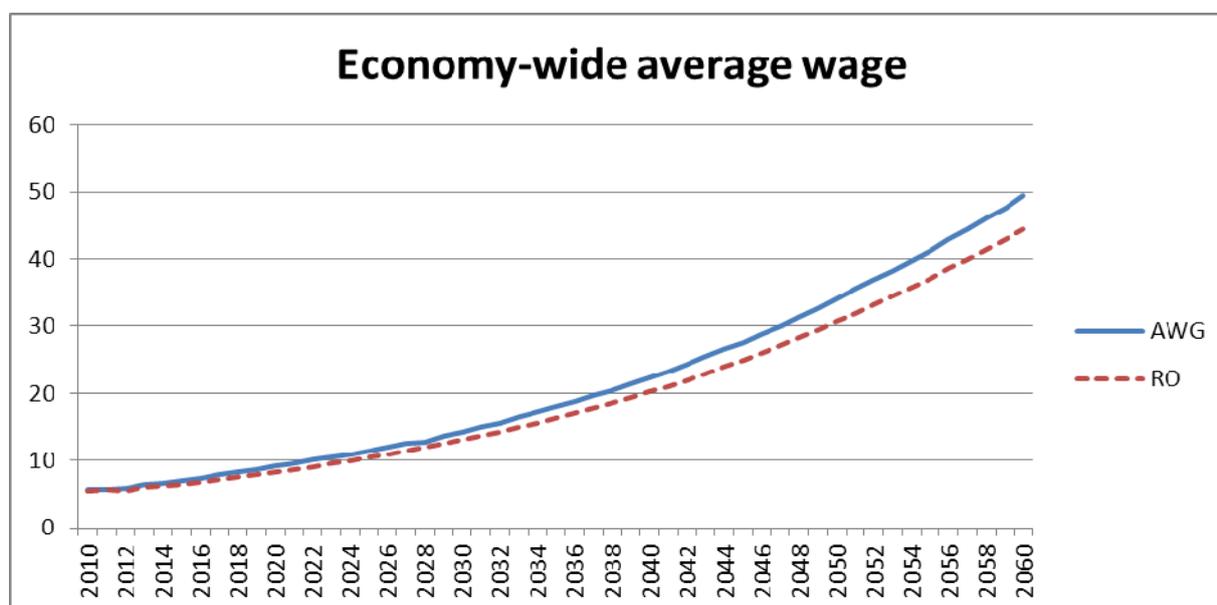
Table 13c: Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions) – Female

New pension	2013	2020	2030	2040	2050	2060
I. Projected new pension expenditure old age and early retirement (millions EUR)	98.6	157.5	220.2	365.9	438.8	520.6
II. Number of new pensions ('000)	92.8	94.4	91.4	100.4	80.1	66.1
Average annual pension	2.1	3.3	4.8	7.3	11.0	15.8
III. Standard contributory period	29.1	31.3	35.0	35.0	35.0	35.0
IV. Point value (EUR)	172.5	224.3	290.6	354.2	431.8	526.4
V. Average pension points at retirement	29.9	31.0	31.5	31.0	30.6	30.3
VI. Average number of months paid the first year	6	6	6	6	6	6
VII. Correction index	1	1.25	1.54	1.94	2.42	2.88
VIII. $II \cdot IV \cdot V \cdot VI \cdot VII / III$	98.6	157.5	220.2	365.9	438.8	520.6

IX. Average contributory period	29.0	30.6	31.4	32.0	32.5	32.8
X. Average pension points accrued per year (V/IX)	1.03	1.02	1.01	0.97	0.94	0.92
Monthly average pensionable earnings / Monthly economy-wide average wage	1.09	1.09	1.08	1.08	1.08	1.08

This table has been built using an alternative approach. The quantum of the pension benefits of an individual is thus calculated using a point-based formula, by multiplying the average annual number of points accrued by the insured, by the point value. For each career month, gross earnings are divided by the gross economy-wide average wage for that month. The annual number of points is obtained as the average of the 12 monthly numbers of points. The total number of points accrued in an individual's career is the sum of the annual numbers of points. The average annual number of points is the ratio of the total number of points accrued by the individual along his career versus the statutory contributory period corresponding to the individual's cohort. Hence, the effective contributory period of the person is not taken into consideration for the pension benefits calculation. The statutory contributory period is set by the Labour Ministry, according to the retirement age set for the cohort in case and to the evolution of the life expectancy.

Row VII shows the correction index which is applied every year, and only for the persons who retire during that specific year. This correction index represents a multiplying factor, for the average number of pension points of that generation, and is computed by dividing 43.3 of the economy-wide gross average wage from the previous year by the value of the pension point for that specific year. The retiree then continues with this new number of points throughout all the years afterwards. Noticeable, the economy-wide average series used differs from the one employed by the European Commission services. The series we used here follows the same trend, but the basic level is lower, as represented in the graph below.



(Values in thou. euros per year)

III.4 Financing of the pension system

Table 14: Revenue from contribution (million), number of contributors in the public scheme (in 1000), total employment (in 1000) and related ratios ()

	2010	2013	2020	2030	2040	2050	2060
Public contribution	7345.9	7979.6	12233.9	17855.4	25115.3	36489.6	52058.5
<i>Employer contribution</i>	4921.7	5346.3	7340.3	10713.2	15069.2	21893.8	31235.1
<i>Employee contribution</i>	2424.1	2633.3	4893.5	7142.2	10046.1	14595.9	20823.4
<i>State contribution</i>							
Number of contributors* (I)	5302.4	5947.8	6043.6	5790.0	5335.7	5104.1	5027.6
Employment (II)	:	8406.0	8085.8	7416.8	6768.9	6260.8	5962.4
Ratio of I/II	:	0.71	0.75	0.78	0.79	0.82	0.84

*Note: The number of contributors also includes the employees insured by the sectoral pension systems (military, police, intelligence)

The recently instituted legislative measure of decreasing the social contribution rate due by the employers, by 5 p.p. (i.e. as from 20.8 to 15.8 of the employee's gross wage, for normal working conditions) can be offset, within the total volume of contributions, by the enlargement of the contribution basis. The employment is estimated to follow a continuously decreasing trend, down to 71 of the current number of employees, at the end of the projection horizon. Nevertheless, the estimates related to the number of contributors are positive, as the grey and black areas of the economy will gradually disappear. Thus, the weight of the contributors among the employees will constantly improve.

The differences between the number of contributors and the volume of employees come from the different methodologies applied in calculation.

The employment is calculated according to the international labour office methodology, so it can also include day-workers or part-time workers. These categories are considerable in Romania, and they are not included as contributors. On the other hand, the indemnified unemployed are also contributors, so can be other categories not included in employment, as well.

The projected evolution takes into account the specific features of employment in Romania, respectively the significant weight of the self-employed. As compared to EU28's average weight of the self-employed among total employment, which is 16.5, this ratio for Romania reaches 32.2 (according to Eurostat - LFS). Out of these self-employed, almost half are farmers. This category contributes voluntarily to the pension system. Romania's long term development and the rural modernization, also including the consistent European aid, will reduce the percentage of these people compared to the wage earners. Consequently, the number of contributors from this category will increase, even on the background of the ageing of population.

Important, in Romania the above-mentioned trend is validated by the recent years' reality, when the ratio between contributors and employment has raised as from 57 in 2010 to approximatively 65 in present (considering the employment not revised according to the results of the population census in 2011).

The existence of a buffer fund, to smooth the financing gaps that occur due to the cyclicity of employment, is not expressly stipulated. However, at the budgetary revisions, the necessary amounts can be transferred from the State's Budget to the Social Insurance Budget. The extent to which the State has an obligation to cover any remaining financing gaps is related to people's right to benefit of social insurance. This right is guaranteed by the State, in accordance with the fundamental law.

III.5 Sensitivity analysis

The sensitivity analysis of the public pension expenditure, as a percentage of GDP, is undertaken through a series of alternative scenarios, based on specific deviations from the baseline scenario. The deviations in assumptions apply to only one parameter for each alternative scenario, while the other parameters considered remain unchanged.

Table 15: Total and public pension expenditures under different scenarios (deviation from baseline scenario)

	2013	2020	2030	2040	2050	2060
Public Pension Expenditure						
Baseline	8.4	8.3	8.2	8.6	8.5	8.2
Higher life expectancy (2 years)	0.0	0.0	0.1	0.2	0.3	0.4
Higher lab. productivity (+0.25 pp.)	0.0	0.0	-0.1	-0.2	-0.3	-0.3
Lower lab. productivity (-0.25 pp.)	0.0	0.0	0.1	0.2	0.3	0.3
Higher emp. rate (+2 p.p.)	0.0	-0.1	-0.2	-0.2	-0.2	-0.2
Higher emp. of older workers (+10 pp.)	0.0	-0.2	-0.4	-0.5	-0.4	-0.4
Lower migration (-20)	0.0	0.0	0.0	0.0	0.0	0.0
Policy scenario: linking retirement age to increase in life expectancy	0.0	-0.1	-0.2	-0.4	-0.5	-0.5
TFP Risks	0.0	0.0	0.1	0.2	0.4	0.5
Total Pension Expenditure						
Baseline	8.4	8.3	8.3	9.0	9.2	9.0
Higher life expectancy (2 years)	0.0	0.0	0.1	0.2	0.3	0.4
Higher lab. productivity (+0.25 pp.)	0.0	0.0	-0.1	-0.2	-0.3	-0.3
Lower lab. productivity (-0.25 pp.)	0.0	0.0	0.1	0.2	0.3	0.4
Higher emp. rate (+2 p.p.)	0.0	-0.1	-0.2	-0.2	-0.2	-0.2
Higher emp. of older workers (+10 pp.)	0.0	-0.2	-0.4	-0.5	-0.5	-0.4
Lower migration (-20)	0.0	0.0	0.0	0.0	0.0	0.1
Policy scenario: linking retirement age to increase in life expectancy	0.0	-0.1	-0.2	-0.4	-0.5	-0.5
TFP Risks	0.0	0.0	0.1	0.3	0.5	0.6

The higher employment rate results in higher GDP, so the ratio of the relatively equal pension expenditures within GDP diminishes. For the higher employment rate of old workers, the GDP grows even more and such growth is more significant than the increase of the pension expenditures.

For the higher labor productivity, there is a 0.3 percentage point decrease of the total pension expenditures, at the end of the projection horizon, compared to the baseline. The main reason for this decrease is due to the quick impact of productivity on the GDP and the delayed impact on the pension benefits; the latter are a reflection of the pensioner's earnings throughout his entire career. The same explanation, in the mirror, applies to the lower productivity.

The higher life expectancy determines a 0.4 p.p. deviation from the baseline scenario. The GDP would not increase significantly, but a longer life leads to more people receiving pension benefits and, thus, conducts to higher pension expenditures.

In the case of lower migration, the GDP decreases only marginally, so the pension expenditures slightly increase as percentage, although the afferent macro assumptions consider a small augmentation of the population aged over 65, as well as a reduction of the working-age population.

The alternative scenarios pertinent to the dynamic retirement age, permanently adjusted in accordance with the life expectancy evolution, would lead to significant gains, of 0.5 p.p., at the end of the projection horizon.

The risks associated with a worse development of TFP can lead to a 0.5 p.p. (for public pensions) and 0.6 p.p. (for total pension expenditures) deviation of the pension expenditures, as percentage of GDP. Consequently, the scenario based on the risks associated with a worse development of TFP produces the most significant deviations from the baseline.

III.6 Description of the changes in comparison with the 2006, 2009 and 2013 projections

Table 16: Overall change in public pension expenditure to GDP under the 2009, 2012 and 2015 projection exercises

	Public pensions to GDP	Dependency ratio	Coverage ratio	Employment effect	Benefit ratio	Labour intensity	Residual (incl. Interaction effect)
2009	9.24	13.61	-4.91	0.28	1.73		-1.46
2012	3.70	12.93	-4.69	0.36	-3.70	-0.01	-1.20
2012/2015*	0.39	10.60	-5.38	0.32	-4.11	-0.13	-0.90
2015	-0.15	6.89	-2.49	0.02	-3.96	0.01	-0.63

* using the 2015 model with the 2012 macroeconomic assumptions.

Tables 16 and 17 refer to the major differences between the results of the present projections and those from the previous exercises.

We included a separate line in table 16, with the results of the projections based on 2012 macro-assumptions, ran under the 2015 model. Consequently, the differences due to the modelling improvement are mirrored by the difference between the 2012 results and the projections obtained by using the same assumptions, ran under the current model features. The dependency ratio improves due to the better demographic assumptions. There is a big

difference in the labour intensity assumptions, between the 2012 and 2015 projection exercises.

Another change was also introduced in the 2015 exercise, regarding the "minimum income guarantee". In the 2012 exercise this category was included as a pensions expenditure, but it refers to active population that have an income per head of family member under a certain level (i.e. persons that receive minimum income guarantee are active on the labor market; when becoming pensioners, they will no longer get this type of payment, as they will start to receive pension benefits, possibly including a social pension), so in the 2015 exercise this category was removed from the pensions projections, following the Commission's recommendations. It is worth mentioning that the "minimum income guarantee" is funded from the state budget and not the social security budget, from which the public pensions are being paid.

Regarding the political changes occurred since the 2012 projection exercise, we must mention the 5 pp reduction of the employer's social insurance contribution rate, which entered into force on October 1st, 2014. We consider that the adjustment of the fiscal requirements will improve the employment, through the diminution of the black labour. This could have been reflected in the policy related change only on the income side.

As presented in Table 17, part of the significant changes in results is due to the considerable improvement of the modeling.

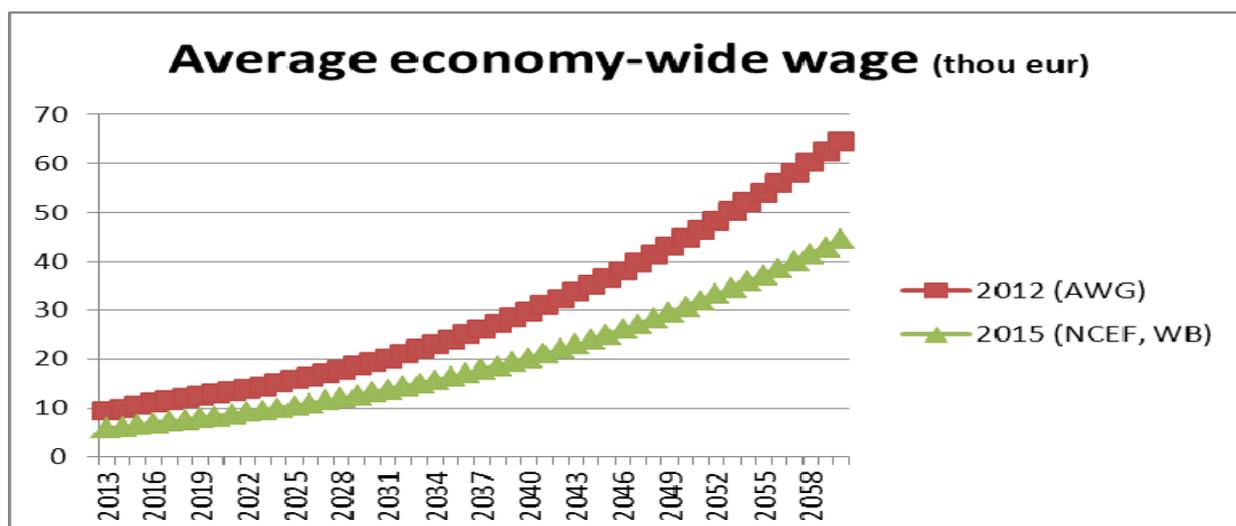
Table 17: Decomposition of the difference between 2012 and the new public pension projection (of GDP)

	2010	2013	2020	2030	2040	2050	2060
Ageing report 2012	9.8	9.3	9.2	10.3	11.6	12.8	13.5
<i>Change in assumptions</i>	-0.2	0.4	-0.1	-0.5	-0.7	-1.3	-1.8
<i>Improvement in the coverage or in the modeling</i>	-0.2	-1.3	-0.8	-1.6	-2.3	-3.0	-3.5
<i>Change in the interpretation of constant policy</i>							
<i>Policy related changes</i>			0.0	0.0	0.0	0.0	0.0
New projection	9.4	8.4	8.3	8.2	8.6	8.5	8.2

2012 was the first year when we were able to use a long-term projection model. At that specific moment, some components were not optimally correlated within the equations. Consequently, a mixture of the results obtained from the model with separate macro-assumptions became necessary. For example, the AWG macro-assumptions have been introduced in the model without the necessary initialization processing.

Furthermore, the development of the number of contributors has been projected distinctively, by taking into account the evolution of the self-employed, but also of the black labour and the grey economy. At this moment, this trend seems to be more moderate than anticipated in 2012.

As you can notice from the following graph, a major difference comes from the data series used for the projection of the economy-wide average wage. In 2012 we used AWG's projection, starting at 9368 euro in 2013 and ending at 64611 in 2060, while, in the present projections, when we used our national data, supported by the World Bank model, the series starts at 5951 euro and reaches 44429 euro at the end of the projection horizon. These differences are reflected both in the contribution basis and, through the correction index applied to the average number of pension points, in the quantum of the pension benefits.



Therefore, the results of the present projections constitute the fruits of a significant improvement of the quality, related to the way of using the model and to the input database.

Table 18 also illustrates the differences not only between the results of the 2012 and 2015 projections, but also including a projection based on the 2012 assumptions, run under the model used as in 2015.

Table 18: Projected Gross public pension expenditure (as of GDP)

	2010	2013	2020	2030	2040	2050	2060
2012 Report	9,8	9,3	9,2	10,3	11,6	12,8	13,5
2012 using 2015 model	9.6	8.0	8.3	8.6	9.2	9.7	9.9
2015 Report	9.4	8.4	8.3	8.2	8.6	8.5	8.2

As one can notice from this table, the difference is visible even for 2010 (when, theoretically, the figures should coincide). As a matter of fact, in the 2012 projections not only that we used a poor database, but we also had to keep the base year of the model as 2008, so the figures for 2010 may have been further distorted by processing, as we took them from the output of the projections model. Anyway, for the present round of projections the complete databases have become available, so all the statistics are correct.

Other main elements leading to the difference in the results:

- The demographic changes in the assumptions, with an important improvement estimated

- The aspect not taken into account in the last projections, that the shift of part of the contributions and, hence, of the pension benefits from the first to the second and third tiers should be mirrored in the pension benefits formula. For the time being, there is no methodology decided, as the moment when this translation of payments hasn't come yet (the private pension system started to collect contributions for only 7 years now). In our present projection, we considered that the adjustment applies to the average number of pension points accrued. This is why, in table 13a, this variable goes down, below 1, to 0.93 to the end of the projection period. Comparatively, in the previous exercise it continued to rise, up to 4.50.

- The new pensions correction index was also higher, due to the higher series of wages used: up to 4.02, as compared to 2.88 in the present exercise

- The model requests that the demographic and employment data should be processed through a dedicated Excel with Visual basic macros program, before being introduced in the input. As in 2012 we weren't aware of this aspect, serious distortions appeared consequently in the data.

- Not the least, there is an important difference between the GDP series included in the macro-assumptions, as from 619.1 billion euro in 2060 (2012 macro-assumptions) to 787.3 billion in the actual assumptions.

PART IV –DESCRIPTION OF THE MODEL AND THE DATABASE

IV. 1 Institutional context in which the projections are made

The projections are made strictly for the Ageing Report 2015.

IV.2. Assumptions and methodologies applied

The model applied relies on informed assumptions of future patterns including:

- Wage growth
- Real returns on pensions assets
- Economic growth
- Growth in coverage of a contributory pension scheme

One of the main assumptions of the model is that, once retired, the individuals continue to receive the pension benefits until the end of their life. At the same age, both the pensioners and the individuals still active have the same probability of dying.

IV.3. Data used to run the model

The main data for forecasting the expenditure for the pension system are:

Entry Indicators:

A. GENERAL:

1. Base year data
2. Wage and pension brackets and cumulative distributions
3. Demographic trends (sex ratio at birth, mortality rate multiplier for disabled, mortality rate multiplier for Old Age pensioners)
4. Macroeconomic trends (actual figures until 2013, EC projections afterwards)
 - a) real GDP growth
 - b) productivity growth of minimum wage workers
 - c) inflation rate
5. Interest rate
6. Benefit eligibility
7. of people willing, but not allowed for normal retirement, after reform
8. Replacement rate
9. Revenue sources
10. Costs and other expenditure
11. Indexation
 - a) pension indexation to inflation
 - b) pension indexation to normal wage growth
12. Benefit formula parameters for old age

B. POPULATION:

1. Population volume
2. Fertility rates
3. Mortality rates
4. Immigration

C. LABOR

1. Labor participation rate
2. Unemployment rate

3. Earning profile in terms of minimum wage
4. Pension profile in terms of minimum pension

D. PENSION

1. Pension system in base year and reform
2. Length of service at retirement
3. Contributors as of population
4. Old age – stock of population
5. Disabled as of population
6. Survivors as of population
7. Exemption rate

The model is data intensive in order to support the robustness of the results. The key required data are:

- Population fertility and mortality rates by age and gender.
- Labor force participation rates and unemployment rates by age and gender.
- Numbers of contributors and beneficiaries, their contribution and retirement patterns by age and gender.
- Wages and pensions by age and gender, income distribution for contributors and pensioners.

IV.4. Reforms incorporated in the model

The model can assess anything from ‘parametric’ reforms of initial pay-as-you-go systems changing pensionable ages, contribution rates, benefits, indexation etc.—to structural reforms, such as the introduction of individual, funded retirement savings accounts or notional accounts. PROST model can handle provident fund schemes as well as pay-as-you-go systems as the starting point, before reform. Recently, the reduction of the employer’s social contribution rate, from 20.8 to 15.8 of the employee’s gross wage, has been adopted and included in the model accordingly.

IV.5. General description of the model

The core model is the World Bank’s **pension reform options simulation toolkit (PROST)**. It comprises a set of instruments which can model pension contributions, entitlements, system revenues and system expenditures over a long timeframe into the future. The model is designed to promote evidence-based policy-making, bridging the gap between quantitative and qualitative analysis of pension regimes. Additionally, two models, one for the repartition on sex and age groups and the other for the second pillar, have been included.

The model utilizes country-specific data, provided by the European Commission, and generates population projections, that, combined with economic assumptions, are used to forecast future numbers of contributors and beneficiaries. In turn, this approach generates flows of revenues and expenditures. The model then projects fiscal balances, taking into account any partial pre-funding of liabilities. The model can use either a ‘stock’ or a ‘flow’ approach. In the stock concept, parameters such as retirement are expressed as total retirees as a percentage of population rather than as probabilities of retirement, since the stocks can be more stable predictors of the future.

There are three indices (dimensions) for each variable: a=age, t= time (year), g=gender.

Main equations:

Total population:

$$P(a, t, g) = [1 - m\%(a - 1, t - 1, g)]P(a - 1, t - 1, g) + im(a, t, g),$$

where $im(a, t, g)$ is the net migration, and $m(a, t, g)$ is the probability of dying.

The equation can be used for any age group, other than the new-born ($a > 0$). For the latter, the following formula applies:

$$NEWBORN(t) = \sum_a f\%(a, t - 1)P(a, t - 1, 2),$$

where $f(a, t)$ is the fertility rate.

The PROST model groups the total population in 3 age categories: youth (YP), working age (WP) and old (OP). If a_r represents the retirement age, then:

$$YP(t, g) = \sum_{a=0}^{14} P(a, t, g), \quad WP(t, g) = \sum_{a=15}^{a_r} P(a, t, g), \quad OP(t, g) = \sum_{a=a_r}^{a_{\max}} P(a, t, g)$$

Labor supply:

$$LF(a, t, g) = P(a, t, g) \cdot lfp\%(a, t, g),$$

where $lfp(a, t, g)$ is the labor supply's participation rate.

Employed:

$$EM(a, t, g) = LF(a, t, g) \cdot [1 - u\%(a, t, g)],$$

where $u(a, t, g)$ is the unemployment rate.

Number of existing pensioners:

$$EP(a, t, g) = P(a, t, g) \cdot rr\%(a, t, g),$$

where $rr(a, t, g)$ is the retirement (exit) rate.

Number of existing disabled:

$$ED(a, t, g) = P(a, t, g) \cdot ds\%(a, t, g),$$

where $ds(a, t, g)$ represents the disability occurrence rate

Number of effective contributors:

$$EC(a, t, g) = NC(a, t, g) \cdot [1 - ee\%(a, t, g)],$$

where $ee(a,t,g)$ represents the contributors' exemption rate, and $NC(a,t,g)$ is the number of nominal contributors.

Number of nominal contributors:

$$NC(a, t, g) = P(a, t, g) \cdot cr\%(a, t, g),$$

where $cr(a,t,g)$ is the contribution rate, calculated as percentage of the contributors of **a** and gender **g** within total persona of age **a** and gender **g**.

Pension fund revenues:

$$REV(t) = CON_COLL(t,3) + PEN_COLL(t) + TR(t) + O_REV(t) + INVEST(t),$$

Where $CON_COLL(t,3)$ represents the contributions from the income tax;
 $PEN_COLL(t)$ represents the contributions from pensions (e.g. pension tax);
 $TR(t)$ represents transfers from the state's budget;
 $O_REV(t)$ represents other revenues;
 $INVEST(t)$ represents investment revenues.

Pension funds expenditures:

$$EXP(t) = PAYM_T(3,t) + O_EXP(t) + ADMIN(t) + ASSET_M(t),$$

where $PAYM_T(3,t)$ represents expenditures incurred with the pension payments;
 $O_EXP(t)$ represents other expenditures;
 $ADMIN(t)$ represents administrative expenditures;
 $ASSET_M(t)$ represents the assets' administration cost.

Current balance:

$$BAL(t) = REV(t) - EXP(t)$$

Model output

The PROST program produces five output modules, presented as Microsoft Excel tables with graphic summaries. The modules are:

Population projections, including life tables, population pyramids, population dependency ratios etc.

Demographic structure: labor force and employment, numbers of contributors and beneficiaries, system dependency ratio.

Financial flows: projections of wages, benefits, revenues and expenditures of the pension system, pension scheme balance and the implicit pension debt. The financial flows module also calculates the adjustments—to benefit levels or contribution rates—that would ‘balance’ the system, i.e. bring revenues and expenditures into line.

Fundamental systemic reforms: this module illustrates the effect of a shift to a ‘multipillar’ regime, incorporating both a pay-as-you-go, defined-benefit pension and a funded, defined contribution scheme or exclusively one or the other. Again, it measures the impact both on the system finances and on individuals’ pension entitlements, including measurement of transition costs. The total pension benefit and the value of each of the pillars are provided separately.

IV.6. Additional features of the projection model

The model can accommodate a distribution of wages per cohort which allows users to determine the effects of changes in floors and ceilings of income, subject to contribution and the effects of changes in the minimum and maximum pension levels.

The model, which can be based either on population or on employment, also allows for different transition paths to a new system, including the age cohorts (generations) covered by the new system (such as applying reforms only to younger workers) and the treatment of pension rights accrued before the reform. Accrued rights can be paid in multiple ways, including as recognition bonds and as proportional wages. On-going funded defined contribution schemes and notional accounts can be modeled in PROST as well.

Additionally, the developments of the number of pensioners and pension expenditures, as it relates to the non-earnings related pensions, facultative private pensions and special (sectorial) pensions have also been modeled. Starting with 2005, the pensions for farmers are also paid from the State Budget.

All these categories do not pay contributions to the Social Insurance Budget. In order to estimate the expenditure for the farmer’s scheme we used a simple, linear model, based on data provided by the House of Pensions.

METHODOLOGICAL ANNEX

Economy-wide average wage at retirement

Table A1: Economy-wide average wage at retirement evolution (thousands euro)

	2010	2013	2020	2030	2040	2050	2060
Economy-wide average wage	5.42	5.95	8.26	13.14	20.21	30.69	44.43
Economy-wide average wage at retirement	5.64	6.42	9.16	14.34	22.35	34.04	49.41

Pensioners vs Pensions

Generally speaking, every pensioner gets a public pension. Some of the public pensioners become switchers; further, a segment of the public pensioners may also enlist in the private facultative pensions. Any beneficiary of a social pension receives it additionally to the calculated pension. This is why the figures afferent to the number of public earning related pensions can be found in the Questionnaire's chapter „Number of pensioners”.

Pension taxation

As of **2011** the pensioners with pension above 740 RON have to pay health insurance (5.5 applied to the difference between the pension quantum and the mentioned ceiling of 740). For the pensioners with pension benefits higher than 1000 RON, pension tax applies to the amount which exceeds this ceiling, after the deduction of the health insurance contribution. The calculation of the tax is as follows: the difference between pension gross benefit (only if greater than 1000 RON), minus the contribution for health insurance (5.5 applied to pension benefit), minus the threshold set up by law (1000 RON according to GPO 87/2000) is subject to personal income tax (by a tax rate of 16.). As the total volume of taxes collected raises to circa 5 of the total earnings-related public pension expenditures, the same percentage has been kept for the entire projection horizon.

Disability pension

The disability pensions are transformed into old age pensions, once the statutory retirement age is reached. The weight of disability pensioners among the total population of the same age and gender is assumed to increase by circa 25 until 2040 and remains constant afterwards. This increase is in accordance with the new legal dispositions, stating that the accumulated contributory period no longer represents an eligibility criterion for the disability pension.

Table A2: Disability rates by age groups ()

		2010	2013	2020	2030	2040	2050	2060
Age group 20-54	M	2.6	2.3	2.9	3.3	3.5	3.5	3.5
Age group 55-59	M	22.5	20.9	22.4	24.1	26.3	26.3	26.3
Age group 60-64	M	22.1	21.5	22.8	25.2	26.8	26.8	26.8
Age group 20-54	F	3.1	2.9	3.6	4.3	4.3	4.3	4.3
Age group 55-59	F	27.3	26.2	28.3	31.2	32.8	32.8	32.8

Survivor pensions

The assumption used is that the percentage of the number of survivors among total population, for each age and gender, is kept constant along the projection horizon.

Non-earnings related minimum pension

The level of this pension is set according to the evolution of the daily basket. The development of the non-earnings related minimum pension beneficiaries is impacted by two opposite trends: on the one hand, there is a diminution of this number, by mean of further integration in the employment; on the other hand, it seems that a slightly higher number of persons who work abroad for the most part of their career will also benefit of this social pension. In such cases, the number of pension points accumulated by them within the country of origin would entitle the beneficiaries to a quantum below the minimum pension.

Contributions

One of the consequences of the recent measure to decrease the employers' social contribution rate by 5 p.p. is expected to be the improvement of the collecting degree. This step would represent a short-run acceleration of the forecasted trend, to gradually eliminate the black and grey economies. As presented in the text corresponding to Table 14, the ratio between the number of contributors and the number of employed will increase, along time, as from 71 to 84.

Some methodological assumptions considered in respect of the pension categories projected separately from the model

Structure on ages of the pensioners, as percentage of total

Age bracket	54-	55-59	60-64	65-69	70-74	75+
Military	10	13	15	15	23	24
Farmers	0	3	8	9	10	70
Social Pension	6	8	12	14	28	32
Social Disability	3	8	17	17	22	33

The structure on gender is equal between men and women for social pensions and social disability pensions (as this is the ratio currently), while for the military we considered a constant 97 weight of men and for farmers only 10 men.

As for the pension expenditures of these categories projected outside the model, the assumption used is that the farmers' average pension will follow the same evolution as the old age average pension projected inside the model, the military pensioners' average pension converges toward the regular old age average pension projected in the model, while the social pensions are indexed every ten years (starting with 2021, as until then no change is anticipated), in accordance with the real wage growth along the decade.