Estonian country fiche on the pension system

November 2017

Part 1

1. Overview of the pension system

1.1. Description

Estonian pension system is based on a **three-pillar approach**, where the first pillar is the state pension fund and which is included to general government accounts. The second pillar is mandatory to newcomers to the labour market (and to all persons born 1983 and later), and the third pillar is a voluntary pension scheme. The second and third pillar pension funds are not included in general government accounts but the second pillar funds are included in the context of EPC AWG projection exercise because of it having a significant impact on future pensions.

A multi-pillar pension scheme rests on the assumption that income after retirement is to be formed from several different sources, each with its different legal, organisational and financial principles. Current legal principles of the state pension insurance are effective since 1999-2000. It was then established that the right and the amount of the future old age pension is tied to the amounts of social tax paid by or on behalf of the person over the full career. Mandatory funded pension scheme was launched in 2002. Possibilities for supplementary funded pension were created in 1998.

The first pillar of the Estonian pension scheme is a state pension insurance based on a pay-as-you-go financing and covers three social risks: old age, permanent incapacity for work (which is being phased out of the pension system, see chapter 1.2) and loss of a provider.

Protection ensured by state pension insurance includes two levels:
1) National pensions ensured for all residents of Estonia;
2) Old-age, incapacity-for-work and survivor's pensions based on former work input.

A right to national pension (**minimum pension**) on the basis of age starts from the age of 63, on the condition that the pension applicant has lived in Estonia for at least 5 years. Minimum pension is paid in the fixed rate, in the so-called national pension rate, which is 175.94 euros per month (from 1.04.2017).

In 2017, the retirement age for men and women is 63 years. The retirement age will continue to be increased for both sexes to 65 years by 2026.

The qualification period for old age pension is 15 years of pensionable service in Estonia.

Early retirement is possible 3 years before the official retirement age but the benefit received (pension) will be reduced by 0,4% per each month of early retirement. One can also postpone the retirement, after reaching the official retirement age, and is entitled to receive the 0,9% higher pension benefit per each month of postponement. If a person keeps on working during the retirement, he/she will receive the full pension in addition to wage.

Old age pension consists of three parts: base amount, length-of-service component and insurance component. The base amount is a flat-rate element. The length-of-service component applies to periods of pensionable service through the end of 1998 and depends on

the length of service (in years). The insurance component applies to pensionable service from 1999 and depends on social tax paid by the person (in case of self-employment) or on behalf of the person by the employer or by the state.

Since 1999, old age pension rights are acquired only on basis of social tax paid. Until 1999, pension rights were determined on the basis of the length of service. The pension formula includes a gradual transition from the old rules to the new rules. For persons who withdraw from work before 1999, the state pension depends only on the flat rate base amount and the length of service. For persons who entered the labour market in 1999 or later, the state pension also consists of two parts: base amount and insurance component. In essence, the three-part pension formula applies only to those generations who have acquired pensionable service both before and after 1999.

The pension formula used since 2000 can be described as follows:

$$P = B + V \cdot s + V \cdot \sum A$$

where:
P – amount of pension (in EEK);
B – base amount (in EEK);
s – pensionable length of service (up to 1999, in years)
$\sum A$ – sum of annual pension insurance coefficients;
V – cash value of one year of pensionable length of service and the pension insurance coefficient 1.0 (in EUR).

To calculate the annual pension insurance coefficient for a given individual, the amounts of state pension insurance part of social tax paid or calculated for the person in the specific calendar year are divided by the Estonian annual average amount of the pension insurance part of social tax. Hence, annual pension insurance coefficient reflects the ratio of social tax calculated on the earnings of the person to the Estonian average.

Real values of pensions are influenced by the values of the base amount (B) and the cash value of the annual score (V), which are subject to regular indexation (see below). From 01.04.2014, the base amount (*B*) is €134.91, which is ca 37% of the average old age pension and the cash value of annual score *(V)* is €4.96.

State pension insurance is financed mainly from the state pension insurance part of social tax. The rate of state pension insurance part of social tax is 16% for persons having joined the II pension pillar and 20% for those who have not joined. The expenses of national pensions and pension supplements are covered from other revenues of the state budget. If necessary, the state budget shall also cover any current deficit of the pension insurance budget, i.e. any difference between social tax revenues and expenditures on pensions.

Increasing of actual pension payments is performed through regular indexation. Pension index was changed in 2008 in order to guarantee the stable increase of pensions, to ensure the higher benefit rates to older generations and to diminish the need for one-off and ad hoc increases, which used to be policy for many government coalitions before.

The indexation system is based on social tax and inflation. Pension index is a sum of 80% of social tax increase and 20% of the annual increase in consumer price index. In addition, when

applying the index to the parts of the pension, different co-efficient are used – 0,9 for the cash value of annual score and 1,1 to base amount of pension, in order to further increase the solidarity in the system.

So the index is calculated as follows:

$$i_{YearN} = 0{,}8 \cdot (\frac{SocialTax_{Year(N-1)}}{SocialTax_{Tear(N-2)}} - 1) + 0{,}2 \cdot CPI_{Year(N-1)}$$

and is applied to pension formula in following way:

$$P = (1 + 1{,}1 \cdot i) \cdot B + V \cdot s + (1 + 0{,}9 \cdot i) \cdot (V \cdot \sum A)$$

According to Pension Insurance Act, the Government of Estonia has to analyse the impact of the increase in pensions to financial and social sustainability and suggest to the parliament the changes in indexation in every 5 years.

Besides the general state pension insurance, the Estonian pension system also includes some special schemes – old age pensions at favourable conditions and superannuated pensions, enabling representatives of specific professions or persons with specific social status to retire before the general retirement age. Also, some categories of civil servants (for example judges, prosecutors, officials of the State Audit Office, police officers, members of the Defence Forces, Chancellor of Justice) have a right to favourable special pensions. Amount of special pensions, although increasing, has remained limited (close to 0,1% of GDP). Government has been committed to reducing the special rights and for example the pension addition paid to the public sector workers based on the length of service was abolished from 2013.

The second pillar of the Estonian pension system is a mandatory funded pension based on full pre-financing and covering only the risk of old age. Private asset management companies administer the II pillar pension funds. In essence, the II pillar is an individual savings scheme, where the size of pension depends on the total contributions over the career and rate of return of the pension fund.

Participation in the II pillar is mandatory for persons born in 1983 or later. People born prior to 1983 and participating at the labour market can join the II pillar on a voluntary basis. The rate of the II pillar contribution is 6% of wages – the employee pays 2% from gross wages, which is supplemented by the state with 4% of gross wage on the account of social tax paid by the employer.

The retirement age in the II pillar is the same as in the I pillar. An additional requirement to receive a funded pension is the fulfilment of a qualification period of 5 years, which has to be passed from the date of commencing the payment of contributions. II pillar was launched in July 2002. Thus the payment of first benefits were done in 2009 (benefits on the basis of inheritance started from 2007). According to the law the main payment modality is a compulsory lifetime annuity. Insurers are allowed to offer only base (insurance) products for policy holders. Joint products are also allowed but they have to meet the requirements of the base product. A guaranteed period may be stipulated so that the beneficiary or beneficiaries

specified in a contract are entitled to payments made pursuant to the contract if the insured dies during the guaranteed period.

Table 1 – Qualifying condition for retiring

			2016	2020	2030	2040	2050	2060	2070
Qualifying condition for retiring with a full pension	Minimum requirements	Contributory period - men	15	15	15	15	15	15	15
		Retirement age - men	63	63y9m	65	65	65	65	65
		Contributory period - women	15	15	15	15	15	15	15
		Retirement age - women	63	63y9m	65	65	65	65	65
	Statutory retirement age - men		63	63y9m	65	65	65	65	65
	Statutory retirement age - women		63	63y9m	65	65	65	65	65
Qualifying condition for retirement WITHOUT a full pension	Early retirement age - men		60	60y9m	62	62	62	62	62
	Early retirement age - women		60	60y9m	62	62	62	62	62
	Penalty in case of earliest retirement age		14,40%	14,40%	14,40%	14,40%	14,40%	14,40%	14,40%
	Bonus in case of late retirement		10,80%	10,80%	10,80%	10,80%	10,80%	10,80%	10,80%
	Minimum contributory period - men		15	15	15	15	15	15	15
	Minimum contributory period - women		15	15	15	15	15	15	15
	Minimum residence period - men[1]		5	5	5	5	5	5	5
	Minimum residence period – women[2]		5	5	5	5	5	5	5

Source: Member state

Table 2 – Number of new pensioners by age group - administrative data (year 2015)

Age group	All	Old age	Disability	Survivor	Other (including minimum)
15 - 49	5 571	0	4 156	700	715
50 - 54	1 967	126	1 624	1	216
55 - 59	3 136	976	1 999	0	161
60 - 64	7 960	7 199	620	4	137
65 - 69	229	211	0	3	15
70 - 74	40	28	0	2	10
75+	60	26	0	0	34

Source: Commission services

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

The main change in the public pension system compared to the AR2015 system, is that the disability pensions are being moved out of the first pillar and the pension system altogether. The transition was legislated to take place in 2016-2021 and has been implemented as planned. The disability pension is being substituted with a benefit scheme in our Unemployment Insurance Fund. There are also changes to how the benefit recipient is determined and what must one do to keep getting the benefit. This has already began to

[1] This is to qualify for the „national pension“ which is a minimum pension.

decrease the number of people who are incapable of work and given a small boost to our employment and working age population ratio, which is at an all-time high. The new work ability benefit projection is modelled separately and added to the pension projection results where applicable (e.g tables 7, 8, 9, 17, 18, 19, A3, A4). This is to give a more comparable picture of the pension system costs to the previous Ageing Report projections and to other countries projections as all have the disability pensions in the pension system.

1.3. Description of the actual "constant policy" assumptions used in the projection

No deviations from the law in projections.

Part 2

2. Overview of the Demographic and labour forces projections

2.1. Demographic development

Estonian population is in decline due to various reasons since regaining independence at the beginning of the 1990s. This trend is expected to continue, although the latest EUROPOP projections have softened the decline considerably compared to the previous projections and compared to other Baltic states, which are facing similar demographic problems. The reason is that there have been considerable remigration in the recent years. Ageing of the population is more rapid in comparison with other European countries as the starting levels of life expectancy are currently relatively low but are expected to converge with EU average levels by 2070. Old age dependency ratio is set to increase rapidly, adding pressure to the public pension system.

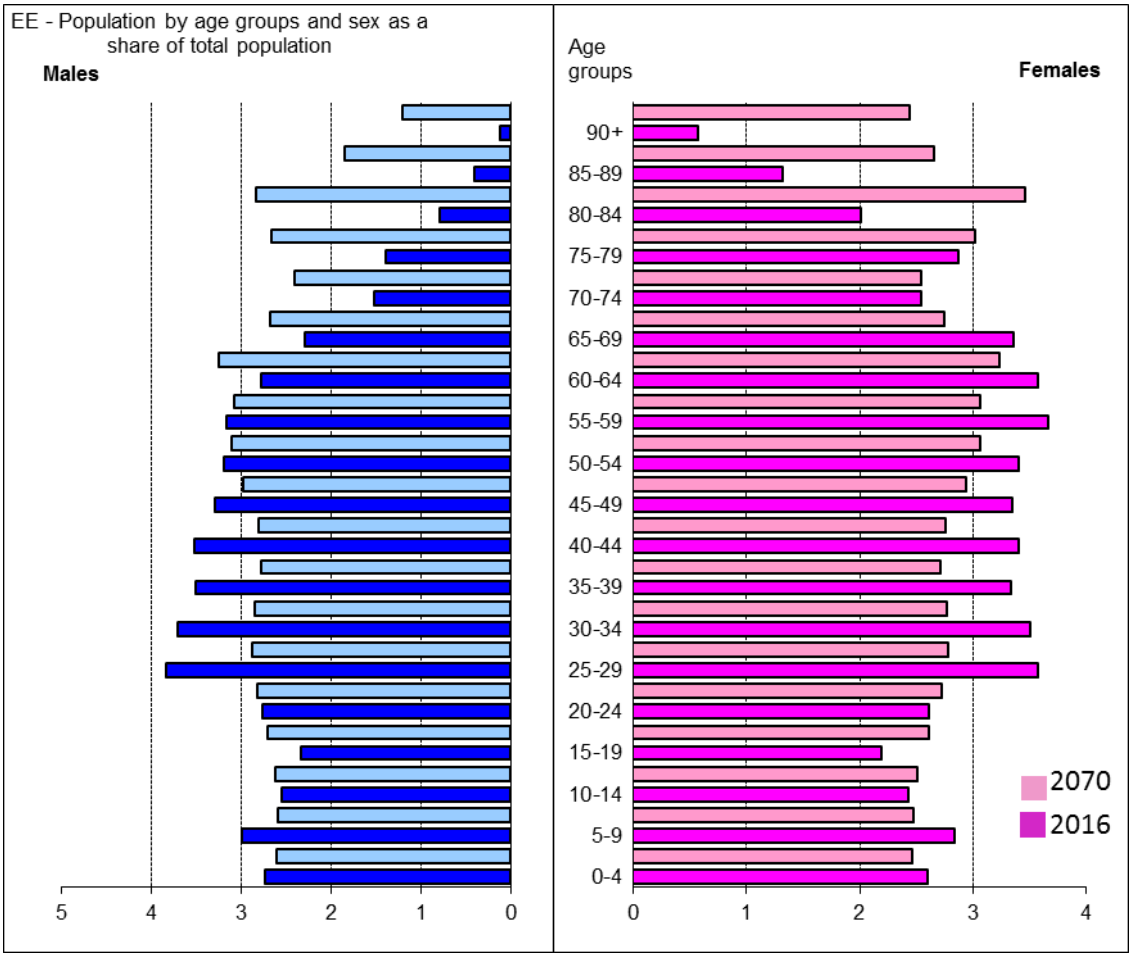
Table 3 – Main demographic variables evolution

	2016	2020	2030	2040	2050	2060	2070	Peak year*
Population (thousand)	1 315	1 318	1 305	1 283	1 255	1 219	1 176	2020
Population growth rate	0,1	0,0	-0,2	-0,2	-0,3	-0,3	-0,3	2016
Old-age dependency ratio (pop65/pop15-64)	29,7	32,2	37,8	42,6	49,2	55,7	52,7	2058
Ageing of the aged (pop80+/pop65+)	27,2	29,4	29,4	34,4	35,4	37,4	47,4	2070
Men - Life expectancy at birth	72,8	73,8	76,1	78,3	80,3	82,2	83,9	2070
Men - Life expectancy at 65	15,4	16,0	17,3	18,6	19,9	21,1	22,2	2070
Women - Life expectancy at birth	81,9	82,5	84,1	85,6	87,0	88,3	89,5	2070
Women - Life expectancy at 65	20,4	20,9	22,0	23,1	24,1	25,1	26,0	2069
Men - Survivor rate at 65+	74,7	76,5	80,6	84,0	86,9	89,2	91,2	2070
Men - Survivor rate at 80+	38,9	42,0	49,4	56,4	62,7	68,4	73,3	2070
Women - Survivor rate at 65+	90,2	90,9	92,3	93,5	94,6	95,4	96,1	2070
Women - Survivor rate at 80+	68,4	70,3	74,8	78,6	82,0	84,8	87,2	2070
Net migration	2,9	2,3	1,4	1,2	0,7	0,1	0,3	2016
Net migration over population change	2,6	6,6	-0,6	-0,5	-0,2	0,0	-0,1	2021

Source: EUROSTAT and Commission Services

*(Explanatory note: *This column represents a peak year, i.e. the year in which the particular variable reaches its maximum over the projection period 2016 to 2070.)*

Graph 1: Age pyramid comparison: 2016 vs 2070



2.2. Labour forces

Labour forces are projected by the Commission Services, on the bases of the expected demographic evolution described in the paragraph above.

Key variables that influence the evolution of pension expenditure are shown in Table 4 and Table 5.

Table 4 – Participation rate, employment rate and share of workers for the age groups 55-64 and 65-74

	2016	2020	2030	2040	2050	2060	2070	Peak year*
Labour force participation rate 55-64	71,2	70,6	73,1	71,2	69,8	71,4	71,0	2031
Employment rate for workers aged 55-64	65,8	64,6	66,3	65,0	64,0	65,3	65,0	2031
Share of workers aged 55-64 on the labour force 55-64	92,4	91,6	90,7	91,2	91,6	91,4	91,6	2016

Labour force participation rate 65-74	26,0	22,7	18,0	19,3	18,8	17,3	18,9	2016
Employment rate for workers aged 65-74	26,0	22,7	18,0	19,3	18,8	17,3	18,9	2016
Share of workers aged 65-74 on the labour force 65-74	100,0	100,0	100,0	100,0	100,0	100,0	100,0	2028
Median age of the labour force	42,0	42,0	43,0	44,0	42,0	42,0	42,0	2035

Source: Commission Services

*(Explanatory note: *This column represents a peak year, i.e. the year in which the particular variable reaches its maximum over the projection period 2016 to 2070.)*

Table 4 shows the expected development of those age groups (55 - 64 and 65 – 74) that are more influenced by the effects of pension reforms that shift retirement age (both early and statutory) or by active labour market policies that are targeted to prolong working life.

Table 5 – Labour market entry age, exit age and expected duration of life spent at retirement

MEN	**2017**	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**	**Peak year**
Average effective exit age (CSM) (II)	65,2	64,8	65,3	65,3	65,3	65,3	65,3	2030
Contributory period	37,5	37,3	36,8	39,1	36,8	37,9	33,4	2040
Duration of retirement	15,6	16,0	17,3	18,6	19,9	21,1	22,2	2070
Duration of retirement/contributory period	0,4	0,4	0,5	0,5	0,5	0,6	0,7	:
Percentage of adult life spent at retirement	24,9	25,5	26,8	28,2	29,6	30,8	31,9	2070
Early/late exit	0,6	0,9	0,7	0,7	0,6	0,5	0,5	2024
WOMEN	2017	2020	2030	2040	2050	2060	2070	Peak year
Average effective exit age (CSM) (II)	65,0	64,5	64,8	64,8	64,8	64,8	64,8	2017
Contributory period	39,5	38,6	34,1	28,8	25,6	26,3	23,0	2016
Duration of retirement	20,6	21,7	22,0	23,1	24,1	25,1	26,0	2069
Duration of retirement/contributory period	0,5	0,6	0,6	0,8	0,9	1,0	1,1	:
Percentage of adult life spent at retirement	30,5	31,8	32,0	33,1	34,0	34,9	35,7	2069
Early/late exit	0,7	0,5	0,6	0,6	0,6	0,5	0,5	2016

Source: Commission Services

*(Explanatory note: *This column represents a peak year, i.e. the year in which the particular variable reaches its maximum over the projection period 2016 to 2070. ** Duration of retirement is calculated as the difference between the life expectancy at average effective exit age and the average effective exit age itself. *** The percentage of adult life spent at retirement is calculated as the ratio between the duration of retirement and the life expectancy diminished by 18 years. **** Early/late exit, in the specific year, 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 5 summarises the estimated evolution of working career duration (contributory period) and life spent at retirement. It also provides evidence of the effectiveness of active labour market policies and penalties on early retirement on prolonging working career.

Contributory periods are not projected as the pension system is based on the insurance points accrued – thus the model focuses on that. Contributory period is affected by the increase in

length of service part of the pension by 2 years for every child raised until the age of 8 (can be used for one parent, usually a mother). Also the years spent raising the children up to the age of 3 are counted as the years of service together with, for example, years spent in deportation (during the occupation).

As the add-on on children is being phased out (replaced by the higher contributions by the state to the second pillar on every child raised), the initially high number of the insurance points for women is rapidly falling due to the move of contribution based system.

Fast increase of life expectancy (convergence with the best performers in EU) will result in larger share of life spent at retirement, thus adding the pressure on pension system. The fully funded scheme is implemented to reduce the pressure and in order to provide adequate income for the elderly.

Part 3

3. Pension projection results

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

Difference between ESSPROS and AWG numbers is negligible.

Table 6 - Eurostat (ESSPROS) vs. Ageing Working Group definition of pension expenditure (% GDP)

	2007	2008	2009	2010	2011	2012	2013	2014
1 Eurostat total pension expenditure	5,7	6,9	8,9	8,7	7,8	7,6	7,6	7,6
2 Eurostat public pension expenditure	5,7	6,9	8,9	8,7	7,8	7,6	7,6	7,6
3 Public pension expenditure (AWG)	5,6	6,9	8,8	8,7	7,8	7,6	7,8	7,8
4 Difference (2) - (3)	0,1	0,0	0,1	0,0	0,0	0,0	-0,2	-0,2

Source: EUROSTAT and Member State

3.2. Overview of projection results

Social security pension spending will fall mainly due to implementation of mandatory private II pillar and reforming the disability pension (see chapter 1.2.). Part of the social tax, together with pension rights, is switched to the funded private pension funds for the people who have joined the second pension pillar. Total pension expenditure (two pillars combined) is set to increase after 2026 due to increased coverage of II pillar and higher pensions received from there.

Taxes on pensions are not included in the model and neither in the projections. The reason behind this is the high level of tax-exempted income for the retired and the political commitment to keep the average pension tax free. However, there has been a change in pension taxation. Starting from 2018, the supplementary income tax allowance for pensions is abolished as the basic income tax allowance is being raised above the average pensions. The assumption is that the previous political commitment of keeping the average pension tax free is honoured in the future as well by raising the basic allowance in step with the wages and thus with pensions (pensions are mostly indexed to wages).

Table 7 - Projected gross and net pension spending and contributions (% of GDP)

Expenditure	2016	2020	2030	2040	2050	2060	2070	Peak year*
Gross public pension expenditure	8,1	7,8	7,2	7,1	7,1	6,9	6,4	2018
Private occupational pensions	:	:	:	:	:	:	:	:
Private individual pensions	0,0	0,1	0,3	0,7	1,3	1,8	1,8	2062
Mandatory private	0,0	0,1	0,3	0,7	1,3	1,8	1,8	2062
Non-mandatory private	:	:	:	:	:	:	:	:
Gross total pension expenditure	8,2	7,8	7,5	7,8	8,3	8,8	8,2	2016
Net public pension expenditure	:	:	:	:	:	:	:	:
Net total pension expenditure	:	:	:	:	:	:	:	:

Contributions	2016	2020	2030	2040	2050	2060	2070	Peak year*
Public pension contributions	5,7	5,5	5,2	5,1	5,0	5,0	5,0	2018
Total pension contributions	8,0	7,4	7,3	7,3	7,5	7,7	7,7	2016

* Includes work ability benefits that replace disability pensions starting in 2016

Source: Commission Services

*(Explanatory note: *This column represents a peak year, i.e. the year in which the particular variable reaches its maximum over the projection period 2010 to 2070.)*

The main driving force behind the ratio of public spending between 2016 and 2070 is the demographic one and the full implementation of II pillar together with its out-payments. As the first payments from the funded pillar started on 2009, the impact on the benefit ratio will magnify with time (resulting in more and more of the retired persons receiving pension from both I and II pillar). Disability pensions are being moved out of the public pension system but after the recipients reach statutory retirement age, they are back in the public pension scheme with relaxed minimum requirements. In tables 7 and 8 (and elsewhere as well), the new work ability benefits are added to the pension cost to give a more comparable picture of the pension system costs to the previous Ageing Report projections and to other countries projections as all have the disability pensions in the pension system.

Table 8 - Projected gross public pension spending by scheme (% of GDP)

Pension scheme	2016	2020	2030	2040	2050	2060	2070	Peak year *
Total public pensions*	8,1	7,8	7,2	7,1	7,1	6,9	6,4	2018
of which								
Old age and early pensions:	6,7	6,3	5,9	6,0	6,0	6,0	5,4	2016
Flat component	2,6	2,6	2,7	2,9	3,1	3,3	3,1	2057
Earnings related	4,0	3,7	3,3	3,1	2,9	2,7	2,4	2016
Minimum pensions (non-contributory) i.e. minimum income guarantee for people above 65	0,0	0,0	0,0	0,0	0,0	0,0	0,0	2016
Disability pensions	1,3	0,2	:	:	:	:	:	:
Survivor pensions	0,1	0,1	0,1	0,1	0,1	0,1	0,1	2026
Other pensions	0,1	0,1	0,0	0,0	0,0	0,0	0,0	2022
Work ability benefits	0,0	1,0	1,1	1,0	0,9	0,8	0,8	2022

* Includes work ability benefits that replace disability pensions starting in 2016

Source: Commission Services

(Explanatory note: Table 8 provides an example of how public expenditure could be decomposed. Countries should adapt this table with regards to their specific situation, i.e. farmer, self-employed, etc This column represents a peak year, i.e. the year in which the particular variable reaches its maximum over the projection period 2010 to 2070.)*

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

This part provides more details about the development of public pension expenditures (Table 9a and Table 9b). It uses a standard arithmetic decomposition of a ratio of pension expenditures to GDP into the dependency, coverage, benefit ratio, employment rate and labour intensity.

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

For the projection round 2015, two further sub-decompositions have been agreed. The coverage ratio is further split with the scope of investigating the take-up ratios for old-age pensions and early pensions:

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

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

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

The proposed decomposition is calculated using both data on pensions (Table 9a) and pensioners (Table 9b). The number of pensions and the average pension amount are important to understand the dynamics of pension expenditure. Projections on the number of pensioners have to be done coherently with the demographic and macroeconomic frameworks.

Table 9a - Factors behind the change in public pension expenditures between 2016 and 2070 (in percentage points of GDP) - pensions

	2016-20	2020-30	2030-40	2040-50	2050-60	2060-70	2016-70	Average annual change
Public pensions to GDP*	-0,4	-0,6	-0,1	0,0	-0,1	-0,6	-1,8	0,000
Dependency ratio effect	0,7	1,4	0,9	1,1	1,0	-0,4	4,6	8,3%

Coverage ratio effect	-1,9	-1,0	0,0	0,0	-0,1	0,1	-3,0	-5,8%
*Coverage ratio old-age**	0,0	-0,2	0,0	0,0	0,1	0,0	-0,2	-0,3%
*Coverage ratio early-age**	-4,5	-3,5	-0,3	1,3	0,1	-0,2	-7,1	-16,5%
*Cohort effect**	-0,6	-1,0	-0,1	-1,5	-1,3	0,9	-3,5	-6,9%
Benefit ratio effect	1,1	-1,0	-0,9	-1,0	-0,9	-0,4	-3,0	-5,7%
Labour Market/Labour intensity effect	0,0	0,1	0,0	0,0	-0,1	0,1	0,2	0,3%
Employment ratio effect	0,0	0,1	0,0	0,0	-0,1	0,1	0,1	0,2%
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0%
Career shift effect	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,1%
Residual	-0,3	-0,1	-0,1	-0,1	-0,1	0,0	-0,7	2,9%

* Includes work ability benefits that replace disability pensions starting in 2016

Source: Commission Services

Table 9b - Factors behind the change in public pension expenditures between 2016 and 2070 (in percentage points of GDP) - pensioners

	2016-20	2020-30	2030-40	2040-50	2050-60	2060-70	2016-70	Average annual change
Public pensions to GDP	-0,4	-0,6	-0,1	0,0	-0,1	-0,6	-1,8	0,000
Dependency ratio effect	0,7	1,4	0,9	1,1	1,0	-0,4	4,6	8,3%
Coverage ratio effect	-1,9	-1,0	0,0	0,0	-0,1	0,1	-3,0	-5,8%
*Coverage ratio old-age**	0,0	-0,2	0,0	0,0	0,1	0,0	-0,2	-0,3%
*Coverage ratio early-age**	-4,5	-3,5	-0,3	1,3	0,1	-0,2	-7,1	-16,5%
*Cohort effect**	-0,6	-1,0	-0,1	-1,5	-1,3	0,9	-3,5	-6,9%
Benefit ratio effect	1,1	-1,0	-0,9	-1,0	-0,9	-0,4	-3,0	-5,7%
Labour Market/Labour intensity effect	0,0	0,1	0,0	0,0	-0,1	0,1	0,2	0,3%
Employment ratio effect	0,0	0,1	0,0	0,0	-0,1	0,1	0,1	0,2%
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0%
Career shift effect	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,1%
Residual	-0,3	-0,1	-0,1	-0,1	-0,1	0,0	-0,7	2,9%

* Includes work ability benefits that replace disability pensions starting in 2016

Source: Commission Services

The main driving forces behind the ratio of public spending between 2016 and 2070 are demographics and the full implementation of II pillar together with its out-payments. As the first payments from the funded pillar started on 2009, the impact on the benefit ratio will magnify with time (resulting in more and more of the retired persons receiving pension from both I and II pillar). Disability pensions are being moved out of the public pension system but after the recipients reach statutory retirement age, they are back in the public pension scheme with relaxed minimum requirements. This affects the coverage ratio of early-age retirement.

Table 10 - Replacement rate at retirement (RR) and coverage by pension scheme (in %)

	2016	2020	2030	2040	2050	2060	2070
Public scheme (BR)	33%	35%	30%	27%	24%	21%	20%
Public scheme (RR)	:	:	:	:	:	:	:
Coverage	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Public scheme old-age earnings related (BR)	38%	36%	31%	28%	24%	22%	20%
Public scheme old-age earnings related (RR)	41%	43%	37%	33%	29%	27%	26%

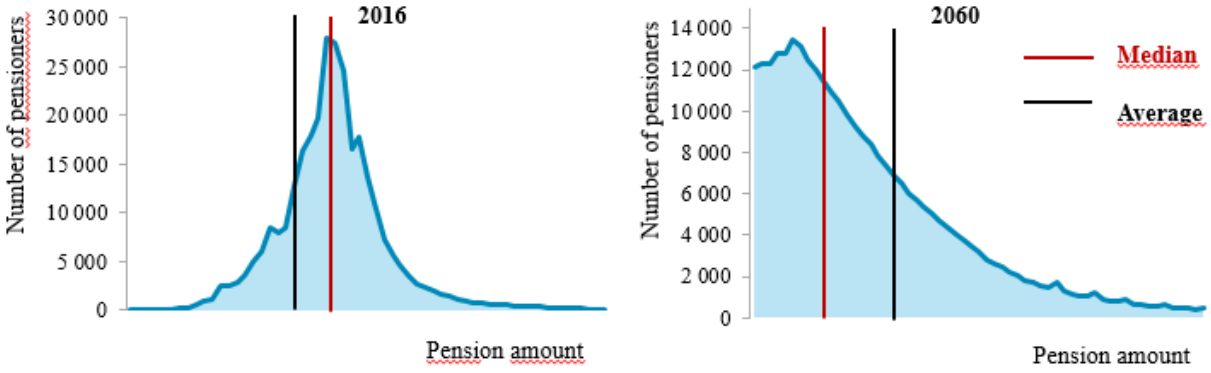
Coverage	72,6	89,1	94,4	95,0	95,7	96,2	95,9
Private occupational scheme (BR)	:	:	:	:	:	:	:
Private occupational scheme (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Private individual scheme (BR)	2%	2%	4%	5%	7%	7%	7%
Private individual scheme (RR)	4%	5%	8%	12%	14%	15%	15%
Coverage	6,4	13,1	38,6	58,9	74,8	86,1	88,5
Total (BR)	33%	35%	32%	30%	29%	28%	27%
Total (RR)	42%	45%	44%	43%	43%	42%	40%

Source: Commission Services

(Explanatory note: Coverage of each pension scheme is calculated as a ratio of the number of pensioners within the scheme and the total number of pensioners in the country. When data on pensioners are not available calculation based on number of pensions is allowed.)

Table 10 illustrates the switch of the part of pension spending from the first pillar to the second. Replacement rates from the pay-as-you-go scheme will fall and payments from the II pillar will increase. More and more people over time start to receive part of their pension benefit from the II pillar, thus reducing their benefits from the state pillar. The future adequacy of the pensions is projected to fall but remain above 40% which is satisfactory. A larger problem is the distribution of these pensions which is illustrated in graph 2. Stemming from this, there have been proposals to change the pension formula.

Graph 2. Pension distribution



The coverage of old age pension is very good today (near 100%) and there are expected to be no changes in future. The coverage of II pillar depends on how big was the switching activity to II pillar in voluntary age cohorts. In mandatory age cohorts the coverage should be almost the identical to the state pension). The number of old age pensioners will gradually increase mainly to do the increasing life expectancy.

Table 11 – System Dependency Ratio and Old-age Dependency Ratio

	2016	2020	2030	2040	2050	2060	2070
Number of pensioners (thousand) (I)	416,1	340,5	336,6	361,7	386,0	402,4	378,8
Employment (thousand) (II)	647,5	627,5	588,8	563,3	526,2	492,7	479,8
Pension System Dependency Ratio (SDR) (I)/(II)	64,3	54,3	57,2	64,2	73,4	81,7	79,0

Number of people aged 65+ (thousand) (III)	252,2	267,9	302,8	327,0	351,2	370,7	346,1
Working age population 15 - 64 (thousand) (IV)	850,6	833,2	801,7	767,3	713,3	665,4	657,2
Old-age Dependency Ratio (ODR) (III)/(IV)	29,7	32,2	37,8	42,6	49,2	55,7	52,7
System efficiency (SDR/ODR)	2,2	1,7	1,5	1,5	1,5	1,5	1,5

Source: Commission Services

The ratio of the number of social security pensioners and the number of people at the age of 65 and higher should remain more or less the same, since the number of pensioners will increase due to the increase in life expectancy and the number of employed (and not getting pensions) is also increasing (higher participation rates in older ages). The coverage of pensioners should also remain the same. The ratio of the number of social security contributors and the total employment should remain the same since all contributors are employed. The support ratio is decreasing substantially due to the reasons stated above.

Tables 12-13 show that the coverage is currently distorted by the disability pension scheme, where a large portion of people under the pensionable age receive pensions. As stated before, this is being reformed and the disability pension is being moved to the unemployment insurance scheme with qualification requirements more similar to that of unemployment insurance benefit receivers. The number of disability pensioners is currently very high with 23% of all pensioners receiving disability pensions in 2016 which explains the extreme coverage shifts in 2016-2030 and afterwards. With these people moved out, the more accurate picture of coverage emerges from 2030 onwards.

Table 12a – Pensioners (public schemes) to inactive population ratio by age group (%)

	2016	2020	2030	2040	2050	2060	2070
Age group -54	21,0	7,8	5,0	5,2	5,1	5,2	5,3
Age group 55-59	207,6	74,1	35,2	32,1	37,4	43,0	39,9
Age group 60-64	159,3	87,8	58,6	57,9	54,9	64,0	59,1
Age group 65-69	149,5	145,6	124,2	125,2	123,7	125,2	124,3
Age group 70-74	121,7	116,3	110,1	111,8	111,3	111,2	111,4
Age group 75+	100,9	100,9	100,7	100,6	100,6	100,5	100,5

Source: Commission Services

Table 12b – Pensioners (public schemes) to population ratio by age group (%)

	2016	2020	2030	2040	2050	2060	2070
Age group -54	8,3	3,2	2,1	2,1	2,2	2,2	2,3
Age group 55-59	36,4	13,3	6,8	6,9	8,0	8,9	8,4
Age group 60-64	65,3	36,1	20,6	21,3	20,5	23,6	21,7
Age group 65-69	101,1	101,1	90,9	90,6	90,2	92,0	90,2
Age group 70-74	101,0	100,8	100,7	100,7	100,6	100,5	100,8
Age group 75+	100,9	100,9	100,7	100,6	100,6	100,5	100,5

Source: Commission Services

Table 13a – Female pensioners (public schemes) to inactive population ratio by age group (%)

	2016	2020	2030	2040	2050	2060	2070
Age group -54	18,8	7,1	4,8	4,9	4,9	5,0	5,1
Age group 55-59	224,1	65,8	30,0	26,8	31,6	36,9	33,9
Age group 60-64	118,0	63,2	37,2	35,9	33,0	41,5	36,7
Age group 65-69	153,9	144,5	119,5	118,8	116,9	118,7	117,4
Age group 70-74	120,5	115,3	106,9	107,8	107,2	107,1	107,3
Age group 75+	100,7	100,7	100,6	100,5	100,5	100,5	100,5

Source: Commission Services

Table 13b – Female pensioners (public schemes) to population ratio by age group (%)

	2016	2020	2030	2040	2050	2060	2070
Age group -54	8,2	3,2	2,2	2,2	2,3	2,3	2,4
Age group 55-59	34,2	11,7	6,0	6,2	7,2	8,2	7,6
Age group 60-64	50,0	25,9	13,4	13,8	13,0	16,1	14,1
Age group 65-69	100,9	100,9	88,8	88,4	87,8	89,8	87,7
Age group 70-74	100,8	100,7	100,6	100,7	100,6	100,5	100,8
Age group 75+	100,7	100,7	100,6	100,5	100,5	100,5	100,5

Source: Commission Services

These changes might be better explained with some extra data (13c) from the projections concerning the number of pensioners and the disability portion of it. Because of this, the expenditure and many other parts of the projections will change. The expenditure to the state still remains, just not in the pension system. However, the application of the reform (including different qualification requirements) has had a positive beginning with more people moving out of inactivity than predicted, resulting in smaller expenditure projections than initially predicted and also comparing the new scheme to the old.

Table 13c – Number of pensioners and disability pensioners

	2016	2017	2018	2019	2020	2021
Number of pensioners	416,1	397,0	377,9	359,1	340,5	322,0
Of which disability	96,0	76,5	57,0	37,8	18,8	0,0

Table 14a reports information on I) new public pension expenditure, II) average contributory periods, III) average pensionable earnings, IV) average accrual rates and V) the number of new pensioners. To guarantee the consistency of the projections, the projected expenditure on new public pensions must not differ from the one obtained by multiplying components I to VI. This is the case here, the consistency check results the same exact aggregate expenditure on new pensions as the projection result.

Table 14a - Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions) - Total

	2016	2020	2030	2040	2050	2060	2070

I. Projected new pension expenditure (mln EUR) (II*III*IVa*V*VI) + (IVb*V*VI)	53,8	63,6	102,4	144,2	204,3	194,4	276,8
II. Average contributory period*	38,9	38,0	35,4	33,8	31,2	32,0	28,3
III. Monthly average pensionable earnings (`000 EUR)	1,0	1,2	1,9	2,8	4,2	6,0	8,6
IVa. Average accrual rates	0,5%	0,5%	0,5%	0,4%	0,4%	0,3%	0,3%
IVb. Flat component (`000 EUR)	0,15	0,2	0,3	0,4	0,5	0,7	1,0
V. Number of new pensioners (`000)	13,1	13,0	15,7	16,4	17,9	12,9	13,4
VI. Average number of months paid in the first year	11,2	11,3	11,3	11,4	11,4	11,2	12,0
Monthly average pensionable earnings/Monthly economy-wide average wage	0,87	0,88	0,88	0,88	0,88	0,88	0,88

* Contributory period is not actual working years, since the public scheme is being substituted with a private scheme

Source: Commission Services

The accrual rate is decreasing due to the fact that the pension insurance coefficient value is indexed with regular pension index, value of which is lower than the increase in wages. Low value stems from a fact that basic pension is not included in the calculation of accrual rates and that a share of pension rights in first pillar is decreasing due to the implementation of funded pillar.

The difference in terms of wages of men and women is over time transferred to pension system and will result in lower pensions for women. The average contributory period does not exactly represent the average working years of people because of the shift to a more contribution based scheme. What the average contributory period represents, is the average value of pension points collected over the career to claim public pension. But since there is a mandatory private funded scheme which, in part, replaces the public scheme, the points go down over time. It goes down more for women, because women tend to be away from the system longer (e.g child care) but more importantly, Estonia has a large gender wage gap which here results in a shorter contributory period (i.e less pension points) compared to men. Since the contributory periods do not represent actual working careers of future pensioners, the actual working careers are presented in table 14d below. We see that they are very much more in line with the CSM exit age projections (table 5) than the contributory periods presented here. We expect a small increase in working careers in 2030 compared to 2020 due to the increase in statutory pension age and that the career lengths will remain largely the same onwards since no more changes to the pension system has been put into law.

Table 14b - Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions) - Men

	2016	2020	2030	2040	2050	2060	2070
I. Projected new pension expenditure (mln EUR) (II*III*IVa*V*VI) + (IVb*V*VI)	32,2	28,5	52,5	82,1	118,7	111,1	160,9
II. Average contributory period*	38,0	37,3	36,8	39,1	36,8	37,9	33,4
III. Monthly average pensionable earnings (`000 EUR)	1,2	1,4	2,2	3,2	4,7	6,9	9,9
IVa. Average accrual rates	0,5%	0,5%	0,5%	0,4%	0,4%	0,3%	0,3%
IVb. Flat component (`000 EUR)	0,15	0,2	0,3	0,4	0,5	0,7	1,0
V. Number of new pensioners (`000)	7,3	5,5	7,3	8,0	8,9	6,3	6,8
VI. Average number of months paid in the first year	11,2	11,3	11,3	11,4	11,4	11,2	12,0
Monthly average pensionable earnings/Monthly economy-wide average wage	1,00	1,00	1,01	1,01	1,01	1,01	1,01

* Contributory period is not actual working years, since the public scheme is being substituted with a private scheme

Source: Commission Services

Table 14c - Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions) - Women

	2016	2020	2030	2040	2050	2060	2070
I. Projected new pension expenditure (mln EUR) (II*III*IVa*V*VI) + (IVb*V*VI)	21,8	33,9	49,4	63,1	87,6	85,0	118,7
II. Average contributory period*	40,0	38,6	34,1	28,8	25,6	26,3	23,0
III. Monthly average pensionable earnings (`000 EUR)	0,9	1,1	1,6	2,4	3,5	5,1	7,3
IVa. Average accrual rates	0,5%	0,5%	0,5%	0,4%	0,4%	0,3%	0,3%
IVb. Flat component (`000 EUR)	0,2	0,2	0,3	0,4	0,5	0,7	1,0
V. Number of new pensioners (`000)	5,8	7,6	8,4	8,4	9,0	6,6	6,6
VI. Average number of months paid in the first year	11,2	11,3	11,3	11,4	11,4	11,2	12,0
Monthly average pensionable earnings/Monthly economy-wide average wage	0,74	0,74	0,74	0,74	0,74	0,74	0,74

* Contributory period is not actual working years, since the public scheme is being substituted with a private scheme

Source: Commission Services

Table 14d – Actual working careers (in years)

	2016	2020	2030	2040	2050	2060	2070
Men	38,7	38,5	38,6	38,6	38,6	38,6	38,6
Women	38,8	38,8	39,0	39,0	39,0	39,0	39,0

Source: Member state

3.4. Financing of the pension system

There is no explicit rule for covering the difference of the pension contributions and payments but as government has an obligation to fulfil the pension commitments of the PAYG-scheme, implicitly, if there is a financing gap, it is covered by other revenue sources. Current projections place the financing gap at or below 1% of GDP.

Table 15 – Financing of the system

	Public employees	Private employees	Self-employed
Contribution base (million)	2 185	6 117	437
Contribution rate/contribution			
Employer	20% (if not participant to the 2nd pillar); 16% (if participant to the second pillar)	20% (if not participant to the 2nd pillar); 16% (if participant to the second pillar)	20% (if not participant to the 2nd pillar); 16% (if participant to the second pillar)
Employee	-	-	-
State	-	-	-
Other revenues	-	-	-
Maximum contribution	0	0	0
Minimum contribution	0	0	0

Source: Commission Services, Member state

Table 16 – Revenue from contribution (million), number of contributors in the public scheme (in 1000), total employment (in 1000) and related ratios (%)

	2016	2020	2030	2040	2050	2060	2070
Public contribution	1 189,3	1 436,3	1 992,1	2 745,8	3 740,2	5 075,0	7 023,0

Employer contribution	*1 139,0*	*1 375,6*	*1 907,9*	*2 629,7*	*3 582,1*	*4 860,4*	*6 726,1*
Employee contribution	*:*	*:*	*:*	*:*	*:*	*:*	*:*
State contribution	*50,3*	*60,7*	*84,2*	*116,1*	*158,1*	*214,5*	*296,9*
Other revenues	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*
Number of contributors (I)	647,5	627,5	588,8	563,3	526,2	492,7	479,8
Employment (II)	647,5	627,5	588,8	563,3	526,2	492,7	479,8
Ratio of (I)/(II)	1,0	1,0	1,0	1,0	1,0	1,0	1,0

Source: Commission Services

3.5. Sensitivity analysis

Higher life expectancy will increase the part of life spent in retirement, thus resulting in higher spending in both the public and private part of the pension system.

Higher/lower labour productivity will affect the payments from the II pillar more than those from the PAYG scheme, as the II pillar pensions are linked directly to contributions and PAYG pensions have also the flat rate component and the part related to number of years worked.

Higher/lower employment has almost no effect as it increases on the one hand the contributions but at the same time also the pension entitlements. *Higher employment rate of older workers* has almost no effect for the same reason.

Higher/lower migration has almost no effect. However, compared to the previous Ageing Report, there has been a shift of the main direction of Estonian migration. In the last round, the scenario with lower migration meant less outward migration (higher GDP, more population). In this round the same scenario means less remigration with opposite effects (lower GDP, less population). So comparison between the rounds yields opposite results.

Linking the retirement age to the increase in life expectancy results in considerable savings in pension system from 2030 and onwards, especially in 2050 and onwards. According to the existing rules, the retirement age is kept at the level of 65 from 2026 and onwards.

Table 17 - Public and total pension expenditures under different scenarios (deviation from the baseline)

	2016	2020	2030	2040	2050	2060	2070
Public Pension Expenditure							
Baseline*	8,1	7,8	7,2	7,1	7,1	6,9	6,4
Higher life expectancy (2 extra years)	0,0	0,0	0,1	0,2	0,3	0,3	0,4
Higher labour productivity (+0.25 pp.)	0,0	0,0	0,0	0,0	-0,1	-0,2	-0,2
Lower labour productivity (-0.25 pp.)	0,0	0,0	0,0	0,1	0,1	0,2	0,3
Higher emp. rate (+2 pp.)	0,0	0,0	-0,1	0,0	0,0	0,0	0,0
Lower emp. rate (-2 pp.)	0,0	0,0	0,1	0,0	0,0	0,0	0,0
Higher emp. of older workers (+10 pp.)	0,0	-0,1	-0,1	0,0	0,0	0,0	0,0
Higher migration (+20%)	0,0	0,0	0,0	0,0	0,0	0,0	0,1
Lower migration (-20%)	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1
Lower fertility	0,0	0,0	0,0	0,0	0,1	0,1	0,2
Risk scenario	0,0	0,0	0,1	0,1	0,2	0,2	0,2

Policy scenario: linking retirement age to increases in life expectancy	0,0	0,0	-0,2	-0,6	-1,0	-1,1	-1,0
Total Pension Expenditure							
Baseline*	8,2	7,8	7,5	7,8	8,3	8,8	8,2
Higher life expectancy (2 extra years)	0,0	0,0	0,1	0,2	0,3	0,4	0,5
Higher labour productivity (+0.25 pp.)	0,0	0,0	0,0	-0,1	-0,2	-0,4	-0,5
Lower labour productivity (-0.25 pp.)	0,0	0,0	0,0	0,1	0,3	0,5	0,6
Higher emp. rate (+2 pp.)	0,0	0,0	-0,1	-0,1	-0,1	-0,1	-0,1
Lower emp. rate (-2 pp.)	0,0	0,0	0,1	0,1	0,1	0,1	0,1
Higher emp. of older workers (+10 pp.)	0,0	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1
Higher migration (+20%)	0,0	0,0	0,0	0,0	0,0	0,0	0,1
Lower migration (-20%)	0,0	0,0	0,0	0,0	0,0	0,0	-0,1
Lower fertility	0,0	0,0	0,0	0,0	0,2	0,4	0,5
Risk scenario	0,0	0,0	0,1	0,2	0,3	0,4	0,4
Policy scenario: linking retirement age to increases in life expectancy	0,0	0,0	-0,2	-0,7	-1,3	-1,4	-1,2

* Includes work ability benefits that replace disability pensions starting in 2016

Source: Commission Services

3.6. Description of the changes in comparison with the 2006, 2009, 2012 and 2015 projections

Changes in comparison with previous AWG projections are somewhat noticable in terms of the outcome as a share of pensions to GDP since the disability pensioners are moving out of the pension system. The levels in terms of the starting points between 2015 and 2018 versions do not differ significantly.

Table 18 - Average annual change in public pension expenditure to GDP during the projection period under the 2006, 2009, 2012 and 2015 projection exercises

	Public pensions to GDP	Dependency ratio	Coverage ratio	Employment effect	Benefit ratio	Labour intensity	Residual (incl. Interaction effect)
2006 *	-2,96	3,15	-1,50	-0,57	-3,84	:	-0,20
2009 **	-0,70	4,62	-1,65	-0,19	-3,11	:	-0,37
2012 ***	-1,13	6,71	-2,74	-1,12	-3,33	-0,02	-0,63
2015****	-1,36	5,52	-2,04	-0,44	-3,90	-0,01	-0,49
2018*****	-1,77	4,65	-2,96	0,12	-2,97	0,02	-0,64

* 2004-2050; ** 2007-2060; *** 2010-2060; **** 2013-2060; *****2016-2070

***** Includes work ability benefits that replace disability pensions starting in 2016

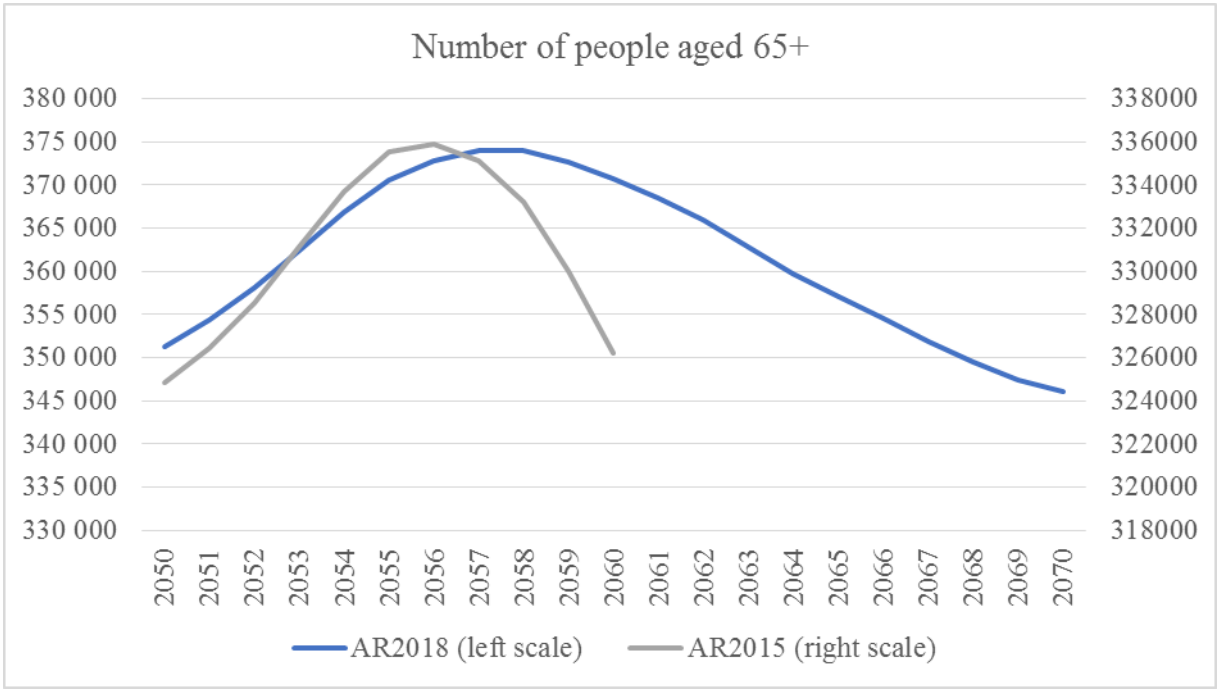
Source: Commission Services

*(Explanatory note: The Table presents the average annual change of pension expenditure and the contributions of the underlying component to that change, whereas Table shows, for different intervals of time, the decomposition, in percentage points, of the factors behind the change in public pension expenditures. * 2004 - 2050, ** 2007 - 2060, *** 2010 - 2060, **** 2013 – 2060. ***** 2016 - 2070. Please note that the four components do not add up because of a residual component.)*

Table 19 looks at the decomposition of the differences between the last two Ageing Report projections. Although the disability pension reform would have a policy change effect, in table 19 the new work ability reform costs are added to the pension projection. The remaining difference is assumed to be the change in macroeconomic assumptions, since the projection model is the same. The assumptions contribute to some increase in expenditure in 2040-2060. The most important contributing factor is the change in population outlook with the new assumptions having almost 14% more people over 65 compared to assumptions used for AR2015. Although the change in working age population is significant as well (11%), it increases the expenditure outlook. Old-age participation rates have also been estimated down. The old-age dependency ratio in 2060 is also a bit higher (55.7 in AR2018 vs 54.7 in AR2015).

However, most of the gap between estimates comes from the population dynamics. The decade between 2050 and 2060 is estimated to be a turning point in the number of people aged over 65 – growth stops and turns negative. In AR2015 it was assumed that the number of 65+ people will peak in 2056 and that in 2050 and 2060 the overall number is largely the same – meaning that the peak is rather sharp and symmetrical to that decade. So the pension cost growth rate will have a rather sharp slowdown in the latter half of the decade. In the AR2018 projections, something similar is estimated but the peak is estimated to come later, in 2058, and 2060 sees a much larger number of people over 65. The peak is also much smoother and wider. So the slowdown of cost happens later which is illustrated in the graph below. AR2018 sees a rather sharp slowdown of public pension costs in the next decade. In this sense, a more fitting comparison would be between 2070 and 2060, when this demographic shift has played out.

Graph 3: Population projection comparison AR2015 vs AR2018



Source: Commission Services

Table 19 - Decomposition of the difference between 2015 and the new public pension projection (% of GDP)

	2016	2020	2030	2040	2050	2060	2070
Ageing report 2015	7,8	7,8	7,2	7,0	6,8	6,4	:
Change in assumptions	0,3	0,0	0,0	0,1	0,3	0,5	:
Improvement in the coverage or in the modelling	:	:	:	:	:	:	:
Change in the interpretation of constant policy	:	:	:	:	:	:	:
Policy related changes	:	:	:	:	:	:	:
New projection*	8,1	7,8	7,2	7,1	7,1	6,9	6,4

* Includes work ability benefits that replace disability pensions starting in 2016

Source: Member State

Part 4

4. Description of the pension projection model and its base data

4.1. Institutional context in which those projections are made

The pension projections model is managed by the Insurance Policy Department of the Ministry of Finance of Estonia.

4.2. Assumptions and methodologies applied

The model contains basic macro-economic assumptions as inputs (on GDP, labour productivity and wage growth, future inflation etc). These assumptions have automatic links and also feedback in the model.

Future productivity increases and average unemployment rates (for men and women) are exogenous inputs (assumptions). These two assumptions allow seeing the impacts of less or more to GDP development. Future inflation rates (GDP deflator and CPI) are also exogenous. GDP growth rate for each year results from the change of employees and change of labour productivity.

Real GDP growth = (1+labour productivity growth)*(1+change of employees) – 1

Labour force by age and sex is calculated by multiplying population by labour force participation rates for single ages up to the age of 100. In projections it is possible to change the level and the structure of participation rates. Unemployment is calculated by using general trend of unemployment rates and change in unemployment age structure. Employed persons are the difference between the labour force and the unemployment.

In general the model calculates the number of insured who are actually contributing (for the I and II pillar) by applying compliance rates to the employed, by individual age and sex and also their actual wage, from which they pay taxes (this differs from national average wages). Numbers of pensioners for I and II pillar old age pensioners are calculated by applying retirement rate to the population. Difference between the number of pensioners of age x in

year t and the surviving pensioners of age x-1 of year t-1 is taken as the number of new pensioners. Other pensioners (disability, survivor) are calculated by initial data and change vector as follows:

Disability pensioners = population * disability structure base year * disability change

Average pension amounts for all ages for old age pensioners are calculated on the basis of actual pension formula:

$$P = B + V \cdot s + V \cdot \sum A,$$

See description above.

Base and V values are indexed, which results from macroeconomic and labour force projections. S value is real data and this has remained unchanged from 1999. The values are taken from wage statistics. Averages for all age cohorts are used.

To calculate mandatory funded pillar pensions, contribution rate is applied to the wage and these contributions will be accumulated with return rate. Finally it will be turned into annuities, using annuity return rate and unisex life expectancy.

Main assumptions used in the model for projecting II pillar pensions (in addition to the ones agreed by the AWG) are:

- keeping the current rate in terms of contributions (4%+2%);
- real interest rate of 2% on contributions;
- 3% nominal interest rate on annuity;
- profile of switchers to the II pillar.

4.3. Data used to run the model

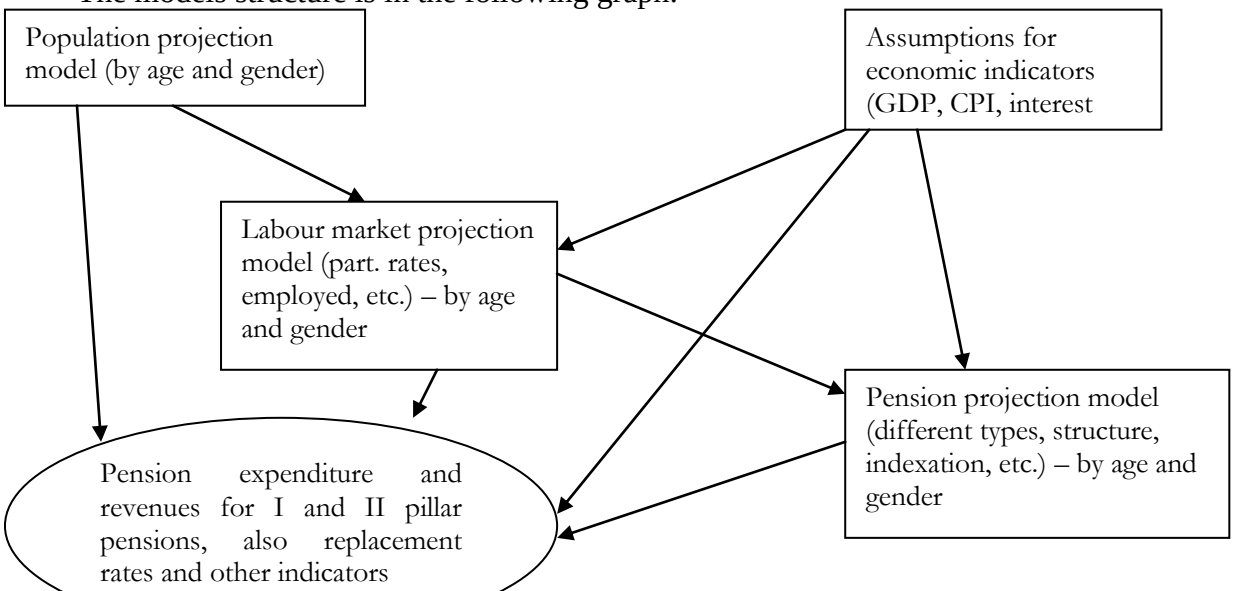
In addition to the macroeconomic assumptions, the model uses pension and pensioner data from the Social Insurance Board and the national Pension Centre (Pensionikeskus)

4.4. Reforms incorporated in the model

The model incorporates the disability pension reform.

4.5. General description of the model(s)

The models structure is in the following graph:



Methodological annex

Economy- wide average wage at retirement

Table A1 shows the economy wide gross wage at retirement and the economy-wide average wage. These are in line with the productivity assumptions since they are largely evolving together. We have no different productivity assumptions for different age groups. What we observe is that younger workers earn considerably more than older and this has remained largely unchanged over the past few decades. Although, everyone's wages still are rise.

Table A1 – Economy wide average wage at retirement evolution (in thousands euro)

	2016	2020	2030	2040	2050	2060	2070
Average yearly gross wage at retirement (current prices - `000 EUR)	9,2	11,0	16,9	25,2	37,2	54,0	76,9
Average yearly gross wage (current prices - `000 EUR)	14,1	17,0	26,0	38,4	56,7	82,4	117,8

Source: Commission Services

Pensioners vs Pensions

The pension projections are broadly in line with the commonly agreed labour force projections but are not precisely derived from them. For the baseline projections of the number of pensioners and working pensioners, a constant ratio is assumed (except for the sensitivity tests). In our model, the number of pensions are exactly equal to the number of pensioners times 12.

Pension taxation

Since there is a broad political commitment to keep the average pension tax free, the overall pension taxation is negligible and not accounted in our pension model at all.

Disability pension

As stated in the body text, the disability part of the pension system is being phased out and replaced with a different system which is not part of the pension system. The disability rate projections will not make much sense here.

Survivor pensions

The assumptions regarding the survivor pension projections are relatively straight-forward since the overall cost is quite small. A constant ratio of beneficiaries is assumed for each age group. No additional assumptions are made regarding household structure, different survival rates or reforms.

Non-earnings related minimum pension

In the nearer term, the take-up and expenditure will not grow considerably since most new pensioners have the minimum rights for a full pension met. However, in the longer term, the take-up will grow, with the expenditure, since more people will not be able to meet the minimum requirements for full pension. This will also skew the pension distribution towards the lower end.

Contribution

Implicit contribution rate is assumed to be constant over the projection horizon.

Alternative pension spending decomposition

TableA3 and Table A4 are equivalent to Table 8a and Table 8b. Tables contained in the body of the country fiche will continue to be calculated by dividing into sub-intervals so to have smaller residual effect (interaction effect). Reduction of the residual will not be allowed for in the tables contained in the annex to the country fiche.

Table A3 - Factors behind the change in public pension expenditures between 2016 and 2070 (in percentage points of GDP) - pensions

	2016-20	2020-30	2030-40	2040-50	2050-60	2060-70	2016-70
Public pensions to GDP*	-0,4	-0,6	-0,1	0,0	-0,1	-0,6	-1,8
Dependency ratio effect	0,7	1,7	1,3	1,8	2,0	-0,9	6,7
Coverage ratio effect	-1,9	-0,8	0,0	0,0	-0,1	0,0	-2,7
*Coverage ratio old-age**	0,0	-0,2	0,0	0,0	0,1	0,0	-0,2
*Coverage ratio early-age**	-4,5	-1,5	-0,1	0,4	0,0	-0,1	-5,8
*Cohort effect**	-0,6	-0,9	-0,1	-1,3	-1,0	0,6	-3,3
Benefit ratio effect	1,1	-1,1	-1,0	-0,9	-0,7	-0,3	-3,0
Labour Market/Labour intensity effect	0,0	0,1	0,0	0,0	-0,1	0,2	0,2
Employment ratio effect	0,0	0,1	0,1	0,0	-0,1	0,1	0,1
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Career shift effect	0,0	0,0	0,0	0,0	0,0	0,1	0,0
Residual	-0,3	-0,5	-0,4	-0,9	-1,2	0,4	-2,9

* Includes work ability benefits that replace disability pensions starting in 2016

Source: Commission Services

Table A4 - Factors behind the change in public pension expenditures between 2016 and 2070 (in percentage points of GDP) - pensioners

	2016-20	2020-30	2030-40	2040-50	2050-60	2060-70	2016-70
Public pensions to GDP*	-0,4	-0,6	-0,1	0,0	-0,1	-0,6	-1,8
Dependency ratio effect	0,7	1,7	1,3	1,8	2,0	-0,9	6,7
Coverage ratio effect	-1,9	-0,8	0,0	0,0	-0,1	0,0	-2,7
*Coverage ratio old-age**	0,0	-0,2	0,0	0,0	0,1	0,0	-0,2
*Coverage ratio early-age**	-4,5	-1,5	-0,1	0,4	0,0	-0,1	-5,8
*Cohort effect**	-0,6	-0,9	-0,1	-1,3	-1,0	0,6	-3,3
Benefit ratio effect	1,1	-1,1	-1,0	-0,9	-0,7	-0,3	-3,0
Labour Market/Labour intensity effect	0,0	0,1	0,0	0,0	-0,1	0,2	0,2
Employment ratio effect	0,0	0,1	0,1	0,0	-0,1	0,1	0,1
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Career shift effect	0,0	0,0	0,0	0,0	0,0	0,1	0,0

Residual	-0,3	-0,5	-0,4	-0,9	-1,2	0,4	-2,9

* Includes work ability benefits that replace disability pensions starting in 2016

Source: Commission Services