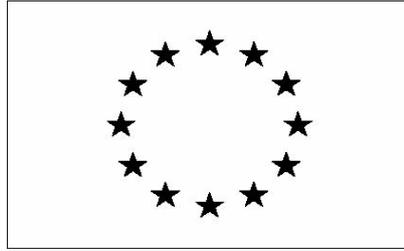




**Ministry of Social
Security and Labour**



Lithuanian country fiche on pension projections 2018

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Overview of the pension system

1.1. Description

Key Features of the Pension System

Since 2004, the Lithuanian pension system consists of three pillars: statutory mandatory PAYG (defined-benefit) pension scheme, statutory quasi-mandatory private funded (defined contributions) scheme and voluntary private funded pension scheme. A legal framework for occupational pensions was developed in 2006.

A social security scheme in Lithuania comprises of the social insurance scheme, state pension scheme, and social assistance pension scheme. The scheme of state pension benefits is functioning alongside with the social insurance pension scheme as it usually accompanies one of the main pensions (social insurance pension), whereas social assistance pensions are meant for the persons not eligible for social insurance pension.

The Social insurance pension scheme in Lithuania is universal; it covers all employed workers regardless of the type of their employer. It was reformed in 1995 by introducing the insurance principle, extending the requirement of the years of full coverage, abolishing early retirement provisions and increasing the retirement age. It includes old-age, disability and widows (-ers) /orphans social insurance pensions.

This pension scheme is financed out of contributions: 23.3% of gross wage is paid by the employer and 3% by the employee (data as of 2016). Self-employed people also have an obligation to insure themselves for the social insurance pension with the contribution rate of 26.3 %.

There are several population groups which contributions for the full pension calculated on minimum wage are covered by means of state budget, namely persons taking care of children under three years or of disabled persons, individuals having the status of an artist (as from the 1st of January, 2011).

Statutory retirement age in 2017 is 63.5 years for men and 62 years for women. The retirement age is being increased annually by 4 months for women and by 2 months for men until it reaches the age of 65 for both genders in 2026.

To address the dramatic aging and to control future spending a reform of social insurance pension system was legislated in 29.06.2016 (Law No XII-2512) and will gradually enter into force in 2018. The main components of this reform are the automatic indexing pensions to the overall wage sum, the increasing of transparency through a simplified pension formula (switch from DB to point system), the increasing of eligibility requirements for the “full” general pension component from currently 30 years to 35 years by 2027 and the gradually shifting the financing of the general pension component to the national budget (since July 2017) in order to lower employer contribution rates (the scope of the further decreasing this contribution will be regularly assessed during the annual government budgeting process).

Pension formula

The overall pension consists of the two parts: (i) a flat-rate basic pension (also called general part of pension), and (ii) earnings-related part of pension (also called individual part of pension).

Basic flat pension

The basic pension is a flat-rate contributory benefit. The full rate is earned with 30 years' contributions, with a proportionally reduced benefit available for people with shorter contribution histories. Since 2008 the basic part of pension has equaled 110% of the basic pension (basic pension is EUR 112 for 2016; from the 1st October 2017 basic pension is 130 EUR).

A long insurance record gives an additional 3% bonus for each full year exceeding 30 years of contributions.

Pension formula of the basic pension:

$$\mathbf{BP = 1.1 * B + 0.03 * e * B}$$

where:

- BP – the amount of the basic pension;
- B – the amount of the statutory basic pension on the month of the pension payment;
- 0.03 – accrual rate for insurance record exceeding 30 years;
- e – number of full years of insurance exceeding 30 years.

According to the new legislation as of June 2016 (starting since 2018) a change of calculation of basic pension (called general part of pension) will be implemented for all initial pensioners. The change will increase general part for pensioners with service years exceeding 30, but will not have any impact for others. A bonus for lengthy insurance pension now will be incorporated in the formula of general part of the pension. Under the new rules, every additional year of contributions will initially raise the general pension component by around $1/30 = 0.33\%$. This value will decline to $1/35 = 0.29\%$ by 2027:

$$\mathbf{\text{general part of pension} = \beta \times B}$$

- β – ratio of persons' insurance period to qualifying insurance period for full pension
- $B = 1.1 * \text{Basic pension amount}$

The requirement of insurance period for full pension will gradually rise from 30 in 2017 to reach 35 years by 2027 (in line with the legislated rise in the statutory retirement age).

Earnings-related pension

The earnings-related part of social insurance pension is calculated by formula:

$$\text{ERP} = 0.005 * S * K * \text{DP},$$

where:

- ERP – the amount of supplementary earning related pension
- 0.005 – accrual rate;
- S – years of insurance record;
- K – individual wage coefficient calculated as a weighted average of a ratio between person's monthly earnings and the average insurable income in the country for the best 25 years of insurance period (with ceiling five times the average insurable income);
- DP – the amount of the Average insurable income in the country on the month of the pension payment;

The earnings-related part offers 0.5% of individual average pay for each year of coverage. Earlier years' earnings are uprated in line with Average insurable income. There is a ceiling to pensionable pay: five times system Average insurable income (figure approved by

government). The Average insurable income used for calculation of the ceiling for 2016 was EUR 445 (EUR 476 in 2017). [This is less than monthly average wage (EUR 774)].

The new pension formula defines pension points as the ratio of a person's past social insurance contributions and the average contributions paid in the economy. This should lead to a slower and more transparent accrual of entitlements in the future. According to the new formula for calculation of the earnings-related (called individual) part would be:

$$\mathbf{ERP = V \times p}$$

where:

- ERP – individual part of pension;
- V – pension points, acquired throughout the whole working career
- p – pension point value.

Pension points V should be calculated as the ratio of a person's past social insurance contributions and the average contributions paid in the economy for the individual part of pension. If a person participates in the private funded pension scheme the amount of the pension points will be lower, as they will be calculated from the contributions lowered by the transfers to the private pension funds. The part of contribution rate allocated for the supplementary part of old age pension is approved by the Government every year and comprises 9.3 percentage points of total 26.3 percent in 2017.

The ceiling of maximum number of pension points during the year is set at 5. Nevertheless, Contribution ceiling was not introduced. This creates the incentives for high earners to participate in the quasi-mandatory private scheme. Pension points should be calculated by applying income history data solely from period after 1994 to service years from both periods - before and after 1994. The full amount of average pension point from period 1994 (without reduction for pension accumulation) is used for the purpose of application to service years before 1994. All years of career after 1994 will be included into the formula instead of best 25 as it was in the old Law.

Initial pension point value p for 2018 will be set as 0.005 multiplied by indexed insured income of 2017 and divided by 0.78, where 0.78 (a numerical value of 1/1.28 laid down in the law) is a correction coefficient which brings overestimated insured income coefficients to proportion of personal insured income with average wage in the country and is calculated as 1 divided by average insured income coefficient from period 1994-2015 (=1.28). For years before the reform (1994-2017) the sum of persons' insured income coefficients will be transformed into number of points multiplying them by the correction coefficient =0.78. Starting from the 2018 average wage earner will get 1 point a year.

The value of entitlements earned in the past remains unaffected. An individual part of pension benefits remains the same when the switchover occurs in 1 January, 2018. A product of service years and average insured income coefficient in the old formula will be considered as a number of points. This number will be multiplied by 0.78. But at the same time pension point value will be divided by 0.78. Thus individual part of pension amount will be kept unchanged.

Different story will be with the new pensioners who will retire since 2018. The unified correction coefficient 0.78 will be applied for the part of career before the reform year 2018

and fluctuation of yearly old coefficients with averaged coefficient 1.28 will give the differences in pension point amounts in pensions, which will be awarded after 2018.

The ratio will therefore be different for people that have retired at different points in time so a uniform correction factor cannot provide a full offset for everybody.

Pension indexation

There was no provision for the legislation on automatic pension adjustment, only discretionary increase of basic pension and insured income by the decision of the Government. The new rule couples pensions with the wage sum in the economy, i.e. the product of average wages and total employment in full-time equivalents. An indexation mechanism is being applied since January 1, 2017. In the new system the basic pension amount and the pension point value will be adjusted each year by the growth of the wage fund in the economy, averaged over the past three years, the current year, and the next three years as per projection. Pension growth is thus now directly linked to the sum of contributions paid, hence accounting for the projected workforce decline. The pension level will consequently rise more quickly than average wages in the short term but more slowly in the medium run.

Qualifying condition for retiring

In July 2004 an early retirement pension scheme was introduced for aged less than 5 years before the retirement age and have an obligatory 30 years of service (from 2018 the obligatory period of insurance for early-retirement pension is increased. The right to get an early retirement pension will have those, who comply with the requirement of the obligatory insurance period which will be valid by reaching the statutory retirement age) Under that scheme pensions are reduced by 0.4% for every full month remaining until the retirement age and the reduced pension is paid life-long. The early retirement pensioners are not allowed to have income from work or other type of pension benefits (social assistance or state pensions) but it is possible to take a lump sum or pension annuity from quasi-mandatory private funded pension scheme.

After reaching the retirement age, a person can continue to work and to receive the employment income along with the old-age pension. In case of deferred retirement the pension is increased by 0.67 % per month or 8% per annum.

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	30	31.5	35	35	35	35	35
		Retirement age - men	63.3	64	65	65	65	65	65
		Contributory period - women	30	31.5	35	35	35	35	35
		Retirement age - women	61.7	63	65	65	65	65	65
	Statutory retirement age - men	63.3	64	65	65	65	65	65	
	Statutory retirement age - women	61.7	63	65	65	65	65	65	
Qualifying condition for retirement WITHOUT a full pension	Early retirement age - men	58.3	59	60	60	60	60	60	
	Early retirement age - women	56.7	58	60	60	60	60	60	
	Penalty in case of earliest retirement age	24%	24%	24%	24%	24%	24%	24%	
	Bonus in case of late retirement	8%	8%	8%	8%	8%	8%	8%	
	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	-	-	-	-	-	-	-	
	Minimum residence period - women	-	-	-	-	-	-	-	

Source: Member State

Table 2a – Number of new pensioners by age group - administrative data (MEN)

Age group	All	Old age	Disability	Survivor	Other (including minimum)
15 - 49	3.872	0	3.321	551	0
50 - 54	1.607	0	1.574	33	0
55 - 59	2.327	457	1.813	57	0
60 - 64	8.728	7.389	832	507	0
65 - 69	426	125	0	301	0
70 - 74	487	46	0	441	0

Table 2b – Number of new pensioners by age group - administrative data (WOMEN)

Age group	All	Old age	Disability	Survivor	Other (including minimum)
15 - 49	3.360	0	2.757	603	0
50 - 54	1.546	0	1.452	94	0
55 - 59	2.099	503	1.414	182	0
60 - 64	10.777	8.325	85	2.367	0
65 - 69	1.356	104	0	1.252	0
70 - 74	1.680	29	0	1.651	0

Table 2c – Number of new pensioners by age group - administrative data (TOTAL)

Age group	All	Old age	Disability	Survivor	Other (including minimum)
15 - 49	7.232	0	6.078	1.154	0
50 - 54	3.153	0	3.026	127	0
55 - 59	4.426	960	3.227	239	0
60 - 64	19.505	15.714	917	2.874	0
65 - 69	1.782	229	0	1.553	0
70 - 74	2.167	75	0	2.092	0

In 2005 a disability reform was implemented, considerably changing the disability recognition procedure. Disability since then is linked to capacity to work rather than merely to a health condition. The level of capacity for work is established (three-tiered, since 2018 twelve-tiered) in respect of individuals of working age only. Pension formula is the same as old-age, but amount calculated will be multiplied by the coefficient ranging from 0.5 to 1.5 according to the level of capacity for work. Since 2009, a person who received the *disability pension* and reached the retirement age has a right to choose whether to continue receiving the disability pension or to convert to the old-age pension. From 2018 the bigger pension – either the old-age pension or the old-age pension for disabled will be paid.

Family members of a deceased insured person are entitled to the *survivors pensions*. The widow's pensions were reformed in 2007. Only widows (-ers) of retirement age or disabled are eligible for widow's pensions; the pensions are flat (EUR 21) and are paid as a supplement to the main old age or disability pension. Orphan's benefits are linked to the pension amount of the deceased (50% of the latter's pension). Widow's pensions will be indexed by the same index as old age pensions since 2018.

There is no minimum social insurance pension guaranteed by the Law. The minimum guarantee is provided by social assistance pensions financed from general taxation.

No income tax is levied on pension benefits paid from the statutory schemes.

The quasi-mandatory private funded pension scheme was introduced on the 1st of January 2004. The second tier of the statutory pension system is voluntary: people are free to choose whether to join it or not. Opting out from the scheme once joined is not allowed. The right to cancel the participation within 30 days of signing the agreement is given only to the newcomers to the system. There are no other limitations to participate except that for being insured with the social insurance pension system and aged below the legal retirement age.

The number of participants in quasi-mandatory private funded pension scheme grew largely due to the involvement of younger population (the share of participants in labour force is 79 %). Around 64% of the working-age population (86% of the workforce) had an account in the statutory private funded pension in late-2016, though only about two-thirds of these people were paying contributions.

The scheme is a DC scheme financed by a fraction of the social insurance contribution (increased from 2.5% to 5.5% of gross wage in 2004-2007 and reduced to 3% from January, 2009 and further to 2% from July, 2009 due to budget constrains). The pre-crisis rules have not been restored during the recovery.

At the end of 2012, the Parliament adopted changes in the funded pension scheme. From 2014 the contributions to the Pension Funds comprise of three sources: 2 percentage points of obligatory social insurance pension contribution (3.5 p.p. since 2020), 1 percent paid by the member (2 per cent since 2016) and 1 percent of the country’s average wage additionally paid by the State (2 per cent since 2016) (so-called “3.5+2+2” formula).

Contributions:			
Year	Fraction of social insurance pension contribution	Additional contribution paid by member	Contribution paid by the state (percentage of average wage in the country)
2014	2%	1%	1%
2016	2%	2%	2%
2020	3,5%	2%	2%

The contributions from the state budget is also be transferred for parents raising children of age under three years and receiving maternity (paternity) social insurance benefit or covered by state social pension insurance by state means. Contributions equal 2 per cent of the country’s average monthly gross wage of the year before last. If these parents raise more than one child under 3 years of age, a fixed payment to the parent account is credited for each child.

The members already participating in the pension accumulation in 2013 were given an option to choose further form of accumulation: to transfer additional contributions to the pension fund, to keep accumulating only part of their social insurance contributions or to terminate pension accumulation. 409 thousands of persons (36.7% of all participants of the scheme) have chosen to transfer the additional contributions, 684 thousands (61.2 % of all participants of the scheme) have chosen to accumulate only part of their social insurance contributions and 24 thousands (2.1 % of all participants of the scheme) have chosen to terminate pension accumulation in the private pension funds (data of December 2013). In the last case the accumulated sum is left in the pension fund till the person acquires the right for the benefit from pension fund. All new participants will join the scheme with additional contributions. In

2017 already more than half of participants pay additional contributions on top of the transferred social security pension contributions.

Pension funds management fees were reduced by amendments. As from 2013 the fee from accumulated assets, which is paid by member, is up to 0.65 percent of a member's average annual assets held in conservative pension fund and up to 1 percent of assets held in other pension funds. The fee from contribution is up to 2 percent and each year is being reduced by 0.5 percentage points till it reaches 0 percent:

Maximum contribution fee is being gradually decreasing since 2013:

2013 – 2%

2014 – 1.5%

2015 – 1%

2016 – 0.5%

Since 2017 – no contribution fee applied.

Joining the funded defined contribution system reduces the part of contributions going to the social insurance budget. The social insurance pension benefit formula reflects this part of “lacking” contributions by coefficient which is calculated yearly and applied to the earnings-related part of the social insurance pension in DB system or by less pension points accumulated a year in the point system. The earnings related part of pension is not reduced due to additional person's contributions or the contributions from the state budget. The system creates the incentive to participate by giving a supplementary pension from private pension funds that is on average higher than the decrease of the public earnings related pension part. According to the assumptions used in the baseline scenario the public old age pension replacement ratio of participant in the private second pillar in the end of the projection is lower by 3 p.p., but the overall replacement ratio from both channels -public and private - is by 15 p.p. higher comparing to the replacement ratio of nonparticipant.

At the retirement, a participant has an obligation to purchase a pension annuity from Life Insurance Company. Only in case of very small annuities (half the amount of the basic pension) or for sums exceeding the annuity of three times the basic pension, one can choose to receive pension benefit in lump sum or as phased withdrawals from the pension fund. Unisex life tables are used for annuity calculation since December 2012.

From 2013 it is possible to receive benefit (annuity) from the pension fund not earlier than 5 years before the retirement and when the early old age state social insurance pension is awarded.

The transfer of a part of social insurance contributions into quasi-mandatory private pension funds in 2004–2007 was partially (by 50%) funded by state allocations (from the means of the Reserve (Stabilisation) Fund). During the economic crisis and later in 2009-2013, the transfers were fully funded by the State budget allocations. Since 2014 these transfers are not compensated by State budget any more.

There are no government guarantees on the return of the quasi-mandatory private funded pension scheme.

The voluntary private funded pension scheme started operating in 2004. Income and corporate tax allowances are applied to contributions made by an insured person or by his employer if they do not exceed 25% of the person's annual earnings. The participation in the system remains very low comprising for merely 3.3 % of the labour force and savings are generally small. Legal regulation of voluntary private pension accumulation allows

terminating the accumulation agreement and withdrawal of the funds at any time. However, withdrawal of the funds is not taxed with the personal income tax only if duration of accumulation was longer than 5 years and there were less than 5 years left until the retirement age or the person was disabled. Acquisition of annuity is not mandatory, thus, such participants can be called participants in “pension” accumulation with some reservations.

The state pension system functions independently from the social insurance pension system. The so-called state pensions system evolved after 1995 pension reform, when it was aimed to clear up pension system from the privileges such as double counting of the pensionable record for victims of occupation and war or early retirement for mothers of large families and others. All these special provisions were moved to the separate pension system financed from the state budget and not based of any type of contributions. The state pensions are awarded to the persons with distinguished achievements for the state (1st and 2nd degree), officials and military servants, judges, scientists and for victims and deprived persons, mothers of large families. Some of them are earnings-related (e.g. officials and military servants state pensions and judges’ state pensions) some are calculated on the special state pension’s basis (e.g. 1st and 2nd degree, scientists, mothers and pensions of deprived persons).

Since 2014 state pensions that amount 116 EUR in 2017 are also paid for the mothers that have born 5 or more children (previously 7 or more children).

State pensions are awarded irrespective of the eligibility to social insurance pensions and may be paid out along with them. However, the amount of pensions of the first and second degree and military servants in total may not exceed 1.5 of the average wage in the country.

The state pension system is financed directly from the state budget. 11% of pensioners receive this type of pension and state pension expenditure comprises 0.34% to GDP in 2016.

Social assistance pensions provide a minimum income to those not eligible to social insurance old age, disability and survivors pensions or having insufficient amount of benefit. The amount of the social assistance pension in case of old age is equal to 90% of the social assistance basis (EUR 112 since 01.01.2017) that is 26.5% of the minimum monthly salary or 17% of the average net wage in the country in 2017. Social assistance pensions are pension income-tested. Social assistance pension expenditure to GDP comprised 0.19% in 2016 and covered about 5 % of pensioners.

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

The most recent of reform included in the projections were 2016 amendments in the social insurance pension system. The main components of this reform are the automatic indexing pensions to the overall wage sum, the switch from DB to point system, the change of calculation of the general part of pension, the increasing of eligibility requirements for the “full” general pension component from currently 30 years to 35 years by 2027 and the gradually shifting the financing of the general pension component to the State budget in since July of 2017 by half percent and in 2018 by one percent. The loss of revenue have been compensated by State budget, hence the State occurs as a third insurer in pension contributions.

However, the revised Law on Social Insurance Pensions of June 2016 also contains a requirement that in the case where the average old-age pension in relation to the country’s average wage (de facto the benefit ratio) fell the previous year, the Government shall provide proposals to Parliament with the measures necessary for the increase of the income of the budget of the State Social Insurance Fund and long-term reduction of the demographic impact on the pension system. If such measures result in average pensions not falling relative to the

average wage (namely an unchanged benefit ratio), pension expenditure would be higher than in the baseline scenario (see Graph [10]), representing an upside risk to the current projection.

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

The constant policy scenario is applied. The basic pension amount and point value are fully aligned to wage sum evolution (the seven-year average of the wage sum growth over the previous three, current and (projected) upcoming three years). The historical values of the growth of the Annual gross remuneration since 2013 were used for the calculation of the index in the first years of projection and the model output “Total wage sum of contract workers” was used as a basis for the calculation of the projected pension index. Non earnings-related state pensions are indexed to the half of the growth of the basic pension (as was a proxy variable in the past). Indexing to nominal wage growth is applied for the social assistance pensions, though there is no automatic indexation in the Law.

Indexation rules applied in the projection:

Social security pensions	
Old age pensions	Basic pension and pension point value and widows’ pension are indexed by the seven-year average of the wage sum growth over the previous three, current and (projected) upcoming three years
Disability pensions	
Widows/widowers’ and orphans’ pensions	
State (special) pensions	
Pensions of the Republic of Lithuania of I and II degree	half of the growth of the Basic pension
Pensions for scientists	
Pensions for casualties	
Other state pensions	
Pensions for officials and military personnel	100 % Nominal Wage Growth for new pensions, but stock is not indexed
Pensions for judges	
Social assistance pensions	100 % Nominal Wage Growth

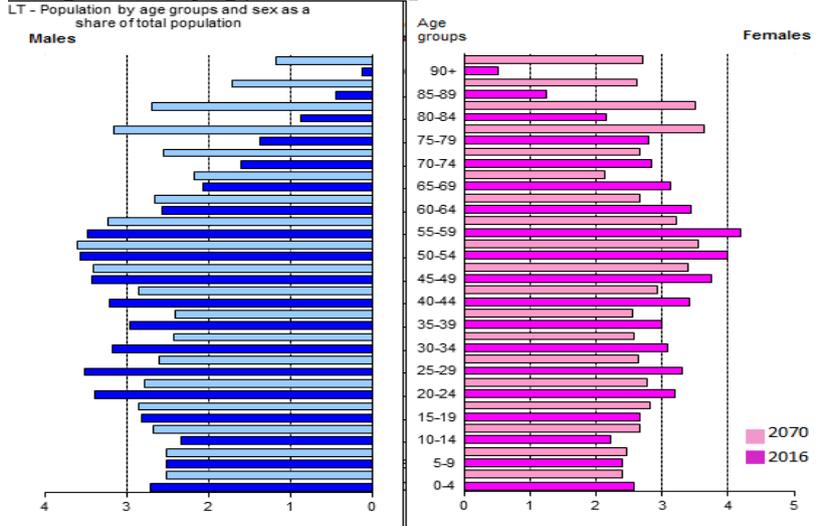
The proportion of the quasi-mandatory private pension scheme participants who transfer additional contributions to the pension funds at the beginning of year 2017 by the cohort and sex was set for the beginning of the projection period. All new entrants to the scheme transfer additional contributions; hence the proportion changes through all projection period and comes to 100 percent in the very end of projection period. The evolution of contribution tariffs is specified at the description of private pension scheme.

Overview of the Demographic and labour forces projections

2.1. Demographic development

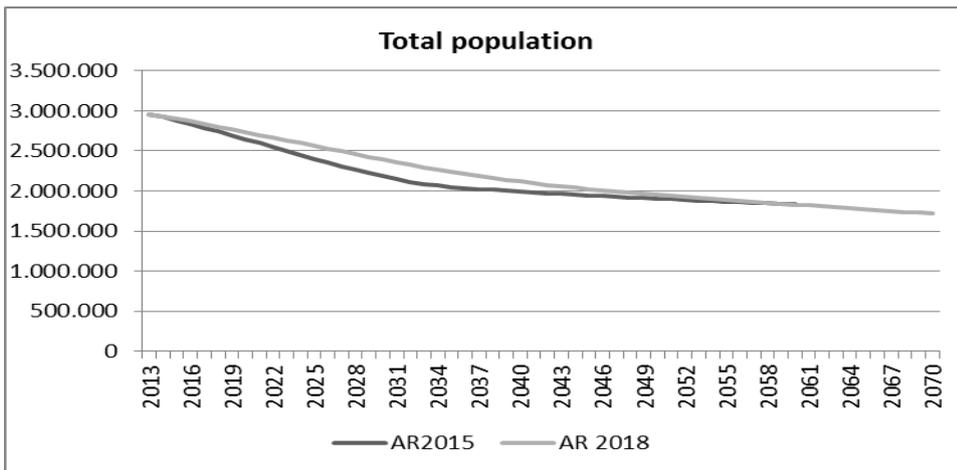
Population in Lithuania is still relatively young and most of the people are in productive ages. Although large part of population that was born during the baby boom are in age groups between 50-60 years and they will retire during the next 5-15 years. According to EUROSTAT demographic projections total population is expected to shrink by 40% over the entire forecasting period and the age pyramid to flatten by 2070.

Graph [1]: Age pyramid comparison: 2016 vs 2070

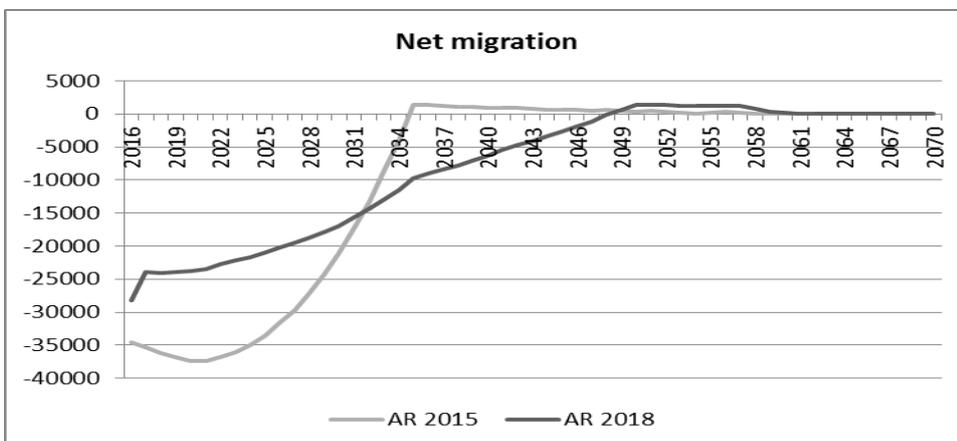


Comparing to Eurostat2013 demographic projection, the population forecasted in the new projection is very similar just with less pronounced negative net migration distributed for longer period (graphs 2 and 3)

Graph [2]

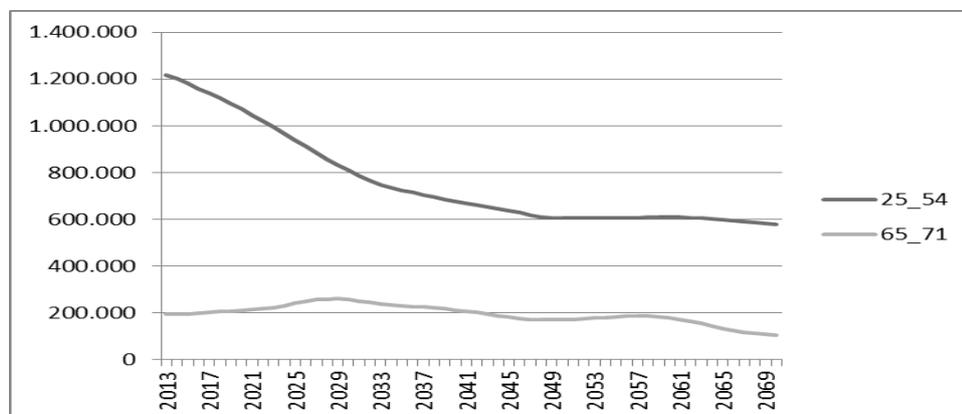


Graph [3]



As a result of high emigration among younger people and low fertility rates, in particular during the late-1990s and early-2000s, Lithuania is ageing at a much faster pace than most other countries.

Graph [4]



Population decrease in younger age groups continues until 2050. This is why the dependency ratio rises dramatically during this period and peaks at 64.5% in 2058 when the second baby boomers generation gets retired (Graph 4).

Later, when projected net migration become neutral and the number of pensioners' decreases as baby boosters came into retirement the dependency rate drops to 53.1% in 2070.

From 2016 to 2070 life expectancy at 65 years rises by 7.5 years for men and 6.3 years for women.

However, the rise of dependency ratio seems to be caused mostly by decreasing number of younger persons (because of projected high emigration) rather than by increasing longevity.

Table 3 – Main demographic variables evolution

	2016	2020	2030	2040	2050	2060	2070	Peak year*
Population (thousand)	2.869	2.733	2.394	2.118	1.951	1.832	1.720	2016
Population growth rate	-1,2	-1,2	-1,4	-1,0	-0,6	-0,7	-0,5	2070
Old-age dependency ratio (pop65/pop15-64)	29,0	31,9	46,4	57,2	60,2	63,9	53,1	2058
Ageing of the aged (pop80+/pop65+)	28,0	29,7	27,1	33,1	41,4	40,1	46,9	2070
Men - Life expectancy at birth	69,3	70,8	73,6	76,2	78,6	80,8	82,8	2070
Men - Life expectancy at 65	14,3	15,1	16,6	18,0	19,3	20,6	21,8	2070
Women - Life expectancy at birth	79,9	81,0	82,8	84,5	86,0	87,4	88,8	2070
Women - Life expectancy at 65	19,3	20,0	21,2	22,4	23,5	24,6	25,6	2070
Men - Survivor rate at 65+	66,2	69,5	75,0	79,7	83,5	86,7	89,3	2070
Men - Survivor rate at 80+	30,9	35,4	43,5	51,3	58,5	65,0	70,7	2070
Women - Survivor rate at 65+	87,1	88,4	90,4	92,0	93,4	94,5	95,5	2070
Women - Survivor rate at 80+	63,2	66,3	71,5	76,0	79,9	83,2	86,0	2070
Net migration	-28,2	-23,8	-17,0	-6,3	1,3	0,2	0,0	2051
Net migration over population change	0,8	0,7	0,5	0,3	-0,1	0,0	0,0	2016

Source: EUROSTAT and Commission Services

Having in mind the increase in statutory retirement age negative evolution of the participation rates in age group 55-64 from current high level (69,9) to much lower level in 2022 (62,8) seems illogical and is caused by the assumptions made in CSM model (the historical 10 average used). After 2022 the participation is increasing very rapidly in line with the retirement age and stays comparatively stable thereafter. Participation rates for age group

66-74 only increases slightly because the increase in retirement age is stopped at 65 years in 2026.

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	69,9	63,4	68,8	70,6	71,7	70,7	73,7	2067
Employment rate for workers aged 55-64	64,6	58,9	63,7	65,6	66,3	65,5	68,3	2067
Share of workers aged 55-64 on the labour force 55-64	92,4	92,9	92,6	92,9	92,5	92,7	92,6	2021
Labour force participation rate 65-74	13,6	11,7	8,9	10,0	10,6	10,5	10,1	2017
Employment rate for workers aged 65-74	13,5	11,6	8,8	9,9	10,4	10,4	10,0	2017
Share of workers aged 65-74 on the labour force 65-74	98,9	99,3	98,7	99,0	98,8	99,0	98,9	2020
Median age of the labour force	42,0	42,0	43,0	45,0	41,0	41,0	43,0	2039

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.)*

The strange pattern of the average effective exit age follow the direction of the participation rates with the decrease in the period 2017-2020 and then rise by 0.7 year for men and by 2 years for women. The increase for women is higher because of more rapid increase of retirement age (4 months per year for women and 2 months per year for men).

The contribution period and pattern of its increase is close to average effective working career calculated by CSM. The contributory periods for women are the same after 2026 as the participation rates are very similar and pension age is the same.

Rapid increase of life spent at retirement (by 7.3 years for men and by 4.4 years for women) causes the increase of pension expenditure, because the Point pension scheme without the sustainability factor does not lower the size of pension benefit in reaction to increased duration of retirement.

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 (Early/late exit) before the year 2023 for female and 2024 for male is higher comparing to other decades due to the cohorts approaching the retirement age being significantly larger than the cohorts above the retirement age and because the shift of the retirement age (not full cohort is allowed to retire).

Table 5a – 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)	63,6	63,2	64,3	64,3	64,3	64,3	64,3	2017
Contributory period	38,1	38,8	41,3	41,3	41,2	41,4	41,1	2059
Duration of retirement	15,3	16,3	17,2	18,7	20,1	21,4	22,6	2070
Duration of retirement/contributory period	40%	42%	42%	45%	49%	52%	55%	2070
Percentage of adult life spent at retirement	24,8	26,5	27,1	28,8	30,3	31,6	32,8	2070
Early/late exit	1,5	1,1	1,0	0,9	1,0	0,6	1,0	2023

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

	2017	2020	2030	2040	2050	2060	2070	Peak year
Average effective exit age (CSM) (II)	61,8	61,8	63,8	63,8	63,8	63,8	63,8	2029
Contributory period	37,2	38,2	41,3	41,3	41,2	41,4	41,1	2059
Duration of retirement	22,1	22,5	22,1	23,3	24,4	25,5	26,5	2070
Duration of retirement/contributory period	59%	59%	54%	56%	59%	62%	64%	2070
Percentage of adult life spent at retirement	33,5	33,9	32,6	33,7	34,8	35,8	36,7	2070
Early/late exit	0,6	1,3	1,1	0,8	0,9	0,6	1,0	2024

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.)

3. Pension projection results

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

All contributory social insurance and non-contributory (financed from state budget) state pensions are explicitly introduced in the country's pension model (social assistance as well). Disability pensions paid out to persons past the standard retirement age are attributed to the category "disability pensions". Projections cover the quasi-mandatory private pensions. Ageing Working Group definition of pension expenditure (% GDP) is identical to EUROSTAT official figures (ESSPROS).

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

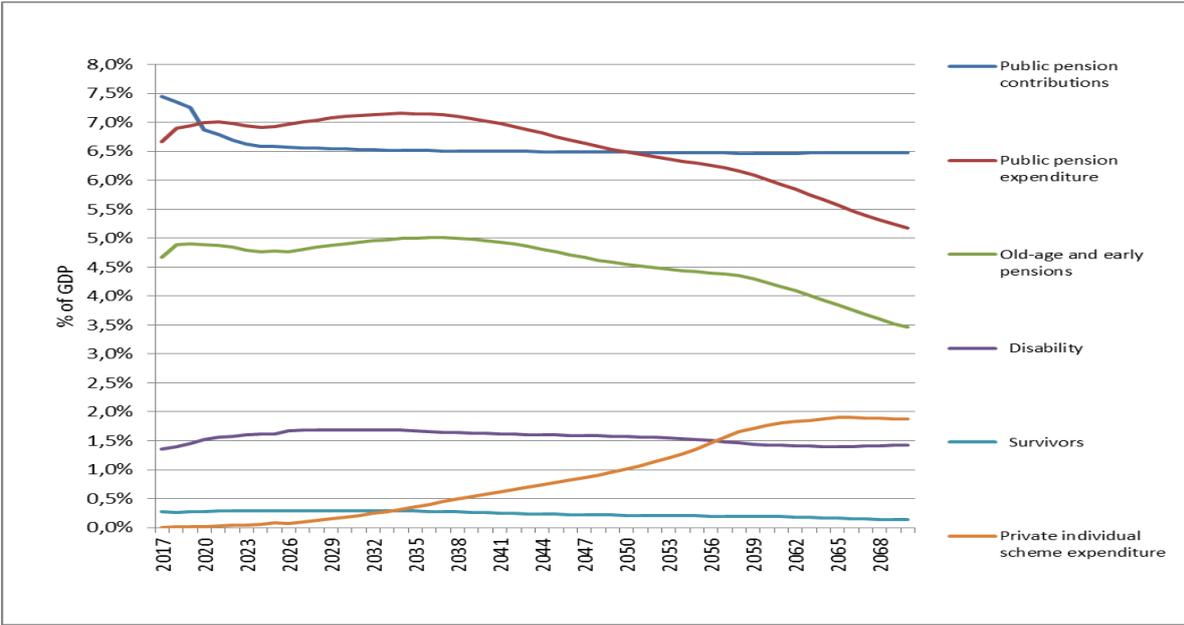
	2007	2008	2009	2010	2011	2012	2013	2014
1 Eurostat total pension expenditure	6,5	7,3	9,5	8,4	7,6	7,6	7,2	7,0
2 Eurostat public pension expenditure	6,5	7,3	9,5	8,4	7,6	7,6	7,2	6,9
3 Public pension expenditure (AWG)	6,5	7,3	9,5	8,4	7,6	7,6	7,2	6,9
4 Difference (2) - (3)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
5 Expenditure categories not considered in the AWG definition, please specify:	:	:	:	:	:	:	:	:
5.1 ...	:	:	:	:	:	:	:	:
5.2 ...	:	:	:	:	:	:	:	:
5.3 ...	:	:	:	:	:	:	:	:

Source: EUROSTAT and Member States

3.2. Overview of projection results

Gross public pension spending in proportion to GDP is projected to decrease by 1.7 percentage points between 2016 and 2070 (from 6.9 to 5.2 per cent with a peak year of 2034 when pension expenditure reaches 7.2 percent of GDP).

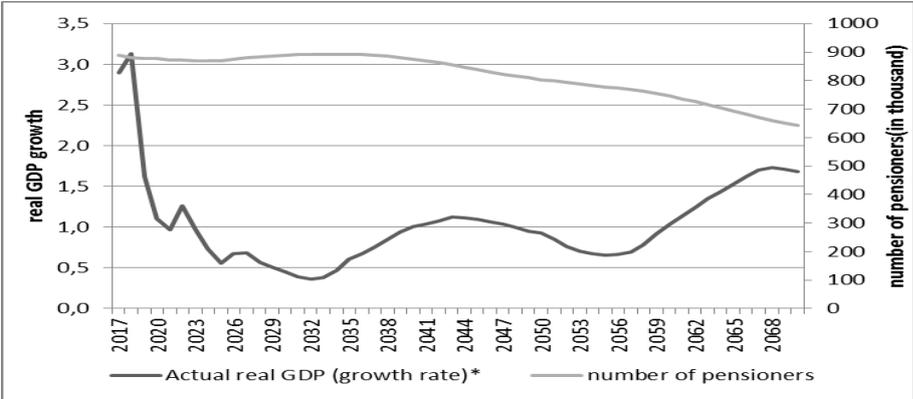
Graph [5]: Total pension expenditure by categories (% of GDP)



This decrease results from the expenditure drop in the old age category (by 1.4 percentage points with the maximum of 5.0 in the peak year). The ratio of pension spending to GDP decreased by 0.3 percentage points in 2016 as compared to 2013 year’s level of 7.2 per cent due to frozen pension indexation in 2013-2014 and an increase of nominal GDP by 10.4 per cent), the small cohorts of pensioners and the increase of retirement age since 2012. Since 2017 the small jump in old age pension expenditure was caused by the ad hoc increase of basic pension by 10 euro in the very end of the year with the reform measures in 2018 (high pension index for the base pension (12.3%) and the change in basic pension calculation formula) on top of it.

The demographic situation will change sharply after 2020 when major post-war baby-boomer cohorts will retire and low birth rate cohorts will be contributing and the biggest flow of emigrants will be leaving the country (-23 thousand net migration per annum in 2020-2025 according to the EUROPOP projections). The highest pension expenditure that will amount 7.2 per cent of GDP in the peak year 2034 is caused by the lowest GDP growth in this projection period and the highest number of pensioners (Graph 6).

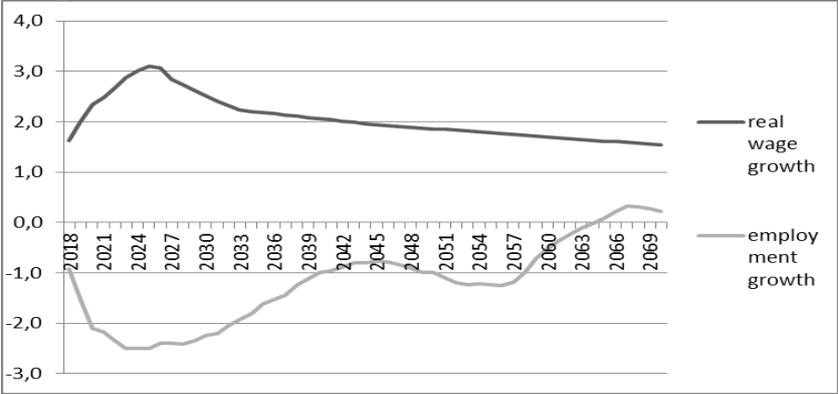
Graph [6]



After 2034 public pension expenditure starts to decrease due to declining number of old-age pensioners and matured quasi-mandatory private funded pension scheme. The projected huge negative net migration flows in the years 2013-2034 decreases number of persons that could become old-age pensioners in the years after. Retired pensioners have a full career history of

pension accumulation in quasi-mandatory private funded pension scheme and consequently lowered old-age pension since then. The main factor that does not allow the pension projection to increase so rapidly as dependency ratio increases is the new automatic pension indexation to the wage sum which is sensible to the employment development. Though the development of the latter seems as mirror-image of the real wage growth (Graph 7), the pension indexation is still by 1% on average higher than CPI.

Graph [7]



Quasi-mandatory private pension spending ratio to GDP is 0 to 1.9 percent until 2070, which is higher by 0.8 p.p. compared to the projection of Ageing Report 2015 because of the higher technical annuity rate of return used, increased share of those paying additional contributions and higher starting point of the amount of Pension accumulation fund.

All pension benefits (from public and quasi-mandatory private schemes) are not subject to taxation.

Meanwhile, public pension contributions are projected to shrink from currently 7.2 to 6.5%: they are forecasted to drop by 0.7% of GDP by 2030. The lowering pattern of Public pension contributions is caused by maturation of Quasi-mandatory private pension scheme (higher number of participants accumulating a part of social insurance pension contribution in their private accounts) and sharp decrease in 2020 when part of contribution rate diverted to pension funds is increased (from 2 per cent to 3.5 per cent).

Social insurance contributions transferred to pension funds of quasi-mandatory private pension scheme jumps by 0.3 per cent of GDP from 0.4% in 2016 to 0.7% in 2020 because contribution rate increases from 2 per cent to 3.5 per cent in that year. Later it goes up slightly till 0.8% as the system matures and share of all workers participating in the scheme increases. Sum of contributions from both participants' salary and from state budget increases about 2 times in 2016 because contribution rate increases from 1 per cent to 2 per cent. Later contributions from participant's salary and the state budget grow respectively from 0.2 per cent of GDP to 0.5 per cent of GDP and from 0.2 per cent of GDP to 0.4 per cent of GDP as all new entrants of the scheme automatically start transferring additional pension accumulation contributions. Contributions from state budget (even including pension accumulation contributions for parents) are slightly lower than the contributions from participant's salary because they are calculated from country's average salary of the year before last.

Overall contributions to Quasi-mandatory private pension scheme increases from 0.8 per cent of GDP in 2016 to 1.6 per cent of GDP in 2070.

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	6,9	7,0	7,1	7,0	6,5	6,0	5,2	2034
Private occupational pensions	:	:	:	:	:	:	:	:
Private individual pensions	0,0	0,0	0,2	0,6	1,0	1,8	1,9	2066
Mandatory private	0,0	0,0	0,2	0,6	1,0	1,8	1,9	2066
Non-mandatory private	:	:	:	:	:	:	:	:
Gross total pension expenditure	6,9	7,0	7,3	7,6	7,5	7,8	7,1	2058
Net public pension expenditure	:	:	:	:	:	:	:	:
Net total pension expenditure	:	:	:	:	:	:	:	:
Contributions	2016	2020	2030	2040	2050	2060	2070	Peak year*
Public pension contributions	7,2	6,9	6,5	6,5	6,5	6,5	6,5	2017
Total pension contributions	7,9	8,0	7,9	8,0	8,1	8,1	8,1	2017

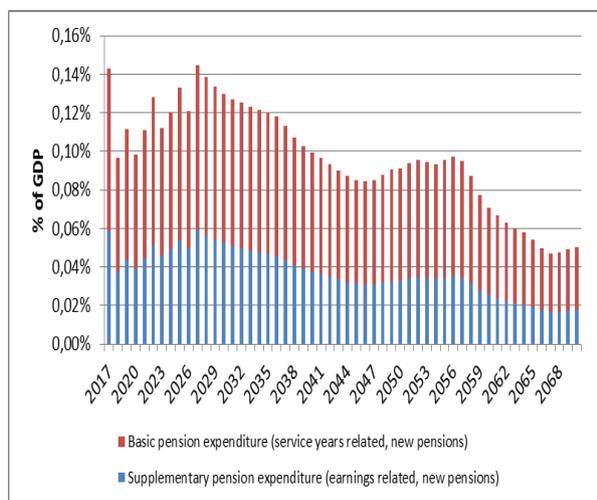
Source: Commission Services

(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.)

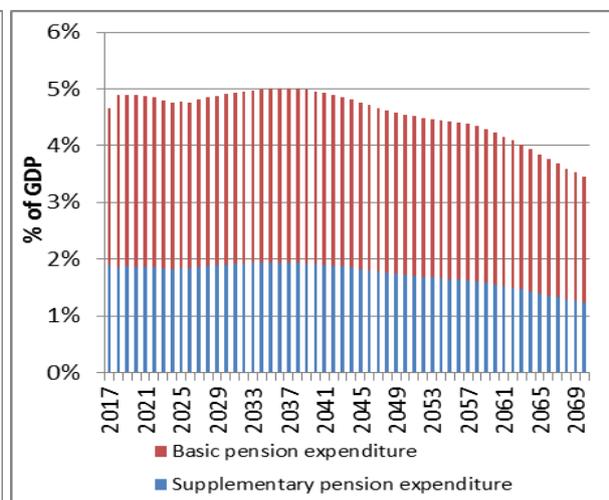
Pension expenditure of *earnings related Old age and early pensions* is projected to follow the path of the public pension expenditure with the same factors behind it.

Graphs 8 and 9 show how basic pension and the earnings related old-age pension evolve over time for both new old-age social insurance pension expenditure and overall old-age social insurance pension expenditure. The number of pensioners has a strongest impact on the new and overall pension expenditure to GDP and the impact of the reform measures to the earnings related and basic pension parts are less visible. The pattern of new pension expenditure (Graph 8) follows the size of cohorts retired. The earnings related part of new pension expenditure increases till 2026 due to an increase in retirement age, while the basic pension stays comparatively stable because of the increase in the requirement of obligatory number of service years. Opposite to the basic pension expenditure that stays stable after 2026 the supplementary new pension expenditure decreases because the private system matures and larger share of new pensioners will be the participants of this scheme (with higher proportion of insurance record with the reduced number of points). The same tendency with a slight delay is seen in the development of all old age pension expenditure (graph 9).

Graph [8]:



Graph [9]:



Unlike the old age pensions, *earnings related disability pensions*' expenditure is expected to increase slightly until 2026 in reaction to the postponement of the retirement age. Afterwards it remains stable with a very slight decrease because of lower population in working age.

The expenditure of the *survivors pensions* is very low and expected to shrink in the future because of three main factors: the new benefits of the reformed widows' pensions system are extremely low and not linked to the amount of the pension of the deceased; the number of orphan's pensions is shrinking in line with young age population and the old type pension of Lost of breadwinners is vanishing.

Non-earning-related pensions including minimum pensions and minimum income guaranty are presented by Social assistance pension scheme expenditure. Most of social assistance pension's recipients are disabled persons of working age with no rights to their own social insurance disability pension and their number decreases in line with shrinking working age population. On the other hand the old-age social assistance pension expenditure increases with aging of population. Despite of much higher indexation of social assistance pensions they stay at very low and stable level –about 0.17 % GDP.

State pension expenditure is now presented under the category *Other pensions*. It decreases from 0.34 percent level to 0.11 percent of GDP till 2050 and remains stable thereafter with beneficiaries of the pensions of victims and deprived persons dying away and the pensions for the persons with distinguished achievements for the state progressively vanishing. Pensions for persecuted persons are awarded to those who suffered during the II World War and country's occupation after that. Naturally, the number of its recipients is diminishing in time as there are less and less new-comers. Similarly, since 2011 the law on state pensions was amended and the pensions for distinguished achievements for the state have been no longer awarded.

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	6,9	7,0	7,1	7,0	6,5	6,0	5,2	2034
of which								
Old age and early pensions:	4,9	4,9	4,9	5,0	4,6	4,3	3,5	2037
<i>Flat component</i>	:	3,0	3,0	3,0	2,8	2,7	2,2	2037
<i>Earnings related</i>	:	1,9	1,9	1,9	1,7	1,6	1,2	2036
<i>Minimum pensions (non-contributory) i.e. minimum income guarantee for people above 65</i>	0,0	0,0	0,0	0,0	0,0	0,1	0,0	2059
Disability pensions	1,36	1,53	1,69	1,63	1,58	1,43	1,43	2031
Survivor pensions	0,29	0,28	0,29	0,26	0,21	0,19	0,13	2030
Other pensions	0,34	0,26	0,17	0,14	0,11	0,11	0,11	2016
of which								
<i>country-specific scheme 1</i>	:	:	:	:	:	:	:	:
<i>country-specific scheme 2</i>	:	:	:	:	:	:	:	:
<i>country-specific scheme 3</i>	:	:	:	:	:	:	:	:

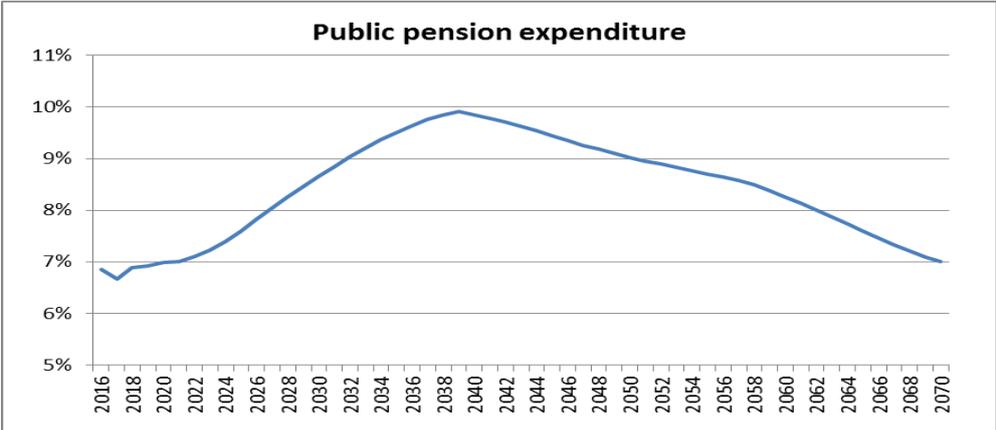
Source: Commission Services

*(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.)*

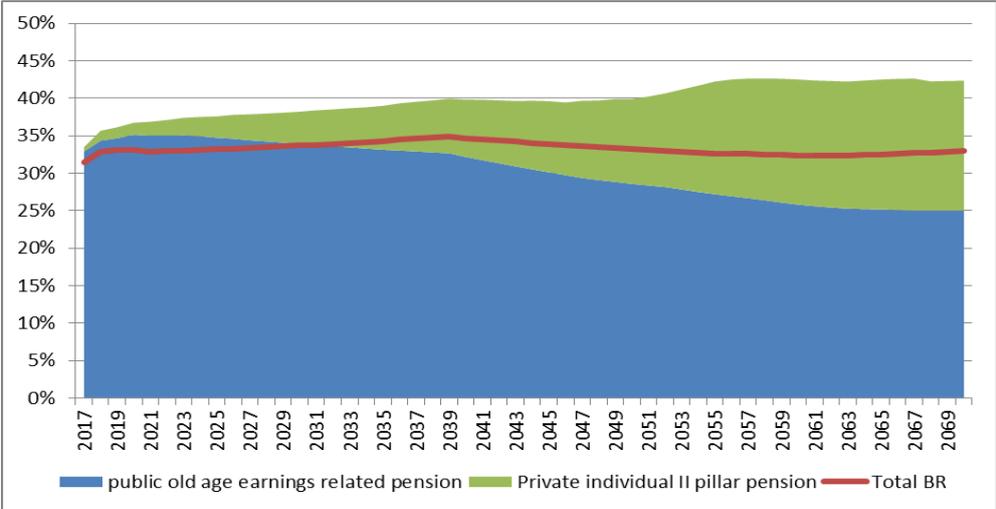
The reduction over time of public pension expenditure as a share of GDP is largely driven by the decline in the benefit ratio over almost the entire horizon (see Graph 12) due to the valorization and indexation of pensions to the wage bill, which is growing at a slower pace

than wage growth in most years due to the projected reduction of the working age population and employment (see Graph 7). As noted in section 1.2, according to the revised Social Insurance Pension Law of June 2016 the Government shall provide a proposal with necessary measures in the case where the benefit ratio decreased the previous year. Assuming valorization and indexation of pensions to average wage growth instead of wage bill growth in the period from 2022 to 2039 would lead to an unchanged total benefit ratio (public and private pillars) by 2070 that results in higher pension expenditure of 7% of GDP (Graph [10]) vis-à-vis the current baseline projection of 5.2% of GDP (see Tables 5-6), representing a sizeable upside risk. It should be noted that the number of old-age pensioners covered by the private pillar (private individual scheme) is 15.5% in 2020, 44.3% in 2030 and 70.6% in 2040. Hence, the replacement ratio for the pensioners not covered by the private pillar would be falling in the latter part of the entire projection horizon from 38% in 2039 to 30% in 2070. Under the assumption of wage indexation during the entire projection horizon, leading to an unchanged public pension benefit ratio, public pension expenditure would be higher, reaching 8.6% of GDP in 2070.

Graph [10]: Public pension expenditure under the assumption of wage indexation from 2022 to 2039 (% of GDP)



Graph [11]: Total RR (public and private) and Total Benefit ratio under the assumption of wage indexation from 2022 to 2039



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

Based on decomposition reported in table 9a and 9b, the main driving force behind the ratio of public pension expenditure to GDP between 2017 and 2070 is the dependency ratio that pushes up pension expenditure by 5 p.p. with the peak year 2058. The effect of a jump of dependency ratio factor is influenced not only by specific features of cohorts retiring but also by a negative net migration (especially of young employees). The improving picture in the last decades could be explained by a projected huge negative net migration flows in the years 2013-2050. This decreases number of persons that could become old-age pensioners in the years after. Other no less important reason is the gradual disappearance of a large baby boom generation of pensioners. Nevertheless, in the last decade the dependency ratio serves as a factor pushing the expenditure down illustrating the outflow of second baby boomers generation.

Coverage ratio has the offsetting effect, especially in the first two decades. The main reason is the postponement of the retirement age. Not less significant is the cohort effect – higher population of age 65+ due to the retired baby boom generation comparing to smaller post baby boom 50-64 age group population.

The second offsetting factor – the benefit ratio – has a main decreasing effect since 2020 to 2060 (by 3.4 percent) thanks to a newly implemented automatic indexation to wage sum, which lowers the pensions comparing to wages when employment is shrinking. In the second half of the projection, a partial switch of social security pensions to the private scheme significantly lowers the individual earnings' related pension part.

Labour market factor helps to mitigate the pension expenditure growth mainly due to higher employment which increases the GDP. As the overall employment growth is negative since 2020 to 2060, it lowers the pension index as well as pension expenditure in that period.

Table 9a - Factors behind the change in public pension expenditure between 2017 and 2070 (in percentage points of GDP) - pensions

	2017-20	2020-30	2030-40	2040-50	2050-60	2060-70	2017-70	Average annual change
Public pensions to GDP	0,1	0,1	-0,1	-0,5	-0,5	-0,8	-1,7	-0,028
Dependency ratio effect	0,6	3,0	1,6	0,2	0,5	-1,0	5,0	8,5%
Coverage ratio effect	-0,4	-1,1	-0,5	-0,1	-0,3	0,0	-2,4	-4,3%
Coverage ratio old-age*	-0,1	-0,6	-0,2	0,0	-0,1	-0,1	-1,1	-2,1%
Coverage ratio early-age*	-0,5	-0,7	-0,4	-0,3	0,9	-1,1	-2,1	-4,2%
Cohort effect*	-0,1	-2,2	-1,4	-0,3	-1,9	2,2	-3,7	-8,0%
Benefit ratio effect	0,0	-1,3	-1,0	-0,6	-0,6	0,0	-3,4	-6,3%
Labour Market/Labour intensity effect	0,0	-0,1	-0,1	0,0	-0,2	0,1	-0,3	-0,6%
Employment ratio effect	0,0	-0,1	-0,1	-0,1	-0,1	0,0	-0,3	-0,6%
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	0,0	-0,4	-0,1	0,0	0,0	0,0	-0,6	-0,2%

Source: Commission Services

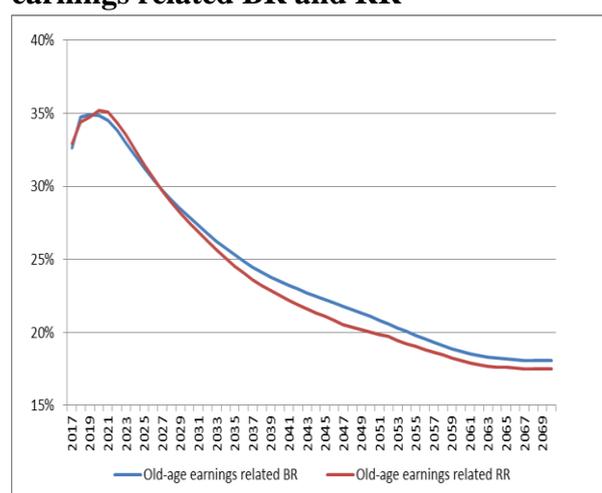
Table 9b - Factors behind the change in public pension expenditure between 2017 and 2070 (in percentage points of GDP) - pensioners

	2017-20	2020-30	2030-40	2040-50	2050-60	2060-70	2017-70	Average annual change
Public pensions to GDP	0,1	0,1	-0,1	-0,5	-0,5	-0,8	-1,7	-0,028
Dependency ratio effect	0,6	3,0	1,6	0,2	0,5	-1,0	5,0	8,5%
Coverage ratio effect	-0,4	-0,8	-0,4	-0,1	-0,2	0,1	-1,8	-3,2%
Coverage ratio old-age*	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1%
Coverage ratio early-age*	-0,4	-0,5	-0,4	-0,3	0,9	-1,1	-1,8	-3,7%
Cohort effect*	-0,1	-2,2	-1,4	-0,3	-1,9	2,2	-3,7	-8,0%
Benefit ratio effect	-0,1	-1,6	-1,0	-0,6	-0,6	-0,1	-4,0	-7,4%
Labour Market/Labour intensity effect	0,0	-0,1	-0,1	0,0	-0,2	0,1	-0,3	-0,6%
Employment ratio effect	0,0	-0,1	-0,1	-0,1	-0,1	0,0	-0,3	-0,6%
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	0,0	-0,4	-0,1	0,0	0,0	0,0	-0,6	-0,2%

Source: Commission Services

Public scheme old-age earnings related pension replacement rate (Graph 12) is rising in the beginning (from 33 per cent in 2016 to 35 in 2018) because the newly implemented pension index is very high in this period due to a good economic situation with high wage growth and improving employment. Later on, the increasing eligibility requirements for the “full” general pension component from currently 30 years to 35 years by 2027 and the lowering pension index due to a sharp decrease in employment will push the replacement rate of social insurance old age pensions down, offsetting the result of a higher contribution period with the increase of the statutory retirement age till year 2027. This makes a big difference from the dynamics of RR and BR in the AR 2015 (Graph 13).

Graph [12]: Public scheme old-age earnings related BR and RR



Graph [13]: Public scheme old-age earnings related BR and RR in AR 2015



The replacement rate of the earnings-related part of the pension is shrinking for every year of participation in the private pension accumulation. The reduction is getting larger during the projection period as the private system matures and a larger share of new pensioners will be the participants of this scheme. Furthermore, they will have higher proportion of insurance

record with larger reduction due to more years when the tariff of 3.5% will have been transferred to private pension funds.

The public old-age earning related pension replacement rate will be complemented by a steadily rising replacement rate (from 1 per cent to 17 per cent) from a quasi-mandatory private pension scheme for 67 per cent of new pensioners at the end of the projection period (Graph 14).

The public old-age earning related pension Benefit ratio representing average public pension benefit ratio to economy wide average wage (Graph 10) is following the pattern of RR as new pensions and all pensions are indexed by the same index. Different denominator of RR – the average wage at retirement – is slightly higher than the economy wide average wage.

Graph [14]: Public scheme old-age earnings related and Private individual scheme (RR)

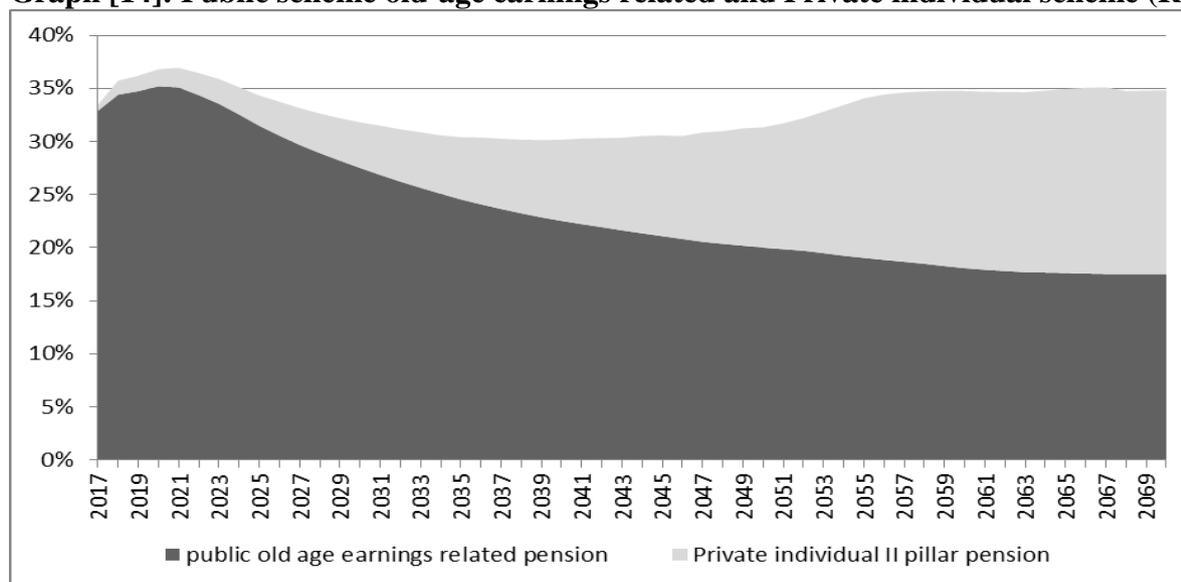


Table 10 - Replacement rate at retirement (RR) and coverage by pension scheme (in %)

	2016*	2020	2030	2040	2050	2060	2070
Public scheme (BR)	31%	33%	27%	23%	22%	19%	19%
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)	33%	35%	28%	24%	21%	19%	18%
Public scheme old-age earnings related (RR)	33%	35%	28%	23%	20%	18%	18%
Coverage	66,7	66,3	67,1	70,2	71,5	73,1	71,1
Private occupational scheme (BR)	:	:	:	:	:	:	:
Private occupational scheme (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Private individual scheme (BR)		1%	2%	4%	5%	8%	10%
Private individual scheme (RR)	1%	2%	4%	8%	11%	17%	17%
Coverage	:	10,5	30,2	50,3	61,3	67,3	66,6
Total (BR)	31%	33%	28%	25%	25%	25%	26%
Total (RR)	33%	36%	31%	29%	29%	32%	32%

* Data for RR refer to 2017

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 is not available, the calculation based on the number of pensions is allowed.)

In the first decade, the number of pensioners is decreasing due to postponement of pension age and increases afterwards by 2038 and then decreases by the end of projections as described in Chapters 2.1 and 3.1. The employment decreases dramatically (because of huge migration) till 2050; however, the number of employed stabilises in the last decade. This decreases the System dependency ratio to more than 100 percent from 2040 to 2060, with a slight improvement in the last decade. The observed slower increase in the system dependency ratio comparing to old age dependency ratio is the result of the increase of the retirement age till 2026 and improved employment rate. This results in improving of the system efficiency till 2050 which remains constant afterwards.

	2016	2020	2030	2040	2050	2060	2070
Number of pensioners (thousand) (I)	908,2	876,4	889,3	874,9	803,7	745,7	642,8
Employment (thousand) (II)	1356,3	1263,5	997,7	853,8	780,1	704,6	698,6
Pension System Dependency Ratio (SDR) (I)/(II)	67,0	69,4	89,1	102,5	103,0	105,8	92,0
Number of people aged 65+ (thousand) (III)	549,5	559,4	643,3	673,4	629,6	602,3	508,8
Working age population 15 - 64 (thousand) (IV)	1897,4	1751,7	1386,5	1177,0	1045,6	942,0	959,0
Old-age Dependency Ratio (ODR) (III)/(IV)	29,0	31,9	46,4	57,2	60,2	63,9	53,1
System efficiency (SDR/ODR)	2,3	2,2	1,9	1,8	1,7	1,7	1,7

Source: Commission Services

Table 12a and Table 12b describe the evolution of the number of pensioners by age groups. This provides an opportunity to analyse the effect of the increase in the statutory retirement age. The ratio is higher than 100 in most cases due to a common practice in Lithuania to work and to get a full pension (old age or disability) at the same time, which gives a possibility to increase pension rights for additional working years as well. Non-residents pensioners increase this ratio above 100 as well.

The ratio of pensioners to the inactive population in the age group 55-59 between 2017 and 2030 is decreasing. It is mainly affected by the legal postponement of the retirement age which postpones the early retirement later as well. So early old age pensioners in this age group completely disappear until 2020 and the number of the disability pensioners slightly increases as a reaction to that. The upward trend of the ratio since 2030 is a result of shrinking inactive population as compared to the entire population of that age group because of a very sharp increase in employment rate (from 79 to 83 percent), while the number of disability pensioners is calculated using a constant probability to be disabled at a specific age (this probability is thus increasing with a shifting retirement age to older cohorts). The ratio of pensioners to inactive is even higher than in age group 60-64.

The stable decrease of the ratio in the age group 60-64 between 2017 and 2030 is caused by the increase of the statutory retirement age. After it reaches 65 in 2026, the ratio becomes close to 100 with a slight increase after as increase of employment in this group is projected. The ratio of pensioners to inactive population in the age groups 65+ stays constant because the increase of retirement age has no impact on this age group and a number of pensioners is calculated using the stable ratio from nondisabled population. The coverage ratio for older age

groups is always not less than 100 percent as the model covers the beneficiaries of social assistance pension scheme, who have not acquired enough their own pension rights.

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

	2017	2020	2030	2040	2050	2060	2070
Age group -54	18,0	18,5	18,9	19,5	15,6	15,0	14,7
Age group 55-59	128,3	106,8	104,1	109,3	117,1	117,2	118,2
Age group 60-64	143,7	110,9	98,1	102,6	103,6	104,7	103,6
Age group 65-69	136,0	127,3	123,6	125,9	127,1	126,8	127,4
Age group 70-74	111,4	112,3	108,4	110,5	110,8	111,1	110,9
Age group 75+	102,2	102,0	102,3	102,3	102,3	102,2	102,2

Source: Commission Services

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

	2017	2020	2030	2040	2050	2060	2070
Age group -54	7,1	7,3	8,0	7,8	6,3	6,3	6,0
Age group 55-59	23,2	22,1	20,5	20,1	20,2	19,9	19,8
Age group 60-64	72,0	59,2	41,3	41,4	40,4	41,1	39,2
Age group 65-69	107,9	107,3	105,9	105,9	106,0	106,1	105,9
Age group 70-74	104,5	104,6	105,5	105,9	106,0	106,0	105,9
Age group 75+	102,2	102,0	102,3	102,3	102,3	102,2	102,2

Source: Commission Services

The same evolution of the female's ratio could be noticed in the tables 13a and 13b.

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

	2017	2020	2030	2040	2050	2060	2070
Age group -54	16,3	16,6	16,8	16,8	13,3	12,7	12,3
Age group 55-59	124,7	96,8	93,2	103,0	107,2	107,5	107,8
Age group 60-64	146,1	108,6	103,4	110,7	110,2	113,9	109,7
Age group 65-69	131,1	121,9	119,8	123,3	124,4	123,9	124,5
Age group 70-74	109,2	110,0	106,2	108,7	108,9	108,9	108,8
Age group 75+	102,3	102,0	102,4	102,6	102,6	102,5	102,6

Source: Commission Services

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

	2017	2020	2030	2040	2050	2060	2070
Age group -54	6,5	6,6	7,1	6,9	5,5	5,4	5,1
Age group 55-59	22,3	20,2	17,8	17,1	17,1	16,8	16,6
Age group 60-64	84,1	67,0	43,3	44,1	42,6	44,6	41,2
Age group 65-69	106,9	106,6	105,3	105,4	105,4	105,5	105,3
Age group 70-74	104,2	104,3	105,2	105,7	105,8	105,7	105,7
Age group 75+	102,3	102,0	102,4	102,6	102,6	102,5	102,6

Source: Commission Services

The evolution of number of new pensioners reflects two effects: size of cohorts retiring and the increase of retirement age. Although the large retiring cohorts with the peak year in 2027 increases the number of new pensioners but postponement of the retirement age slightly offsets this effect. Afterwards, the number of new pensioners continuously decreases due to demographic reasons explained above. The evolution of projected new pension expenditure is directly affected by the evolution of the number of new pensioners, pension indexation coefficient, stricter eligibility conditions and the maturation of quasi-mandatory private pension scheme.

New public pension expenditure for point pension system can be checked by the factors in Tables 14a, 14b and 14c only partially as earnings-related part of the pension comprises a smaller part (40%) of the full pension.

The number of average pension points at retirement is affected by two factors – the increasing contributory period till 2026 as a result of the increased statutory retirement age and decreasing accrual rate for those who contribute to quasi-mandatory private pension scheme. The number of average pension points accumulated per year is reduced in proportion to the size of the contributions transferred to a private pension fund.

The main driver lowering projected average accrual rate is the increase of participation rates in quasi-mandatory private pension scheme for the new cohorts of pensioners.

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

New pension	2017	2020	2030	2040	2050	2060	2070
I Projected new pension expenditure (millions EUR)	23,9	18,2	32,0	29,7	35,5	35,8	35,6
II Number of new pensions (in 1000)	35,5	22,6	31,3	25,1	23,8	18,4	13,4
Total pension points at retirement	36,8	37,8	37,4	33,6	31,4	31,0	30,3
III Average pension points accumulated per year or average contributory period	1,0	1,0	0,9	0,8	0,8	0,8	0,7
IV Average accrual rate (=V/K)	0,5	0,5	0,43	0,39	0,36	0,35	0,35
Point value (V)	3,1	3,5	4,6	5,9	7,9	10,4	14,7
Point cost (K)	619,1	738,3	1052,7	1516,0	2192,5	2960,6	4207,2
V Sustainability/adjustment factors	1,0	1,0	1,0	1,0	1,0	1,0	1,0
VI Average number of months paid the first year	6,0	6,0	6,0	6,0	6,0	6,0	6,0
Monthly average pensionable earnings / Average wage	74%	77%	64%	54%	50%	46%	44%

Source: Commission Services

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

New pension	2017	2020	2030	2040	2050	2060	2070
I Projected new pension expenditure (millions EUR)	11,8	9,9	15,9	14,9	18,7	19,8	19,3
II Number of new pensions (in 1000)	15,0	10,8	13,5	11,0	11,0	9,0	6,4
Total pension points at retirement	43,0	43,3	43,0	38,5	35,7	35,1	34,2
III Average pension points accumulated per year or average contributory period	1,1	1,1	1,0	0,9	0,9	0,8	0,8
IV Average accrual rate (=V/K)	0,5	0,5	0,4	0,4	0,4	0,4	0,3

Point value (V)	3,1	3,5	4,6	5,9	7,9	10,4	14,7
Point cost (K)	619,1	738,3	1052,7	1516,0	2192,5	2960,6	4207,2
V Sustainability/adjustment factors	1,0	1,0	1,0	1,0	1,0	1,0	1,0
VI Average number of months paid the first year	6,0	6,0	6,0	6,0	6,0	6,0	6,0
Monthly average pensionable earnings / Average wage	86%	88%	73%	62%	57%	52%	50%

Source: Commission Services

Pension rules are the same for both genders and so are the dynamics of pension entitlements. Differences only exist in the labour market and they cause the lower careers in the beginning because of lower pension age and lower income for females.

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

New pension	2017	2020	2030	2040	2050	2060	2070
I Projected new pension expenditure (millions EUR)	12,1	8,3	16,1	14,8	16,8	16,0	16,3
II Number of new pensions (in 1000)	20,5	11,8	17,8	14,1	12,8	9,4	6,9
Total pension points at retirement	32,2	32,8	33,1	29,8	27,7	27,2	26,6
III Average pension points accumulated per year or average contributory period	0,9	0,9	0,8	0,7	0,7	0,7	0,6
IV Average accrual rate (=V/K)	0,5	0,5	0,4	0,4	0,4	0,4	0,3
Point value (V)	3,1	3,5	4,6	5,9	7,9	10,4	14,7
Point cost (K)	619,1	738,3	1052,7	1516,0	2192,5	2960,6	4207,2
V Sustainability/adjustment factors	1,0	1,0	1,0	1,0	1,0	1,0	1,0
VI Average number of months paid the first year	6,0	6,0	6,0	6,0	6,0	6,0	6,0
Monthly average pensionable earnings / Average wage	66%	68%	56%	48%	44%	40%	39%

Source: Commission Services

3.2.2. Financing of the pension system

The Public pension system revenue from contributions consists of PAYG social insurance pension contributions and since July 2017, the state started to transfer 1 percentage point (0.5 in 2017) for the financing of basic pension. The employers' pension contributions are lowered by 1 percentage point instead. Pension contribution tariff of 25.3 per cent since 2018 is divided between the employer (22.3%) and the employee (3%). Further increase of State contribution is not envisaged in the Law and will be decided in the annual budgeting procedure. State pensions and social assistance pensions are financed from the state budget.

Transfers to the quasi-mandatory private funded pension scheme starting from 2020 (3.5%) are more than 3% employee contribution rate, so theoretically should be split to both employers' and employees' social insurance contributions (to 0.5% and 3% accordingly). However the whole contribution rate correspond the social insurance income received from the total social insurance contribution so there is no need to split the income going to the private mandatory scheme. In the table 16 the contributions to private pension pillar are extracted from employee contributions. Only a part of contributors participate in quasi-mandatory private pension scheme (this share is increasing through the projection period to max 83% of active members to contributors).

The number of persons employed decreases during the entire projection period. The largest decrease can be seen in the years till 2050 because of a very high projected emigration. Later on, the decrease slows down as the positive net migration is projected and the employment rate increases. The rate of contributors to employed remains stable during all projection period as the slightly higher coverage is already included in the starting year 2017 due to reforms in the labour market. The rate of contributors to employment (0.9) is below 1 due different data sources used: for the employment - national statistics data and for the number of contributors - data from Social insurance fund board database.

The social insurance pension system runs surplus in the beginning of the projection (by 2026). A small system deficit (with maximum 0,3% of GDP) occur in the peak years of pension expenditure projection (in the period 2027-2038) because of ad hock indexation of basic pension in October 2017 (on top of automatic indexation) (Graph 15). The Law states that the calculated pension index is applied unless it generates a pension system deficit. Instead, pension indicators – the amount of basic pension and the value of pension point are left unchanged. This is how the balancing mechanism is working. Therefore, this gap should be covered by suspension of the indexation. However, what is more reasonable, the new balancing measures should be implemented instead e.g. further increase of pension age based on increased longevity, further shift of financing of the basic pension to other taxes than social insurance contributions or changing rules for private pension accumulation.

It was decided to depart from statement of the Law and to present the baseline scenario not fully consistent with the balancing rule of the indexation mechanism as it is not possible to implement it into the model. The manual adjustments of the rates would have to be done sequentially year-by-year together with corresponding adjustments of the projected balances. Therefore the calculation of 11 sensitivity tests would be extremely time-consuming with this manual procedure.

The system runs a surplus after as the automatic indexation mechanism to wage sum does not react to the lowering number of pensioners. Constant policy scenario works further as a factor lowering pensions' replacement ratio, while it is obvious that pensions could be much higher in the second half of the projection not causing the system deficit.

Graph [15]: Social insurance pension system revenues and expenditure in % of GDP (baseline)

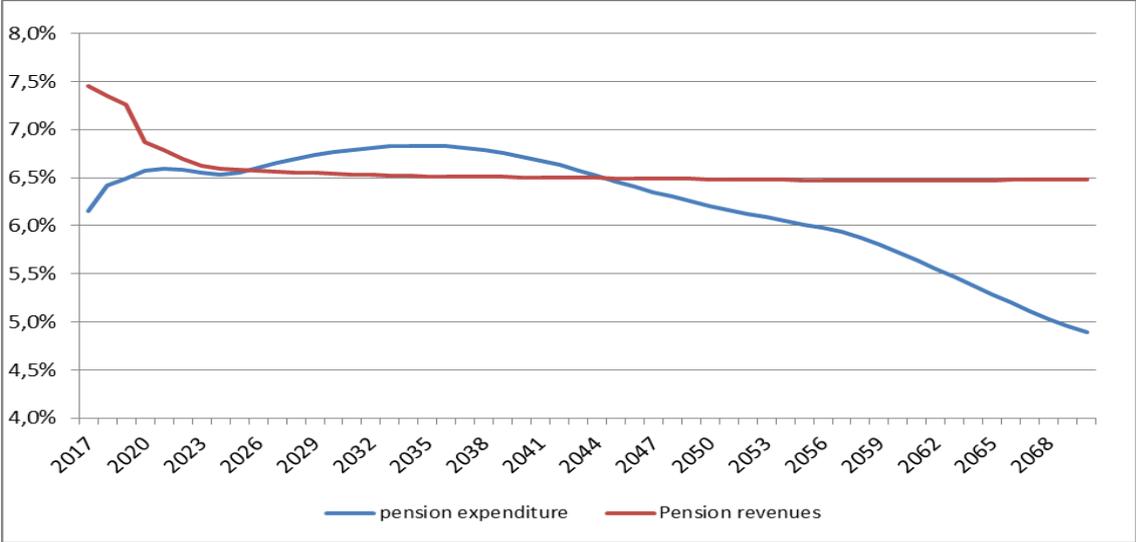


TABLE 15 - Financing of the system

	Public employees	Private employees	Self-employed
Contribution base	gross salary		50% of declared earnings
Contribution rate/contribution	26,3% in 2016; 25,8% in 2017; 25,3% since 2018		
<i>Employer</i>	23,3% in 2016; 22,8% in 2017; 22,3% since 2018		26,3% in 2016; 25,8% in 2017; 25,3% since 2018 (for participants in the private 2nd pillar the tariff is by 2p.p lower (by 3,5 p.p. since 2020)
<i>Employee</i>	3% (2% (3,5% since 2020) for participant in the private 2nd pillar)		
<i>State</i>	0% in 2016; 0,5% in 2017; 1% since 2018; for the participants in the private 2nd pillar the state pays additionally 2% from average wage to their private accounts; contributions for the full pension calculated on minimum wage for persons taking care of children under three years or of disabled persons, individuals having the status of an artist		
<i>Other revenues</i>	-	-	-
Maximum contribution	0	0	0
Minimum contribution	0	0	0

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	2769,7	3192,8	3987,3	5154,3	6949,1	9128,8	12962,4
Employer contribution	2592,3	2982,5	3771,3	4884,9	6594,7	8669,1	12279,7
Employee contribution	177,4	76,6	46,9	50,4	58,6	71,0	132,1
State contribution	0,0	133,7	169,1	219,1	295,7	388,7	550,7
Other revenues	:	:	:	:	:	:	:
Number of contributors (I)	1267,9	1191,2	940,6	805,0	735,4	664,3	658,6
Employment (II)	1356,3	1263,5	997,7	853,8	780,1	704,6	698,6
Ratio of (I)/(II)	0,9	0,9	0,9	0,9	0,9	0,9	0,9

Source: Commission Services

3.2.3. Sensitivity analysis

The higher life expectancy scenario increases the pension expenditure and that increase gets larger during the projection period due to a greater number of years spent at retirement. This effect is substantial because there is no automatic shift of retirement age or a reduction of the amount of the pension benefit due to higher life expectancy. Private quasi-mandatory pension funds' expenditure is supposed to be actuarially neutral.

Scenarios with lower productivity growth slightly increase the pension expenditure to the GDP because the GDP decrease more than nominal pension expenditure and opposite higher productivity growth decrease the pension expenditure to GDP because the GDP increase more than nominal pension expenditure due to the pension indexation to 7 year average of the wage sum growth. Another factor that has an impact on higher deviation in the long run is the fact that on average only 40 percent of pension amount (the earnings related pension part) depends on wages. The impact is stronger in the private pension scheme. The higher labour productivity scenario decreases expenditure to the GDP ratio in the quasi-mandatory private

pension scheme and lower labour productivity increases it. The reason of this is the changing spread between the returns of the private pension funds and the wage growth. Higher labour productivity decreases this spread, whereas a lower labour productivity increases it. The increase of the spread increases the accumulated sum and size of pension annuities in relation to the GDP.

Higher employment scenario slightly decreases pension expenditure to GDP by 2030 as it increases the number of employed and GDP directly while pension expenditure increases mainly because of higher indexation in this period. The pension index is calculated as 7 year average of wage sum growth and the effect of the employment growth to the index is not as immediate as for the GDP growth and comes with delay. The effect of the lower employment rate is similar but in the opposite direction.

Higher employment of older workers' scenario is decreasing the pension expenditure to GDP stronger than the higher employment scenario as it increases the number of employed in older age groups and decreases the number of pensioners accordingly. The downward effect after 2030 diminishes due to the higher accrued pension rights transforming to the higher pension benefits.

The lower migration scenario decreases pension expenditure to GDP in the first two decades as it increases the number of employed and GDP while pension expenditure increases only because of higher indexation in this period (as most of emigrants are from younger age groups). Starting from 2040, this scenario increases the pension expenditure as lower negative net migration before increases the number of population in the older cohorts afterwards and thus the number of pensioners. The pension index until 2060 is higher, further increasing the pension expenditure. In the last decade, it becomes marginally lower (a more stable employment growth (less growth) in the end of projection) but does not offset the impact of a much higher number of pensioners.

A higher migration increases the pension expenditure to the GDP by 2040, as it decreases the number of the employed and the GDP, but the number of pensioners is not affected until 2040 and pension expenditure is lower just because of a lower pension index. Afterwards, the number of pensioners decreases as a result of high emigration before. The pension index is lower since 2060 but it increases in the last decade due to a more stable employment growth (less growth) in the end of the projection.

The lower fertility scenario is neutral in public scheme due to the indexation rule that reacts to a shrinking employment to the same extent as the GDP. Nevertheless, it increases the pension expenditure to the GDP ratio in the private pension scheme.

The risk scenario increases the pension expenditure to the GDP as the GDP decreases more than the nominal pension expenditure due to the pension indexation to wage sum. The lower labour productivity scenario increases the pension expenditure to the GDP ratio in the quasi-mandatory private pension scheme due to a difference in the rate of return and productivity growth.

The scenario of linking retirement age to life expectancy does not affect the public pension expenditure until 2030 as there is a legislated increase of the pension age until 2026 in the baseline scenario. In 2020, it gives even higher pension expenditure, increased by 0.1 p.p., as the legislated increase of female retirement age is faster than increases in the life expectancy. After 2030, the linking of retirement age reduces public pension expenditure.

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

	2016	2020	2030	2040	2050	2060	2070
Public Pension Expenditure							
Baseline	6,9	7,0	7,1	7,0	6,5	6,0	5,2
Higher life expectancy (2 extra years)	0,0	0,0	0,0	0,1	0,2	0,3	0,3
Higher Total Factor Productivity Growth (+0.4 pp.)	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,1
Lower Total Factor Productivity Growth (-0.4 pp.)	0,0	0,0	0,0	0,0	0,1	0,1	0,1
Higher emp. rate (+2 pp.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Lower emp. rate (-2 pp.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Higher emp. of older workers (+10 pp.)	0,0	0,0	-0,1	0,0	0,0	0,0	0,0
Higher migration (+33%)	0,0	0,1	-0,1	-0,2	-0,3	-0,5	-0,6
Lower migration (-33%)	0,0	-0,1	-0,1	0,1	0,2	0,4	0,6
Lower fertility	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Risk scenario	0,0	0,0	0,1	0,1	0,0	0,0	0,0
Policy scenario: linking retirement age to increases in life expectancy	0,0	0,1	0,0	-0,2	-0,3	-0,2	-0,1
Total Pension Expenditure							
Baseline	6,9	7,0	7,3	7,6	7,5	7,8	7,1
Higher life expectancy (2 extra years)	0,0	0,0	0,0	0,1	0,2	0,3	0,4
Higher Total Factor Productivity Growth (+0.4 pp.)	0,0	0,0	0,0	-0,1	-0,1	-0,3	-0,4
Lower Total Factor Productivity Growth (-0.4 pp.)	0,0	0,0	0,0	0,1	0,2	0,4	0,5
Higher emp. rate (+2 pp.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Lower emp. rate (-2 pp.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Higher emp. of older workers (+10 pp.)	0,0	0,0	-0,1	0,0	0,0	-0,1	-0,1
Higher migration (+33%)	0,0	0,1	0,0	-0,1	-0,1	-0,3	-0,6
Lower migration (-33%)	0,0	-0,1	-0,1	0,0	0,1	0,3	0,6
Lower fertility	0,0	0,0	0,0	0,0	0,1	0,3	0,4
Risk scenario	0,0	0,0	0,1	0,2	0,2	0,3	0,3
Policy scenario: linking retirement age to increases in life expectancy	0,0	0,1	0,0	-0,3	-0,4	-0,4	-0,1

Source: Commission Services

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

The difference of pension expenditure in per cent of the GDP in 2018, as compared to the 2015 exercise, is a decrease by 1.68 percentage points. The dependency ratio increased (from 4.3 to 5), coverage ratio and employment effects have worsened slightly. However the benefit ratio effect has increased dramatically (by 3 p.p.). This was an impact of pension system reform with 2 main measures lowering pension expenditure:

1. the automatic indexing pensions to the overall wage sum;
2. the increasing of eligibility requirements for the “full” general pension component from currently 30 years to 35 years by 2027.

Table 18 - Overall change in public pension expenditure to GDP under the 2006, 2009, 2012 and 2015 projection exercises - pensions

	Public pensions to GDP	Dependency ratio	Coverage ratio	Employment effect	Benefit ratio	Labour intensity	Residual (incl. Interaction effect)
2006 *	1,90	5,41	-2,08	-1,03	-0,17	:	-0,24
2009 **	4,57	9,64	-2,41	-0,03	-1,82	:	-0,80
2012 ***	3,47	8,20	-2,87	-1,10	-0,22	-0,01	-0,53
2015****	0,30	4,30	-2,63	-0,55	-0,38	-0,01	-0,42
2018*****	-1,68	5,00	-2,40	-0,28	-3,40	0,00	-0,60

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 expenditure. * 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.)*

The main drivers generating lower pension projection level to the GDP are:

- *Change in assumptions:* a less pronounced negative net migration distributed for a longer period have smoothed out the shape and shifted the peak year of the dependency ratio by two decades (from 2040 to 2060) ; furthermore, a decreased mortality assumption have increased the number of pensioners.
- *Policy-related changes:* the automatic indexing pensions to the overall wage sum have served as a sustainability factor preventing increased pension expenditure when the GDP decreases. The increasing of eligibility requirements for the “full” general pension component from currently 30 years to 35 years by 2027 has eliminated the increase of pensions due to the shift of pension age. These measures have decreased the public pension expenditure in the peak years 2034-2037 by 2.5 p.p. and by 1.6 p.p. in 2060.

Table 19 - Decomposition of the difference between 2012 and the new public pension projection (% of GDP)

	2016	2020	2030	2040	2050	2060	2070
Ageing report 2015	6.7	6.9	8.8	9.5	8.6	7.6	:
<i>Change in assumptions</i>	0.04	-0.3	-0.7	0.0	0.9	2.1	:
<i>Improvement in the coverage or in the modelling</i>	:	:	:	:	:	:	:
<i>Change in the interpretation of constant policy</i>	:	:	:	:	:	:	:
<i>Policy related changes</i>	0.07	0.4	-1.0	-2.5	-3.1	-3.6	:
New projection	6.9	7.0	7.1	7.0	6.5	6.0	5.2

Source: Member State

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

3.3.1. Institutional context in which those projections are made

The Ministry of Social Security and Labour is responsible for the projection of the financial development of the statutory pension scheme.

For this projection round the same cohort model was used. All pension schemes: social insurance, state, social assistance and private quasi-mandatory funded pension schemes are modelled in one model using the same set of assumptions and are linked to each other (e.g. old age and disability with social assistance scheme or old age with private quasi-mandatory scheme).

The projections have been done using the cohort simulation model LSIM (Lithuanian Social Insurance Model). It was firstly developed in 2006 by the joint project of the Ministry of Social Security and Labour and Sweden's National Social Insurance Board (Riksförsäkringsverket). The model was extended and improved by the Ministry in 2011 as the outcome of the project "Using and customizing of existing national standard models (macro and cohorts) for use in policy making" financed by European Commission under the PROGRESS program. The providers of service were Deloitte experts.

All the data (databases) used for the model was prepared in close cooperation with the institutions responsible for awarding the social security pensions and the Department of Statistics of the Government of the Republic of Lithuania (statistics).

In the preparation of the projections the conditions determined by the AWG were followed – the impact of the laws adopted before July 2017 was considered.

The projections were not submitted to a peer review in the country.

The changes made to the model are that all three groups of the participants of quasi-mandatory private pension system (those that are paying additional contribution, ones contributing only part of their social insurance contributions and the ones that have terminated contributions) are modelled separately. Situation at the beginning of the projection period is reflected by different shares of each participant type for each cohort. All new entrants of the scheme transfer additional contributions.

Indicators for new pension expenditure decomposition are now calculated for both genders separately. Pension replacement rates are calculated separately for different kinds of quasi-mandatory private pension scheme participants and they are calculated as a ratio of average new pension to average pre-retirement wage.

The last update of the model was done in October 2017 when the new pension reform of 2016 was incorporated.

3.3.2. Assumptions and methodologies applied

The most important agreed demographic and macroeconomic assumptions were incorporated into the LSIM model exogenously: population projection, nominal wage growth, rate of inflation, rate of return, age-sex specific labour force rates and age-sex specific unemployment rates. The rate of nominal GDP growth was calculated endogenously.

Sex and cohort specific participation rates for all projection period are used exogenously for projecting the number of contributors to the quasi-mandatory private funded pension scheme as a percentage of all contributors.

The effect of the minimum number of service years can be best captured by studying the empirical distribution of service years. The distribution of the length of insurance records was introduced and mean pensions (old-age and disability) are calculated on the basis of this distribution in the LSIM model. This approach enables to reflect the non-linearity in pension formula as well as adjustments of the amount of the basic pension in case of insufficient records and bonuses in case of excessive record and thus provides more reliable estimate of mean pensions and replacement rates.

Besides calculation of the averages, model calculates the distribution of supplementary pensions as well as distribution of basic pensions. Both underlying conditional distribution of s (service years) on condition of the age of becoming pensioner and conditional distribution of k (average ratio of person's insured income to average insured income) on condition of s are derived from the database of pensioners and considered only for newly granted pensions.

The current level of the rate of collecting social insurance contributions is fixed.

An automatic pension indexation is applied - old-age, disability, widow's and orphan's pensions are increased by the seven-year average of the wage sum growth over the previous three, current and (projected) upcoming three years. The historical values of the growth of the Annual gross remuneration since 2013 were used for the calculation of the index in the first years of projection and the model output "Total wage sum of contract workers" was used as a basis for the calculation of the projected pension index.

Real rate of return (common 3 % AWG assumption was used) when accumulating the contributions diverted to the quasi-mandatory private funded pension scheme. As regards payouts from this scheme, a single annuity was assumed, calculated by unisex life expectancy (from EUROPOP) and using annuity rate of return.

Assumptions and methodologies applied and data used to projections of the State pension scheme

The projections of the state pension scheme expenditure are made on the basis of AWG macroeconomic assumptions and the projections on the number of the state pension recipients are made in line with AWG demographic and economic assumptions. The data of the Department of Statistics of Lithuania and public institutions awarding and paying the state pensions on distribution of the number of the state pension receivers and pension amounts have been used as the primary data for these projections.

The following assumptions are used as the basis in calculation of the projections of the state pension system for the years 2017-2070:

- Number of officials and military personnel pensioners is projected using a share of pensioners in population (age and gender specific) and projection of the population. Population mortality tables are applied to determine number of dead pensioners and consequently new pensioners. Pensions newly granted in the specific year are calculated multiplying the percentage of newly granted pension (age and gender specific) and the share of average wage by the projected average nominal wage in that year. Pensions granted before the specific year are kept without indexation. Initial average military pensions are read from input data.
- Regarding the state pensions for victims, they are modelled separately from the other types of state pensions. However, the modelling approaches are very similar in both cases. Initial populations of victims' pension receivers as well as other state pensioners are loaded from the input data. These pensioners are further projected using population mortality tables. New pensions are granted at reaching the retirement age, when cohort

share of victims' pension receivers (resp. other state pensioners) in population is applied to the projected number of people in the cohort reaching retirement age. Cohort share of victims' pension receivers in population decreases for younger cohorts down to zero (for cohorts born in 1957 or later).

- Cohort share of other state pensioners is assumed to be constant over the time according to current ratios by age and taking into consideration retirement age increase. New state pension type for mothers who have born 5 or more children (previously 7 or more children) was included into this scheme.
- Average initial victims' pension as well as average other state pensions are loaded from the input data and they are further indexed by the growth of the base for state pensions. Growth of the base for state pension is assumed to be the half of the growth of declared basic pension. The assumption is based on historic experience.

Assumptions and methodologies applied and data used to projections of the Social assistance pension scheme

- Cohort share of orphans and disability social assistance pensioners is assumed to be constant over the time according to current ratios by age and taking into consideration pension age increase.
- The number of social assistance old age pension beneficiaries are computed as a share in population not receiving old-age or disability pension. This share is set to 1 for cohorts older than statutory pension age. In order to get plausible number of social assistance beneficiaries separate projections with solely resident pensioners are produced.
- Initial average social assistance benefit is loaded from the input data and indexed by the wage growth in consecutive years.

3.3.3. Data used to run the model

All the data (databases) used for the model was prepared in close cooperation with the institutions responsible for awarding the social security pensions and the Department of Statistics of the Government of the Republic of Lithuania (statistics).

The most important parameters for pension expenditure calculation, e.g. average retirement age (considering early and postponed retirement), average service period of new retirees, distribution by age and sex of the number of social insurance pensioners (old-age, disability, widows(-ers) and orphans), pension amounts for the base year, number of contributors and their wage distribution by age, number of contributors to quasi-mandatory private funded pension scheme as a percentage of all contributors (disaggregated by sex and cohort) and were extracted from the database of the Social Insurance Fund Board for the year 2016.

3.3.4. Reforms incorporated in the model

All legislated reforms are incorporated in the model.

3.3.5. General description of the model(s)

The Lithuanian Social Insurance Model LSIM is standard cohort model written in VBA. In the model the population is split into several homogenous groups (cohorts) according to the sex and the year of birth. Individuals within each group are considered to be identical. Input data as well as the variables calculated within the model are in the form of cohort averages or totals or higher level aggregates.

The model starts from current cross-sectional information and makes projection of the cohort development on the basis of sex- and age-dependent assumptions on the cohort structure (e.g. sex- and age dependent participation rates, unemployment rates, disability rates, etc.). Most important outputs comprise total revenues and expenditure of the pension system.

The Model consists of the sequence of modules each performing relatively isolated calculations for all cohorts. Input data are loaded from separate file and they often contain several alternative scenarios so that the user can choose from the predefined scenarios for which the calculations are performed.

3.3.6. Additional features of the projection model

The number of old-age pensioners in the model is calculated on the basis of the population figures and age, gender and year specific shares of pensioners in nondisabled population estimated on the past trends with respect to the number of years before/after statutory retirement age while taking into account its legislated increase. Age specific shares of pensioners will thus change with shifts of pension ages.

The number of new pensioners is calculated from difference between current number of pensioners in a cohort and number of pensioners in the respective cohort in the previous year with taking into consideration expected number of dead pensioners. Newly granted pensions are computed in a loop over “s” values (service years) and “k” values (average ratio of person’s insured income to country average income). In each step, number of new pensioners having the respective values “s” and “k” is calculated from the conditional distributions of “s” on age of becoming pensioner and conditional distribution of “k” on “s” and corresponding newly granted pension (basic and supplementary) is calculated for them. These pensioners are subsequently added to the distribution of newly granted pensions. After calculating newly granted pensions for all values “k” and “s” (i.e. all new pensioners are already included), new pensioners with their pensions are added to pension distributions of survival pensioners.

Cohort and year specific participation rates in quasi-mandatory private funded pension scheme are loaded from the data. They are used later for reduction of supplementary pension due to transfers to quasi-mandatory private funded pension scheme.

The model calculates the number of insured who are actually contributing by applying compliance rates to the employed and their actual wage (lower than national average in statistics) on which contributions are paid.

The replacement rates are calculated as a ratio of average newly granted old-age pension (public or private) to average pre-retirement wage. Total replacement rate (public + private old-age pension to average wage) is computed separately for participants in Pillar II and non-participants in Pillar II. Common total replacement rate (regardless to the participation in Pillar II) is calculated as well.

$$rrPublic(y) = (tot_NewPensionExpenditure(y) / (6 * tot_NewPensioners(y))) / (avgWage (y) / 12)$$

Disabled population at the specific age is calculated from the population (less number of disabled in the previous year) multiplied by disability granting probability and by share of disabled in the respective disability group. Probability of surviving half a year is then applied resulting in disabled population at the specific age in the specific year and for a specific gender and disability group. Number of disabled independent of disability group is cumulated. For cohorts older than the statutory pension age, the disability granting probability is set to zero. Some of the disability pensioners switch to the old-age pension and some of them keep the disability pension. Probabilities of switching to old-age pension depend on the group of the disability and they were derived from the database of pensioners.

Orphans population is projected on the basis of fertility rates, probability distribution of age of mother at the birth of the child. New orphans by death of mother are then calculated using annual survival rates for mothers. Corresponding new orphans' benefits are calculated as 50% of the expected pension of the mother (disability or old-age). New orphans by death of mother and their benefits are then summed over mother's age. New orphans by death of father are calculated similarly by using age difference between father and mother loaded from input data. Age, gender and sex specific number of new orphans and their benefits are then obtained by summing orphans and their benefits by death of mother and death of father.

New widow (-er)s are calculated by applying rate of marriage and survival rates for partners on average population. Projection takes into consideration remarriages and deaths of widow (-er)s. Number of different persons modelled per generation.

4. Methodological annex

Economy- wide average wage at retirement

The data for economy-wide average wage at retirement was obtained from Social insurance fund board database of insured persons. The wage profile by age shows that average pre-retirement wage is higher than economy-wide average wage (graph 16). It is presumed in the projection of pre-retirement wage that the wage profile shifts to the higher ages together with the increase of the retirement age.

Graph [16]

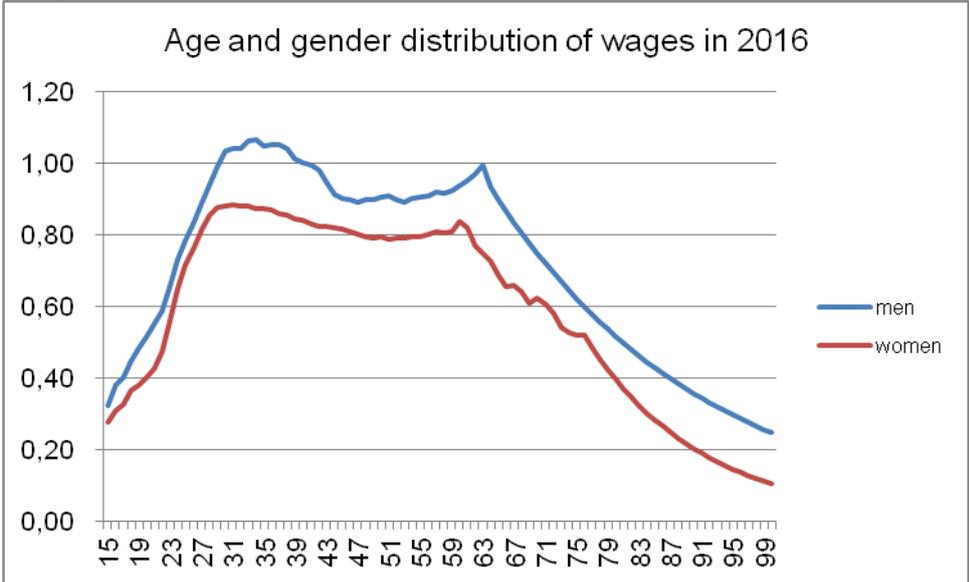


Table A1 – Economy wide average wage at retirement evolution (in thousands euro)

	2017	2020	2030	2040	2050	2060	2070
Economy-wide average wage 1000s EUR	9,8	11,2	18,0	27,3	40,3	58,5	83,7
Economy-wide average wage at retirement 1000s EUR	10,0	11,4	18,4	27,8	41,1	59,7	85,3

Source: Member State

Pensioners vs Pensions

Pension system model works with the number of pensioners. According to legislation it is possible to be entitled to more than one type of pension. Mainly widows and state pensions are paid together with old age and disability pensions. The ratio of pensions over pensioners is stable over the projection horizon and amounts to 1.3.

Pension taxation

Pensions are not subject to taxation.

Disability pension

There is no reform affecting the average amount of the disability pension.

The disability rates in the age groups are mainly affected by the changing distribution of population so as the population ages the average disability rates in older age groups are increasing. Disability rates of the younger age groups also fluctuate due to the changes in distribution of population.

Not all disability pensions are transformed into old age ones when statutory retirement age is reached (see above).

Table A2 – Disability rates by age groups (%)

	2017	2020	2030	2040	2050	2060	2070
Age group -54	5,0	4,8	4,8	4,7	3,9	4,2	4,5
Age group 55-59	20,4	19,8	18,2	17,8	17,8	17,5	17,5
Age group 60-64	20,3	23,2	26,0	25,6	25,3	25,4	25,1
Age group 65-69	13,9	13,9	17,1	16,7	16,7	16,7	17,1
Age group 70-74	12,8	12,9	15,0	15,6	15,4	15,5	16,1
Age group 75+	6,1	7,3	10,0	12,2	12,4	12,3	13,0

Source: Member State

Survivor pensions

A detailed description of the driving forces behind the evolution of the survivor benefit is described in chapter 3.3.6. There are no reforms envisaged that affect the quantification of the benefit so the development of both orphan's and widow's pensions follow the demographic trend.

Non-earnings related minimum pension

The number of social assistance old age pension beneficiaries are computed as a share in population not receiving old-age or disability pension. The shares for all categories (old-age, disability and survivors) are kept constant through all projection period. This share is set to 1 for cohorts older than statutory pension age. In order to get plausible number of social assistance beneficiaries separate projections with solely resident pensioners are produced.

Contribution

Constant contribution rate of 26.3% is assumed over the projection horizon. It is shared between employer (22.3%) and employee (3%) and State (1%). The part of contributions going to public scheme is changing from 24.3% in 2016 to 22.8% in 2020 due to increase of private pension accumulation rate of social insurance contributions from 2% to 3.5% in 2020.

Alternative pension spending decomposition

Table A1 - Factors behind the change in public pension expenditure between 2017 and 2070 (in percentage points of GDP) - pensions

	2017-20	2020-30	2030-40	2040-50	2050-60	2060-70	2017-70
Public pensions to GDP	0,1	0,1	-0,1	-0,5	-0,5	-0,8	-1,7
Dependency ratio effect	0,6	3,6	2,7	0,4	1,2	-2,5	5,9
Coverage ratio effect	-0,4	-1,0	-0,4	-0,1	-0,2	0,0	-2,1
Coverage ratio old-age*	-0,1	-0,5	-0,2	0,0	-0,1	-0,1	-1,0
Coverage ratio early-age*	-0,5	-0,6	-0,4	-0,2	0,8	-1,1	-2,0
Cohort effect*	-0,1	-2,0	-0,9	-0,2	-1,0	1,1	-3,1
Benefit ratio effect	0,0	-1,2	-0,7	-0,4	-0,4	0,0	-2,7
Labour Market/Labour intensity effect	0,0	-0,1	-0,1	0,0	-0,2	0,2	-0,2
Employment ratio effect	0,0	-0,1	-0,1	-0,1	-0,1	0,0	-0,3
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	0,0	-1,2	-1,5	-0,4	-0,9	1,5	-2,6

Source: Commission Services

Table A2 - Factors behind the change in public pension expenditure between 2017 and 2070 (in percentage points of GDP) - pensioners

	2017-20	2020-30	2030-40	2040-50	2050-60	2060-70	2017-70
Public pensions to GDP	0,1	0,1	-0,1	-0,5	-0,5	-0,8	-1,7
Dependency ratio effect	0,6	3,6	2,7	0,4	1,2	-2,5	5,9
Coverage ratio effect	-0,4	-0,8	-0,3	-0,1	-0,2	0,1	-1,6
Coverage ratio old-age*	0,0	0,0	0,0	0,0	0,0	0,0	-0,1
Coverage ratio early-age*	-0,4	-0,5	-0,4	-0,2	0,8	-1,1	-1,9
Cohort effect*	-0,1	-2,0	-0,9	-0,2	-1,0	1,1	-3,1
Benefit ratio effect	-0,1	-1,4	-0,7	-0,4	-0,4	0,0	-3,1
Labour Market/Labour intensity effect	0,0	-0,1	-0,1	0,0	-0,2	0,2	-0,2
Employment ratio effect	0,0	-0,1	-0,1	-0,1	-0,1	0,0	-0,3
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	0,0	-1,2	-1,6	-0,4	-1,0	1,5	-2,7

Source: Commission Services