Finnish Country Fiche on Pensions

February 5th, 2015

Ministry of Finance
Finnish Centre for Pensions
The Social Insurance Institution of Finland

1. Overview of the pension system

1.1. Description

The Finnish public pension scheme (1st pillar) is made up of two statutory pension schemes: one is the national pension scheme guaranteeing a minimum pension to all residents whereas the other is an employment-based, earnings-related pension scheme.

The statutory schemes are closely linked together, with the amount of national pension depending on the size of the earnings-related pension benefits. Increases in the earnings-related pension reduce the national pension by 50 per cent. If the earnings-related pension is above a defined level[1], the national pension is not paid at all. About half of pensioners who get earnings-related pension get also national pension. At the same time, in 2013, there were 80 000 pensioners getting only national pension. Taking all pension types into account, the total number of pensioners in 2013 was roughly 1.38 million.

The *earnings-related pension system* is based on a tripartite arrangement, consisting of employees, employers and the government. Private employees belong to four different sector-related schemes run by private pension institutions. There are little short of 30 pension institutions of different sizes. The pension companies compete with each other and it is employer's decision to choose among pension providers. The Finnish Centre for Pensions is the statutory central body of the private sector pension schemes. The Ministry of Social Affairs and Health is in charge of the general supervision of the earnings-related schemes. Employees in central and local government as well as employees of the Finnish Evangelical-Lutheran Church have their own earnings-related schemes. The schemes for central government employees are managed by the State Treasury under the general supervision of the Ministry of Finance, whereas the Local Government Pension Institute administers the scheme for local government employees.

Pension-tested national pensions are administered by the Social Insurance Institution and supervised by Parliament. National pensions are intended to provide a basic retirement income for those whose earnings related pensions are small or non-existent. All residents of Finland are eligible for the national pension. The old-age pension is payable to insured people over 65 years. A person is entitled to early old-age pension from the age of 63 at the earliest. If the early retirement is taken, the amount of pension will be permanently decreased by 0.4% for each month before the age of 65.

The national pension is also payable as disability and survivor's pension. The supplementary means-tested pension components are: pensioners' housing allowance, pensioners' care allowance, front veterans' supplements and increase for children. National pensions are financed by the state. The purchasing power of national pensions is kept intact by indexation to the consumer price index. The full level of national pension has also been occasionally raised. The most recent discretionary increase in the national pension was 20€ in 2008.

The purpose of the guarantee pension is to provide residents of Finland with a minimum pension if their total pension income before taxes is not more than €736.64 per month (in 2014). The amount of the guarantee pension is affected by any other pension income one may

[1] In 2014 this level is 1 310.30 € per month for people living single and 1 166.96 € for people who live in a relationship; full national pension is 633.91 € and 562.27 € respectively.

have from Finland or abroad. A full guarantee pension is payable only to those with no other pension income. Other pension income is deducted in full from the full amount of the guarantee pension. The care allowance for pensioners, the front-veterans' supplements or the child increase supplementing a pension do not reduce the amount of guarantee pension payable. The guarantee pension is also not reduced by earnings, capital income or assets, or by the informal care allowance. Just as other pensions, the guarantee pension affects both the amount of housing allowance payable and the amount of social assistance being paid to a family. Guarantee pensions are indexed to prices and financed by the state.

The *earnings-related pension* is accumulated according to the following rules. Pensions accrue from the age of 18 to 52 at the rate of 1.5 per cent of wages a year, from 53 to 62 at 1.9 per cent and from 63 to 68 at 4.5 per cent a year. There is no ceiling in the pension benefit.

There are two indices in the earnings-related pension system. The first (pre-retirement index) adjusts past earnings to the present level when computing the pension at the time of retirement. This "*wage coefficient*" puts a weight of 80 per cent on wages and 20 per cent on prices. The other index, "*post-retirement index*", aims at keeping the purchasing power of earnings-related pensions ahead of inflation. This index has a weight of 80 per cent on consumer prices and 20 per cent on wages. Lastly, there is a life expectancy coefficient that adjusts the pensions upon retirement to the changes in longevity as of 2010.

The financing of earnings-related pensions is a combination of a funded and a pay-as-you-go system (PAYG from here on). Pension contributions come from both employers and employees. A fraction of earnings-related pensions are financed from the state budget; the central government contributes to farmers', self-employed and seafarers' pension funding to the degree that the contributions are not sufficient. The pre-funded scheme covers approximately one quarter of earnings-related pension outlays. The rest (3/4) is financed through the PAYG system. Despite the partially funded system in pensions, Finland's earnings-related pension scheme is entirely of the defined-benefit type. The pre-funding is collective in the sense that it has no direct effect on the size of the pension. The main purpose of the pre-funding is to cushion the increase in pension contributions in the coming years.

Voluntary pension schemes (the second and third pillar) have played only a minor role in Finland due to the relatively high net replacement ratio of public pensions, the lack of pension ceilings and full coverage of the systems. From the perspective of pension contribution, the total pension provision consists to 94 per cent of statutory pension provision and to 6 per cent of supplementary pension provision. Thus, in international comparison, the share of supplementary pension provision of the total pension provision is small. In the coming decades, voluntary pension insurance may gain importance as replacement rates in the earning-related pension schemes are projected to decrease due to the life expectancy coefficient.

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

		2013	2020	2030	2040	2050	2060
Men - with 20 contribution years Men - with 40 contribution years Women - with 20 contribution years Women - with 40 contribution years	statutory retirement age	63-68	63-68	63-68	63-68	63-68	63-68
	earliest retirement age	62	63	63	63	63	63
	penalty in case of earliest retirement ag	7.20 %	-	-	-	-	-
	bonus in case of late retirement	Increased accrual rate of 4.5 pp. after 63					

Source: Member States

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

The most important legislative changes since the publication of the previous aging report are related to the agreement to extend working lives that the social partners reached in the spring of 2012. The early old-age pension was terminated in 2014, the eligibility age for part-time pension has risen by one year to 61 years, as has the eligibility age limit for extended unemployment allowance (the so called “unemployment tunnel”). The most recent change in the pension scheme was a partial freeze of the pension indexation; the pensions will be increased by only 0.4 percent in 2015 instead of projected 1.1 percent.

Additionally, there is a substantial pension reform agreed in Finland by the social partners, but it is not legislated yet. The legislation is expected to be passed in May or in June 2015. The agreed reform is treated as a sensitivity scenario and will be discussed later on.

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

The projection is mostly based on the current pension legislation and other guiding regulations.

However, the indexation rules applied to the national pension and guarantee pension differ from the current legislation. According to law, national pensions are adjusted by the consumer price index. National pensions are, however, adjusted discretionarily every so often so as to increase their purchasing power. In the projection, from 2019 onwards, it is assumed that national pensions are adjusted by an index where the weight of consumer price index is 50 % and that of wage index 50%. This choice reflects the actual past policies. In other words, increases are made to the real value of national and guarantee pensions, but these increases lag behind the general earnings growth.

2. Overview of the Demographic and labour forces projections

2.1. Demographic development

The age pyramid and table 2 provide an overview of the demographic developments until 2060. According to Eurostat demographic projections, total population is expected to rise by some 15% over the entire forecasting period.

The old-age dependency ratio (the ratio of persons aged 65 and above to 15–64-year-olds) will continue to grow during the whole projection period, the growth being at its fastest during the current decade. In 2013, the old-age dependency ratio was 29.6%, and it is projected to rise to 45.1% in 2060. The weakening of the old-age dependency ratio in the near future is a consequence of the current age structure in Finland. However, the steadily rising life expectancy implies that the old-age dependency ratio will continue to increase even after the impact of the baby-boom generations has faded.

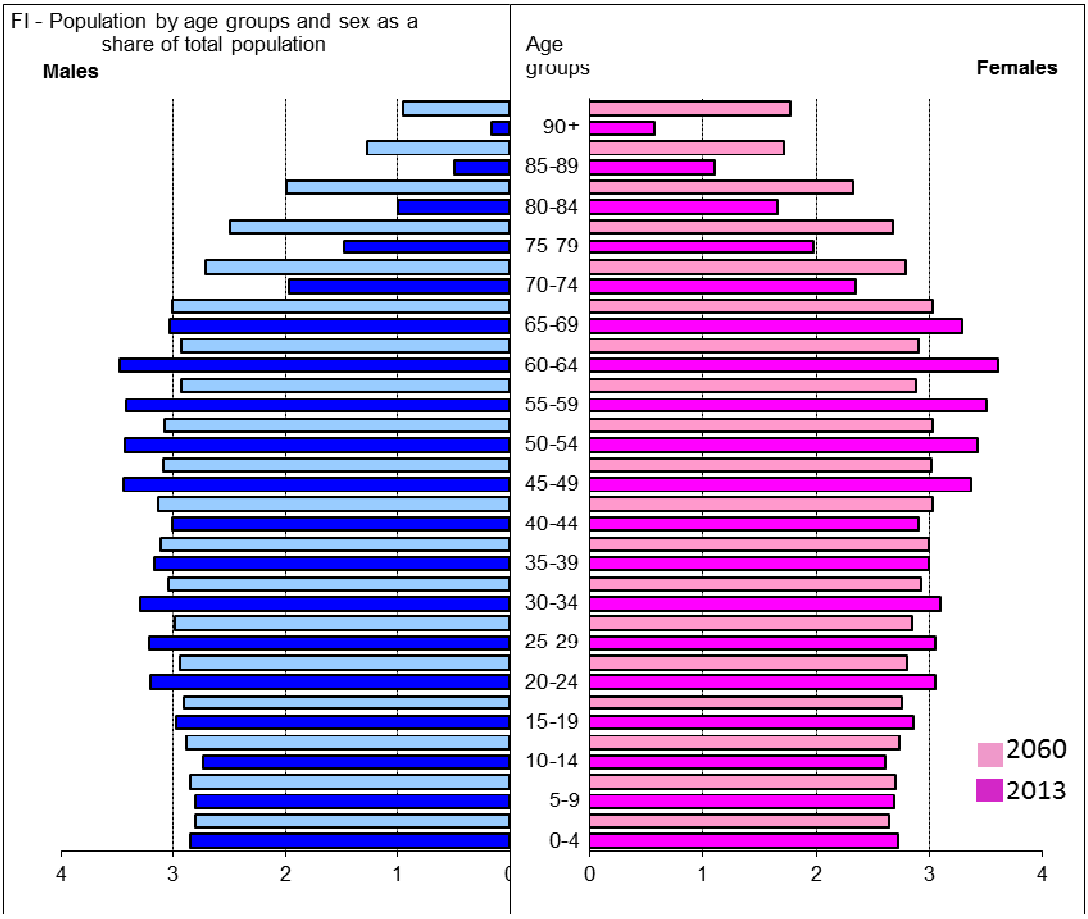
In 2013, life expectancy at birth was 77.7 years for men and 83.5 years for women. It is projected to rise to 84.6 and 89.2 years, respectively, by 2060, thus, the life expectancy at birth increases by about 5½ years for women and 7 years for men. Life expectancy at 65, which approximates the time spent in retirement, rises by some 4½ years for both genders.

Table 2 – Main demographic variables evolution

	2013	2020	2030	2040	2050	2060	Peak year*
Population (thousand)	5439	5633	5892	6064	6165	6244	2060
Population growth rate	0,5	0,5	0,4	0,2	0,1	0,1	2018
Old-age dependency ratio (pop65/pop15-64)	29,6	36,1	41,5	41,1	42,0	45,1	2060
Ageing of the aged (pop80+/pop65+)	26,1	25,1	32,4	38,4	39,2	37,5	2047
Men - Life expectancy at birth	77,7	78,9	80,4	81,9	83,3	84,6	2060
Men - Life expectancy at 65	17,8	18,5	19,5	20,5	21,5	22,4	2060
Women - Life expectancy at birth	83,5	84,5	85,8	87,0	88,1	89,2	2060
Women - Life expectancy at 65	21,4	22,1	23,1	24,0	24,9	25,7	2060
Men - Survivor rate at 65+	84,2	85,9	88,0	89,8	91,3	92,6	2060
Men - Survivor rate at 80+	54,9	58,7	63,8	68,3	72,5	76,1	2060
Women - Survivor rate at 65+	92,1	92,9	93,9	94,8	95,5	96,2	2060
Women - Survivor rate at 80+	73,7	76,3	79,6	82,5	85,0	87,2	2060
Net migration	17,2	22,0	21,7	17,7	9,6	8,9	2025
Net migration over population change	0,7	0,8	1,0	1,3	1,3	1,0	2044

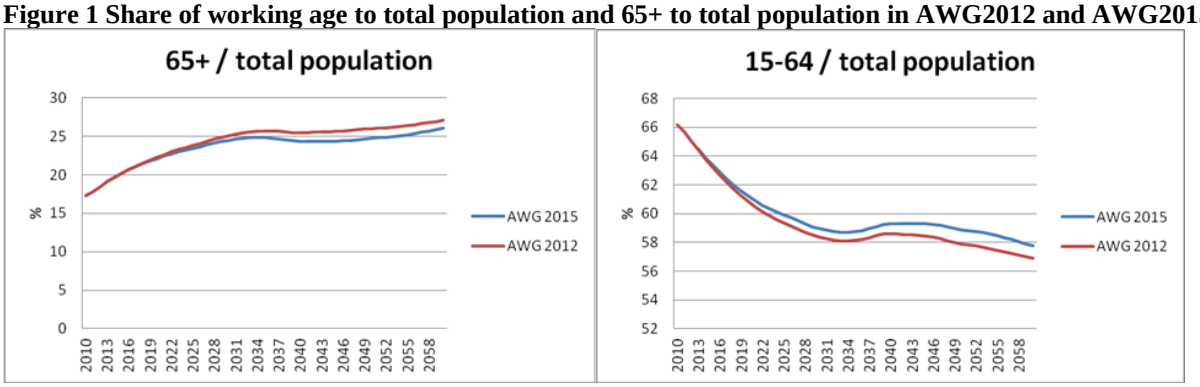
Source: EUROSTAT and Commission Services

Graph 1: Age pyramid comparison: 2013 vs 2060



It seems that the population projection is slightly more favourable to Finland in AWG2015 compared to AWG2012 (see figure 1 below).

Figure 1 Share of working age to total population and 65+ to total population in AWG2012 and AWG2015



2.2. Labour forces

Labour force participation rates (LFPR) are projected to increase for older workers. This will be mostly due to the fact that people live longer and healthier lives, and as a consequence, they will also have to prolong their careers in order to finance the longer lifespan. This effect is implicitly taken into account by the Cohort Simulation Model (CSM). In addition, also the 2009 introduced life expectancy coefficient will play a role in how people behave in the labour market. This is not, however, taken into account in the CSM.

For people aged 55-64, the LFPR will increase from 62.7% in 2013 to 65.7% in 2060, cf. table 3. The largest increase will occur between 2013 and 2022 where the LFPR will already have increased to 67.5%. After 2022, the LFPR will be on a slowly declining track so that the LFPR will be 65.7% in 2060.

The participation rate of 55-64 doesn't, however, quite give an accurate picture of the labour market, as the statutory minimum retirement age in Finland is 63. Dividing the individuals aged 55-64 into two samples, one can see quite clearly the difference between the LFPR before and after the age of 60. In 2013 the LFPR of 55-59 year olds was 76.2% whereas the LFPR of 60-64 was 47%.

Table 3 – Participation rate, employment rate and share of workers for the age groups 55-64 and 65-74

	2013	2020	2030	2040	2050	2060	Peak year*
Labour force participation rate 55-64	62,7	66,8	66,3	66,1	66,4	65,7	2022
Employment rate for workers aged 55-64	58,4	62,8	62,6	62,4	62,7	62,1	2023
Share of workers aged 55-64 on the labour force 55-64	93,1	94,0	94,4	94,4	94,4	94,5	2058
Labour force participation rate 65-74	9,3	11,2	12,9	12,5	12,8	12,8	2046
Employment rate for workers aged 65-74	9,2	11,1	12,7	12,4	12,7	12,7	2046
Share of workers aged 65-74 on the labour force 65-74	98,8	98,9	98,9	99,0	98,9	98,9	2042
Median age of the labour force	41,0	40,0	40,0	40,0	40,0	40,0	2013

Source: Commission Services

The average effective exit age is projected to increase by 1.4 years for men from 2013-2060 and by 0.7 years for women, cf. table 4a and 4b. Furthermore, the entry age is projected to decrease half a year for men and to increase by 0.2 years for women. Hence, the average effective working career is projected to increase 1.9 years for men and, more moderately, 0.3 years for women. The duration of retirement is projected to increase 2.9 and 3.3 years by 2060 for men and women, respectively.

A slight shortage of the cohort simulation model is that, for example, the life expectancy coefficient is not reflected in the projected participation rates or employment rates. It will mostly probably, however, have a positive effect on the length of working career assuming that lower pension rate induce individuals, on average, to prolong their working careers.

Table 4a – Labour market entry age, exit age and expected duration of life spent at retirement - MEN

	2013	2020	2030	2040	2050	2060	Peak year*
Average effective entry age (CSM) (I)	22,5	22,0	22,0	22,0	22,0	22,0	2013
Average effective exit age (CSM) (II)	62,7	64,1	64,1	64,1	64,1	64,1	2016
Average effective working career (CSM) (II)-(I)	40,2	42,1	42,1	42,1	42,1	42,1	2022
Contributory period	2,4	7,5	15,2	23,4	30,1	31,9	2060
Contributory period/Average working career	5,9	17,8	36,1	55,8	71,7	75,7	2060
Duration of retirement **	19,3	19,3	20,3	21,3	22,3	23,2	2060
Duration of retirement/average working career	48,0	45,9	48,3	50,7	53,0	55,2	2060
Percentage of adult life spent at retirement***	30,2	29,5	30,6	31,6	32,6	33,5	2060
Early/late exit****	4,1	2,1	2,0	2,1	2,0	1,9	2013

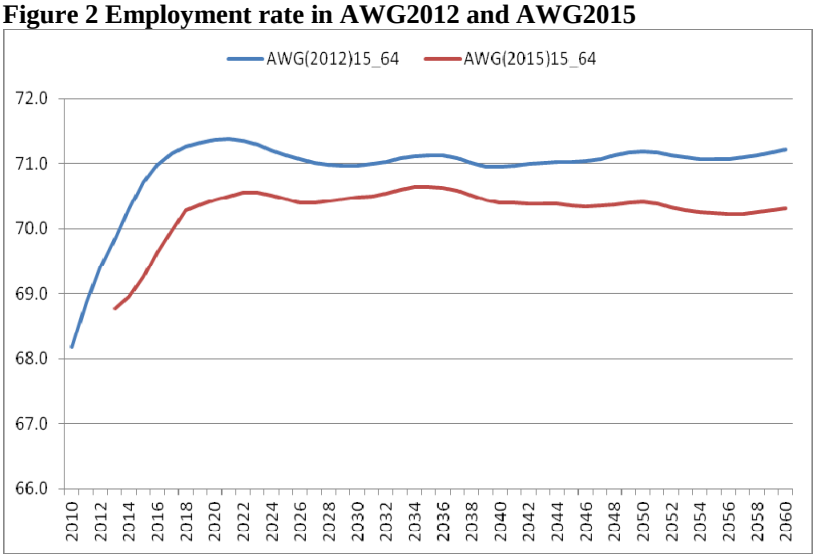
Table 4b – Labour market entry age, exit age and expected duration of life spent at retirement - WOMEN

	2013	2020	2030	2040	2050	2060	Peak year*
Average effective entry age (CSM) (I)	22,7	22,9	22,9	22,9	22,9	22,9	2024
Average effective exit age (CSM) (II)	63,2	63,9	63,9	63,9	63,9	63,9	2022
Average effective working career (CSM) (II)-(I)	40,6	40,9	40,9	40,9	40,9	40,9	2016
Contributory period	2,6	8,0	16,2	24,1	30,6	32,7	2060
Contributory period/Average working career	6,3	19,6	39,5	58,8	74,7	79,8	2060
Duration of retirement **	23,2	23,0	24,0	24,9	25,8	26,6	2059
Duration of retirement/average working career	57,2	56,2	58,6	60,8	63,0	65,0	2059
Percentage of adult life spent at retirement***	33,9	33,4	34,4	35,2	36,0	36,7	2060
Early/late exit****	7,2	2,3	1,8	2,0	2,0	1,9	2014

Source: Commission Services

There is a clearly less favourable employment development in Finland compared to the previous AWG-round (cf. figure 2). This is mostly because, in the CSM, three "good years" are discarded from the calculation of entry/exit rates and are replaced by three "not so good years".

Figure 2 Employment rate in AWG2012 and AWG2015



3. Pension projection results

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

The long-term projection model consists of several interconnected modules, presented in the figure 3 in section 4.5. In the model, the calculation of pension expenditure covers the earnings-related pension acts of the private and the public sectors, as well as the national pension and SOLITA pensions. SOLITA pensions include the pension provision from military injuries insurance, motor liability insurance and workers' compensation insurance. National pensions, including guarantee pensions, are simulated separately from the earnings-related pensions with a model developed in the Social Insurance Institution of Finland.

The main factors explaining the difference between the ESSPROSS and AWG definitions of pension expenditure are that, in the former, pensioners' care allowance and TyEL supplementary pension are included, whereas they are not included in the pension model.

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

TABLE 5	Eurostat (ESSPROS) vs. Ageing Working Group definition of pension expenditure (% GDP)							
	2005	2006	2007	2008	2009	2010	2011	2012
1 Eurostat total pension expenditure	11.2	11.1	10.8	10.8	12.6	12.7	12.5	13.0
2 Eurostat public pension expenditure	10.9	10.9	10.5	10.6	12.4	12.5	12.3	12.8
3 Public pension expenditure (AWG)	:	:	:	:	:	12.2	12.2	12.7
4 Difference (2) - (3)	:	:	:	:	:	0.3	0.1	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

The growth of public pension expenditure is particularly fast in the next two decades, as the baby boom generations reach old age. After that, the GDP share of public pensions actually diminishes somewhat. As for net total pension expenditure, an assumption of a constant tax ratio of 18 per cent has been made, as in the previous round of projections. Similarly, public pension contributions are projected to grow fast until the 2030s, after which they level off.

Occupational and non-mandatory private pensions play a minor role in Finland, and they have not been included in the projections.

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

Expenditure	2013	2020	2030	2040	2050	2060	Peak year*
Gross public pension expenditure	13,4	14,8	15,6	14,1	13,3	13,5	2028
Private occupational pensions	:	:	:	:	:	:	:
Private individual pensions	:	:	:	:	:	:	:
Mandatory private	:	:	:	:	:	:	:
Non-mandatory private	:	:	:	:	:	:	:
Gross total pension expenditure	13,4	14,8	15,6	14,1	13,3	13,5	2028
Net public pension expenditure	11,0	12,1	12,8	11,6	10,9	11,0	2028
Net total pension expenditure	11,0	12,1	12,8	11,6	10,9	11,0	2028
Contributions	2013	2020	2030	2040	2050	2060	Peak year*
Public pension contributions	12,8	13,9	14,2	13,2	12,4	12,4	2027
Total pension contributions	12,8	13,9	14,2	13,2	12,4	12,4	2027

Source: Commission Services

In Finland, there are several harmonised earnings-related pension schemes (private sector, central government, local government, entrepreneurs and farmers). The financing of earnings-related pensions vary considerably between the different pension laws. Contribution rates for private sector employees (TyEL) are determined so that they cover the funded part of pension liabilities and in addition keep the buffer funds at their target level. The contribution rate of entrepreneurs is the same as the average contribution rate for private sector employees as is the contribution rate for farmers, if their pensionable income is above a certain threshold.

The share of disability pensions is projected to decrease somewhat, in line with an assumption of an improving health status of the working age population. Another factor that reduces disability pensions is the fact that number of old workers, who are more likely to end up on disability pension, decline after the baby boom generation is retired. Disability pension is transformed into old age pension when the statutory retirement age is reached.

The evolution of the guarantee pension and national pensions (non-earnings related pensions) are projected to decrease in relation to GDP as each year, more and more individuals are entitled to earnings-related pension schemes, which, in turn, reduces the non-earnings related pension expenditure.

Expenditures in the Farmers' Pension Act (MYEL) are slowly declining from 0.4 of GDP to 0.2 as the sector has become relatively small in Finland and the trend continues. The same is true with the State Employees' Pension Act (VaEL) as the government sector has decreases considerably in size from the 1990s, from 220 000 employees in the beginning of 1990s to approximately 80 000 at the moment. Basically the Employees' Pension Act (TyEL), Self-Employed Persons' Pensions Act (YEL) and the Local Government Pensions Act (KuEL) are growing and, at the same time, substituting the declining pension acts.

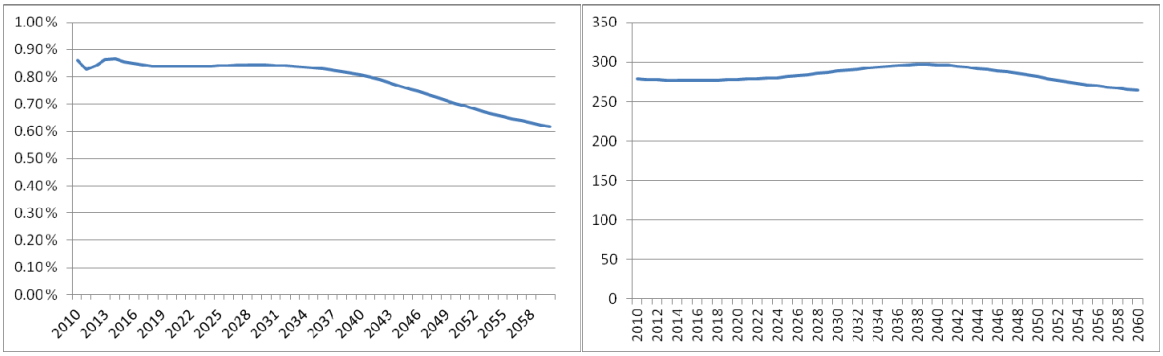
Table 7 - Projected gross public pension spending by scheme (% of GDP)

Pension scheme	2013	2020	2030	2040	2050	2060	Peak year *
Total public pensions	13.4	14.8	15.6	14.1	13.3	13.5	2028
of which earnings related:							
Old age and early pensions	10.1	12.0	13.0	11.7	11.1	11.4	2029
of which							
Entrepreneurs (YEL)	0.5	0.6	0.7	0.7	0.7	0.7	
Farmers (MYEL)	0.4	0.4	0.4	0.3	0.2	0.2	
State employees (VAEL)	2.2	2.2	1.9	1.4	0.9	0.7	
Local government employees (KUEL)	2.1	2.6	3.0	2.7	2.5	2.5	
Child-care and studying (VEKL)	0.0	0.0	0.0	0.1	0.2	0.3	
Others (mainly private sector employees (TYEL))	4.9	6.2	7.1	6.6	6.6	7.1	
Disability pensions	1.1	0.8	0.7	0.7	0.7	0.6	2013
Survivors' pensions	0.9	0.8	0.8	0.8	0.7	0.6	2014
Other pensions	:	:	:	:	:	:	:
of which non-earnings related (including minimum pension and minimum income guarantee):							
Old age and early pensions	0.84	0.67	0.60	0.53	0.48	0.45	2013
Disability pensions	0.39	0.35	0.36	0.34	0.31	0.28	2013
Other pensions	0.08	0.07	0.05	0.04	0.03	0.02	2013

Source: Commission Services

The ratio of survivors' pension expenditure stays somewhat constant until the 2030's after which it starts to slowly decline. There is a declining trend in the total public pension expenditure from the 2030s onwards which also shows in the survivors' pension. In addition, as the pension system matures, the survivors average earnings-related pension increases which in turn lowers the survivors' pension (survivors pension is income-tested). The number of survivors increases until the beginning of 2040s after which it starts to decline. This is mostly due to demographic factors; the yearly number of the deceased will decline in the 2040s and 2050s, and the survivors will spend less time being a widow.

Figure 3 Ratio of survivors' pension expenditure and GDP (left) and number of survivors' pensioners (right)



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

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

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

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

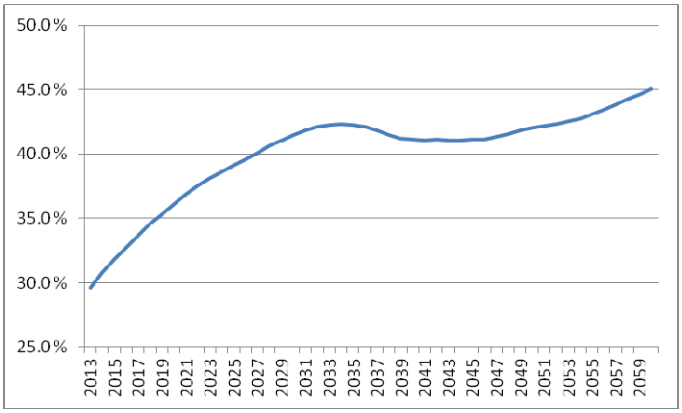
$$\overbrace{\frac{\text{Number of Pensioners}}{\text{Population } 65+}}^{\text{Coverage Ratio}} = \overbrace{\frac{\text{Number of Pensioners } 65+}{\text{Population } 65+}}^{\text{Coverrage Ratio Old-Age}} + \left(\overbrace{\frac{\text{Number of Pensioners} \le 65}{\text{Population } 50-64}}^{\text{Coverage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

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

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

The proposed decomposition is calculated using pensioners, but not with using the number of pensions. By far the largest positive factor behind the change in public pension expenditure is the dependency ratio effect. Up until the early 2030s, the increase in old-age dependency ratio in Finland is one of the fastest in the EU. The dependency ratio is plotted below in figure 4.

Figure 4 Old-age dependency ratio in Finland



The coverage ratio effect is also substantial. The coverage ratio effect represents a significant, but somewhat decreasing factor lowering public pension expenditure in the future. A plausible interpretation for this phenomenon is that, during 2010-2020 and to a degree during 2020-2030, the change in persons still at work after the age of 65 is increasing. This is partly a consequence of the high accrual rate of 4.5% for workers aged between 63 and 68 introduced in the 2005 pension reform. In subsequent decades, this effect is smaller.

The benefit ratio effect reflects mostly the Finnish sustainability factor (life expectancy coefficient), which starts to affect pension benefits increasingly from year 2010 onwards. Life expectancy coefficient is the ratio of the remaining expected lifetime at age 62 on particular year compared to base year 2009. Life expectancy coefficient, which is taken into account in all calculations, cuts the new pensions every year. In practice, for an individual, it is possible to counteract the effect of the life expectancy coefficient by postponing retirement, but it is not visible in the employment scenarios of the CSM.

Table 8 - Factors behind the change in public pension expenditures between 2013 and 2060 (in percentage points of GDP) - pensioners

	2013-20	2020-30	2030-40	2040-50	2050-60	2013-60	Average annual change
Public pensions to GDP	1,4	0,8	-1,5	-0,8	0,2	0,1	0,015
Dependency ratio effect	2,9	2,3	-0,1	0,3	1,0	6,3	0,140
Coverage ratio effect	-1,2	-0,6	-0,2	-0,3	-0,4	-2,7	-0,065
*Coverage ratio old-age**	*-0,1*	*0,0*	*-0,1*	*-0,2*	*-0,2*	*-0,6*	*-0,014*
*Coverage ratio early-age**	*-1,3*	*0,3*	*-1,2*	*-0,6*	*-0,3*	*-3,1*	*-0,076*
*Cohort effect**	*-3,0*	*-3,1*	*0,6*	*0,0*	*-1,1*	*-6,6*	*-0,160*
Benefit ratio effect	0,3	-0,7	-1,3	-0,8	-0,4	-2,8	-0,051
Labour Market/Labour intensity effect	-0,4	-0,1	0,1	0,0	0,0	-0,5	-0,007
Employment ratio effect	*-0,3*	*-0,1*	*0,0*	*0,0*	*0,0*	*-0,3*	*-0,005*
Labour intensity effect	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,002*
Career shift effect	*-0,1*	*0,0*	*0,1*	*0,0*	*0,0*	*-0,2*	*-0,004*
Residual	-0,1	-0,1	0,0	0,0	0,0	-0,3	-0,001

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

Source: Commission Services

The evolution of the replacement rate[2] in the decades to come reflects mostly, again, the effect of the life expectancy coefficient, the effect of which is considerable, especially from the 2030s onwards. The coverage of the public pension schemes is 100%, as all pensioners in Finland benefit from at least one public pension scheme. The life expectancy coefficient is depicted in figure 5 below.

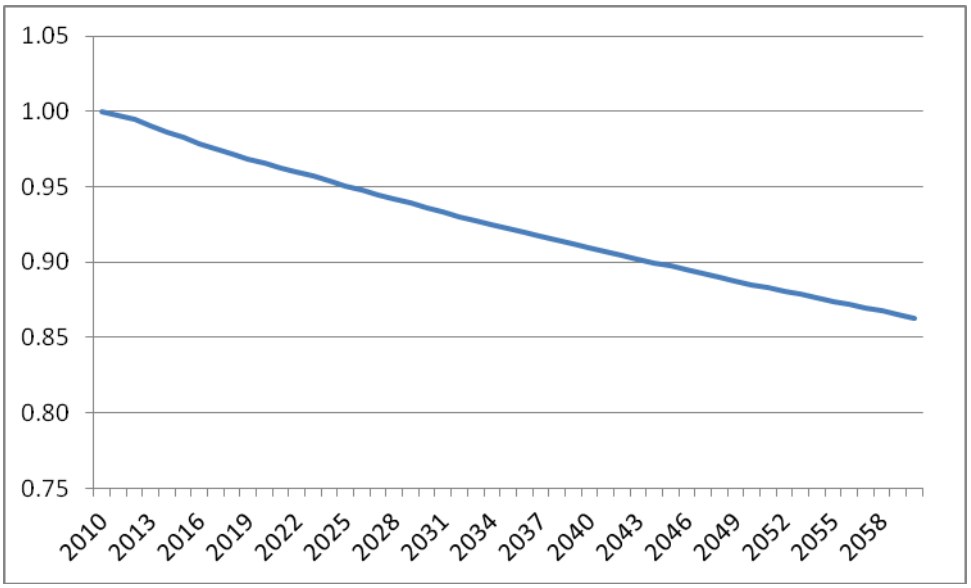
[2] The public scheme replacement rate is calculated by adding up new earnings related old-age pension, new earnings related disability pensions and new national pensions (incl. guarantee pension) and dividing this sum by the total number of new retirees. This number, in turn, is divided by the average wage at retirement. It is assumed, that individuals that do not receive earnings-related pension, do not work before retirement, thus, the lowering the average wage at retirement.

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

TABLE 9	Replacement rate at retirement (RR), benefit ratio (BR) and coverage by pension scheme (in %)					
	2013	2020	2030	2040	2050	2060
Public scheme (BR)	52,1	54,9	52,9	48,8	45,6	43,8
Public scheme (RR)	46,0	51,3	46,3	45,7	45,7	44,1
Coverage	100,0	100,0	100,0	100,0	100,0	100,0
Public scheme old-age earnings related (BR)	48,9	52,3	49,9	45,8	43,2	42,2
Public scheme old-age earnings related (RR)	42,6	47,8	43,2	42,8	43,2	42,0
Coverage	81,3	85,8	88,4	88,4	88,6	89,5
Private occupational scheme (BR)	:	:	:	:	:	:
Private occupational scheme (RR)	:	:	:	:	:	:
Coverage	:	:	:	:	:	:
Private individual scheme (BR)	:	:	:	:	:	:
Private individual scheme (RR)	:	:	:	:	:	:
Coverage	:	:	:	:	:	:
Total (BR)	52,1	54,9	52,9	48,8	45,6	43,8
Total (RR)	46,0	51,3	46,3	45,7	45,7	44,1

Source: Commission Services

Figure 5 Life expectancy / sustainability coefficient used in the simulations



The number of pensioners increases rapidly starting from mid 2010s due to demographic reasons. The same pertains for those aged 65 and older. Employment and working age population are slightly increasing. The increasing system dependency ratio reflects the stationarity in working-age population and increase in pensioners during the decades to come.

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

	2013	2020	2030	2040	2050	2060
Number of pensioners (thousand) (I)	1436,5	1580,8	1752,5	1773,1	1789,2	1853,7
Employment (thousand) (II)	2465,7	2508,1	2534,0	2606,8	2639,7	2626,0
Pension System Dependency Ratio (SDR) (I)/(II)	58,3	63,0	69,2	68,0	67,8	70,6
Number of people aged 65+ (thousand) (III)	1037,5	1246,3	1441,1	1478,7	1525,1	1625,7
Working age population 15 - 64 (thousand) (IV)	3508,1	3448,9	3474,1	3595,6	3629,9	3608,0
Old-age Dependency Ratio (ODR) (III)/(IV)	29,6	36,1	41,5	41,1	42,0	45,1
System efficiency (SDR/ODR)	2,0	1,7	1,7	1,7	1,6	1,6

Source: Commission Services

The noteworthy phenomenon apparent in tables 11a and 11b is the decrease in the share of pensioners in the age group 60–64 during 2010–2060, which reflects the expected rise in the effective retirement age in the future, partly as a result of the 2005 pension reform and the high pension accrual rate for workers aged between 63 and 68. Also, tightened access to the so-called unemployment tunnel to retirement is somewhat reflected in these figures. The reason for the higher than 100 % shares in the tables below is that the pensioners' figures include those living abroad. The same observation of declining share of the age group 60-64 can be made also when the exercise is repeated exclusively for women (tables 12a and 12b).

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

	2013	2020	2030	2040	2050	2060
Age group -54	6.8	6.2	6.1	6.0	5.9	5.8
Age group 55-59	75.8	72.0	60.7	54.4	54.1	54.3
Age group 60-64	87.2	80.7	75.8	67.6	64.1	61.5
Age group 65-69	115.6	114.6	112.0	106.9	101.9	98.2
Age group 70-74	102.1	105.8	107.1	106.1	106.6	106.5
Age group 75+	101.4	101.5	102.6	102.2	101.2	100.1

Source: Commission Services

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

	2013	2020	2030	2040	2050	2060
Age group -54	3,7	3,4	3,4	3,4	3,2	3,1
Age group 55-59	24,7	23,7	26,6	24,3	23,2	23,8
Age group 60-64	46,6	39,1	35,6	32,7	30,8	29,8
Age group 65-69	100,9	92,9	89,5	85,9	82,3	79,4
Age group 70-74	98,3	101,4	100,8	99,3	100,1	100,0
Age group 75+	98,0	100,4	101,5	101,0	100,1	99,2

Source: Commission Services

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

	2013	2020	2030	2040	2050	2060
Age group -54	6.0	5.5	5.5	5.5	5.3	5.3
Age group 55-59	82.6	72.1	63.8	57.1	59.4	60.0
Age group 60-64	85.4	81.6	75.5	67.7	64.8	62.5
Age group 65-69	112.0	114.6	111.1	106.6	102.3	99.0
Age group 70-74	99.4	103.4	104.5	103.1	103.5	103.6
Age group 75+	100.5	100.8	102.3	101.9	100.5	99.7

Source: Commission Services

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

	2013	2020	2030	2040	2050	2060
Age group -54	2.4	2.3	2.3	2.3	2.2	2.2
Age group 55-59	14.8	13.2	12.1	11.8	11.5	11.5
Age group 60-64	45.9	38.2	35.0	32.4	30.5	29.5
Age group 65-69	101.5	94.2	90.4	86.8	83.6	80.7
Age group 70-74	97.0	101.5	100.8	99.5	99.9	99.9
Age group 75+	100.5	100.8	102.3	101.9	100.5	99.7

Source: Commission Services

The projected new pension expenditure is reported in Table 13a. The average contributory period is based on the observed statistical figure for 2010 and from then onwards, the increase follows the lengthening of the working career based on the increase of the expected retirement age. The average accrual rates are the averages for each year in the model. Note that the figures in Table 13a pertain to earnings-related pensions only.

In Tables 13a-c the contributory period in row II is after 2009 due to data issues (in 2005 reform data was aggregated so that this variable cannot be retrieved). This is why there is an additional row in the end of the table which tells the contribution of pre-2009 to new pension expenditure. The projected new pension expenditure, I, thus equals II*III*IV*V*VI*VII+VIII.

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

New pension	2013	2020	2030	2040	2050	2060
I Projected new pension expenditure (millions EUR)	575,3	736,8	926,1	1187,8	1809,5	2600,8
II. Average contributory period	2,5	7,7	15,7	23,8	30,4	32,3
III. Monthly average pensionable earnings	2941,5	3521,6	4760,7	6526,8	8759,7	12065,7
IV. Average accrual rates (%)	2,9	2,3	1,9	1,9	1,9	1,9
V. Sustainability/Adjustment factor	1,0	1,0	0,9	0,9	0,9	0,9
VI. Number of new pensioners ('000)	70,1	68,3	69,1	63,3	67,1	69,7
VII Average number of months paid the first year	6,0	6,0	6,0	6,0	6,0	6,0
VIII Contribution to new pension expenditure accrued before 2009, Total (millions EUR)	487,7	491,3	365,6	192,4	51,8	0,1

Source: Commission Services

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

New pension	2013	2020	2030	2040	2050	2060
I Projected new pension expenditure (millions EUR)	349,3	405,8	516,2	668,5	1002,2	1430,4
II. Average contributory period	2,4	7,5	15,2	23,4	30,1	31,9
III. Monthly average pensionable earnings	3398,3	4008,6	5387,0	7467,2	9977,7	13777,6
IV. Average accrual rates (%)	2,9	2,3	1,9	1,8	1,8	1,8
V. Sustainability/Adjustment factor	1,0	1,0	0,9	0,9	0,9	0,9
VI. Number of new pensioners ('000)	34,7	33,3	34,3	31,7	33,6	34,8
VII Average number of months paid the first year	6,0	6,0	6,0	6,0	6,0	6,0
VIII Contribution to new pension expenditure accrued before 2009, Men (millions EUR)	278,2	273,4	211,2	111,9	26,9	0,1

Source: Commission Services

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

New pension	2013	2020	2030	2040	2050	2060
I Projected new pension expenditure (millions EUR)	249,4	331,0	409,8	519,3	807,2	1170,2
II. Average contributory period	2,6	8,0	16,2	24,1	30,6	32,7
III. Monthly average pensionable earnings	2528,3	3089,8	4182,5	5609,7	7552,1	10403,7
IV. Average accrual rates (%)	2,9	2,3	1,9	1,9	1,9	1,9
V. Sustainability/Adjustment factor	1,0	1,0	0,9	0,9	0,9	0,9
VI. Number of new pensioners ('000)	35,5	35,0	34,9	31,6	33,5	34,9
VII Average number of months paid the first year	6,0	6,0	6,0	6,0	6,0	6,0
VIII Contribution to new pension expenditure accrued before 2009, Women (millions EUR)	209,5	217,9	154,4	80,5	24,8	0,0

Source: Commission Services

3.4. Financing of the pension system

3.4.1. Assets

From the founding of the private sector pension scheme until the 2010s, the pension contributions have nearly always exceeded the pension expenditure. During the period 2010−2012, the TyEL pension expenditure and contribution income were roughly equal. In the future, the expenditure will surpass the contribution income. The difference will be financed with returns on pension assets. In 2012 (31 Dec.), the TyEL assets added up to 185 % of wage sum. They are projected to increase slightly, as a percentage of wage sum, in the future.

There are also considerable public sector pension assets, but they are mostly buffers against the challenging demographic change.

The assets' share of GDP will increase next two decades and decline somewhat thereafter. The decline is mainly due of decrease of the assets of the municipal sector pension fund. Private sector public funds will accumulate during the next decade and will remain stable

after that. The contribution rates are set so that funds do not decline if expenditure increases. Central government funding rules state that funds will be accumulated until the fund reach the 25% level compared to total pension liabilities. Central government pension fund receives all central government pension contributions. The contribution rate will be fixed in future. The fund pays 40 % of yearly pension expenditure to the State budget and rest of contributions and interest revenues after expenses are funded. The municipal sector pension fund will adjust with the surplus or deficit that occurs after expenditures are subtracted from revenues. The contribution rate will be fixed in the future. The municipal sector pension assets will decline significantly during the next decades.

3.4.2. Financing of Pensions

The Employees' Pension Act (TyEL) is a partially funded system, whereas Self-Employed Persons' Pensions Act (YEL) and Farmers' Pensions Act (MYEL) are financed from the PAYG system so that the State pays the share of the expenditure that the contribution income does not cover. The State Employees' Pension Act (VaEL) and the Local Government Pensions Act (KuEL) are PAYG schemes with significant buffer funds. The Seafarer's Pensions Act (MEL) is partially funded scheme of which the state finances one third of expenditures.

The total contributions (as a percentage of wage sum) in table 14 is defined to be the total TyEL contributions of employees and employers. Additionally, the state contributions is defined rather loosely here, as it includes *the expenditures* in the VaEL, the KuEL, the MEL, the YEL, the MYEL and, finally, the national pensions and guarantee pensions are included which are fully financed from the state budget.

The contributions to wage sum ratio will, at first, increase rather sharply from 30.3 % in 2013 to 35.2 % in 2028 after which it will gradually decline to 30.4 % in 2060. This reflects the pressure in the system in the beginning of the simulation period, but the pressure will ease as the demographic change stabilizes. One should also bear in mind, that in the Finnish pension scheme, the increase in life-expectancy is fully neutralized by the life expectancy coefficient and the pressure to the system stems mostly from the evolution of the demography.

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

	2013	2020	2030	2040	2050	2060
Public contribution	24725.1	32685.4	46133.0	62307.7	84353.0	118488.6
Employer contribution	*9032.9*	*11804.2*	*16777.8*	*24382.3*	*34907.9*	*49971.9*
Employee contribution	*2828.8*	*4422.1*	*6388.4*	*9103.6*	*12844.5*	*18752.3*
State contribution	*12863.5*	*16459.1*	*22966.8*	*28821.8*	*36600.5*	*49764.4*
Number of contributors (I)	2286.3	2295.5	2313.7	2391.9	2415.1	2397.4
Employment (II)	2465.7	2508.1	2534.0	2606.8	2639.7	2626.0
Ratio of (I)/(II)	0.9	0.9	0.9	0.9	0.9	0.9

Source: Commission Services

3.5. Sensitivity analysis

The increasing effect of the higher life expectancy scenario on public pension expenditure is dampened by the life expectancy coefficient which decreases the benefit levels. However, the life expectancy coefficient does not remove all the effects of the rising life expectancy on expenditure. First, it does not adjust the pension levels of those who have already retired. Furthermore, the life expectancy coefficient does not apply to pensions paid by The Social Insurance Institution. It is also possible that the dampening effect of the life expectancy coefficient on the expenditure level will weaken if the value of the coefficient approaches its lower limit.

The effect of the higher (lower) labour productivity is in line with the resulting higher (lower) GDP and its denominator effect on pension expenditure. In the long term, an increase in the earnings growth would decrease the pension expenditure relative to GDP. The purchasing power of pensions would grow significantly, even though the pension level would decrease relative to average earnings. In the long term, the TyEL contribution rate would be below that of the baseline projection.

The effect of the higher (lower) interest rate is small and shows up only towards the end of the projection period. The interest rate has no direct impact on pensions. This is because the Finnish pension system is defined-benefit type regardless of pre-funding and large pension funds' assets. Instead the rate of return on pension funds' assets has a remarkable impact on the financial sustainability of the pension system and the whole general government through lowering the contribution rate.

A higher employment rate resulting from a lower structural unemployment rate decreases, as is to be expected, public pension expenditure via the denominator effect. The effect seems to be largest around the year 2030, reflecting the fact that pensions are by large earnings related. High employment implies also high pension accrual. In the longer time horizon these accruals are paid out as higher pensions.

Similarly, the higher employment rate of older workers decreases public pension expenditure as fewer people in the age group 55–64 are inactive, including pensioners. In addition, the pension level would increase relative to average earnings, and the need to raise the TyEL contribution rate would be reduced.

Instead of doing the sensitivity scenario of linking retirement age to life expectancy, the calculation was done according to the Finnish pension reform agreed by the Social partners on September last year. The negotiated reform actually also includes the linking of retirement age to life expectancy, although with different time-schedule than in the Commission scenario. The reform should take place in 2017 and the sitting government have already started the preparation of the legislation. The pension laws themselves are planned to be passed by the next parliament in the spring/early summer this year. In short, retirement age will increase gradually to 65 years by 2025 after which the eligibility age for old-age retirement will be linked to life expectancy as of 2027 so that the time spent working in relation to the time spent in retirement will remain at the 2025 level. Also, there are changes in the part-time pension, accrual rates, contribution rates and life expectancy coefficient. According to the calculations, the reform would decrease the pension expenditure relative to GDP over half percentage point from the 2030s onwards and the need to raise the TyEL contribution rate would be reduced considerably.

Table 15 - Public and total pension expenditures under different scenarios (deviation from the baseline)

	2013	2020	2030	2040	2050	2060
Public Pension Expenditure						
Baseline	13,4	14,8	15,6	14,1	13,3	13,5
Higher life expectancy (2 extra years)	-0,1	0,0	0,1	0,2	0,3	0,2
Higher lab. productivity (+0.25 pp.)	-0,1	-0,1	-0,3	-0,4	-0,4	-0,4
Lower lab. productivity (-0.25 pp.)	-0,1	0,0	0,2	0,3	0,4	0,4
Higher emp. rate (+2 pp.)	-0,1	-0,2	-0,3	-0,3	-0,2	-0,1
Higher emp. of older workers (+10 pp.)	-0,1	-0,8	-0,8	-0,2	0,0	0,0
Lower migration (-20%)	-0,1	-0,1	-0,1	-0,1	-0,1	-0,2
Risk scenario	-0,1	-0,1	-0,1	-0,3	-0,5	-0,8
Policy scenario: linking retirement age to increases in life expectancy*	-0,1	0,0	-0,6	-0,7	-0,8	-0,6
Total Pension Expenditure						
Baseline	13,4	14,8	15,6	14,1	13,3	13,5
Higher life expectancy (2 extra years)	-0,1	0,0	0,1	0,2	0,3	0,2
Higher lab. productivity (+0.25 pp.)	-0,1	-0,1	-0,3	-0,4	-0,4	-0,4
Lower lab. productivity (-0.25 pp.)	-0,1	0,0	0,2	0,3	0,4	0,4
Higher emp. rate (+2 pp.)	-0,1	-0,2	-0,3	-0,3	-0,2	-0,1
Higher emp. of older workers (+10 pp.)	-0,1	-0,8	-0,8	-0,2	0,0	0,0
Lower migration (-20%)	-0,1	-0,1	-0,1	-0,1	-0,1	-0,2
Risk scenario	-0,1	-0,1	-0,1	-0,3	-0,5	-0,8
Policy scenario: linking retirement age to increases in life expectancy*	-0,1	0,0	-0,6	-0,7	-0,8	-0,6

* This scenario is calculated according to the negotiated pension reform which should take place in 2017

Source: Commission Services

3.6. Description of the changes in comparison with 2012 projections

There are several reasons why new macro assumptions change the ratio of pension expenditure to GDP. The most important single factor is the change in assumptions.

In the figure 6 and 7 below, *the blue line* depicts the current 2015 projection, *the red line* is the previous, 2012 aging report projection, *the green line* describes the 2012 projection with the current assumptions in earnings, inflation and other indices and, finally, *the purple line* plots the 2012 projection with all the current assumptions, also including demographic and labour market assumptions. The difference between the blue and purple line are the result of changes in modelling.

Figure 6 Average pension to average wage ratio

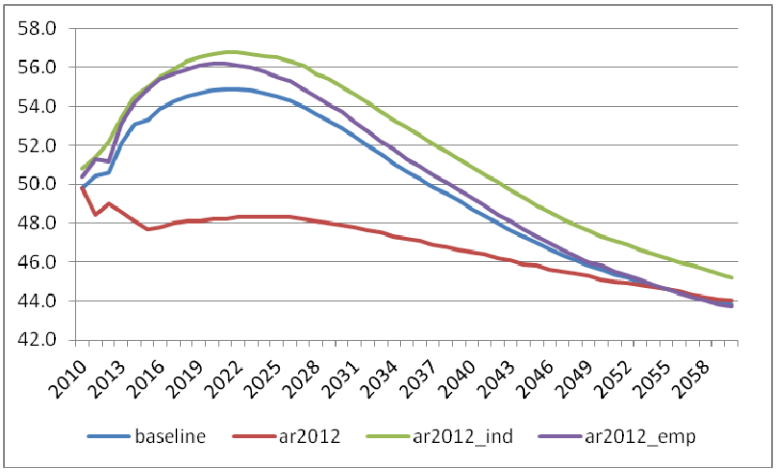
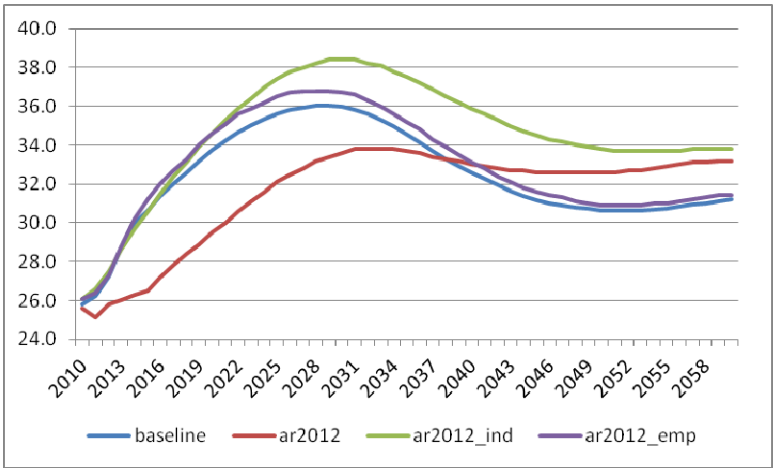


Figure 7 Pension expenditure to wage sum ratio



At the beginning of projection period, the benefit ratio is higher in AR2015 than in AR2012 and the benefit ratio is increasing more rapidly in AR2015, because pensions are indexed only partially to wages and the wage growth is more moderate in AR2015. Nevertheless, the benefit ratio is approximately the same in both projections at the end of the projection period in 2060 (Figure 6, red and blue line). Hence, the more steeply declining benefit ratio in AR2015 is fully caused by the higher beginning level.

In the long run, demographic factors lower pension expenditures to wage sum in two ways. On the one hand, there is more employed relative to pensioners, but on the other hand lower mortality lowers average pensions relative to average wages due to life expectancy coefficient and indirectly longer indexation time (Figure 7, green and purple line).

The level shift downwards in employment rate does not have an effect on earnings-related pension expenditure to GDP *in the long run*. Wage sum and pension expenditure react to changes in employment in the same way, although the pension expenditure reacts much more slowly. On the other hand, lower employment rate certainly increases the national pension expenditure.

GDP relative to wage sum is evolving a bit differently in AR2012 and AR2015. In AR2015, the GDP to wage sum ratio is higher and, consequently, the pension expenditure to GDP ratio is lower compared to AR2012.

Table 16 - Average annual change in public pension expenditure to GDP during the projection period under the 2001, 2006, 2009 and 2012 projection exercises

	Public pensions to GDP	Dependency ratio	Coverage ratio	Employment effect	Benefit ratio	Labour intensity	Residual (incl. Interaction effect)
2006 *	3,33	8,76	-3,07	-0,89	-0,85	:	-0,61
2009 **	3,33	8,69	-3,14	-0,61	-0,86	:	-0,74
2012 ***	3,19	8,57	-3,20	-0,54	-0,90	-0,01	-0,73
2015****	0,06	6,29	-2,61	-0,35	-2,85	0,00	-0,43
* 2004-2050; ** 2007-2060; *** 2010-2060; **** 2013-2060							

Source: Commission Services

Decomposition of the difference between 2012 and the new public pension projection is reported in Table 17. The main reason for the difference is the change in assumptions (ie. earnings, inflation, indices, demographic structure and employment). Improvement in the coverage of modeling includes not only changes in modeling, but also changes in certain parameters such as transition probabilities. There has not been any change in the interpretation of constant policy, and the impact of policy related changes is quite small because there have not been any major reforms since the previous projection (cf. chapter 1.2).

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

	2010	2013	2020	2030	2040	2050	2060
Ageing report 2012	12.0	12.3	14.0	15.6	15.2	14.9	15.2
Change in assumptions	0.1	0.9	1.0	0.0	-1.2	-1.9	-2.0
Improvement in the coverage or in the modelling	0.0	0.0	-0.1	-0.2	-0.1	-0.1	-0.1
Change in the interpretation of constant policy	:	:	:	:	:	:	:
Policy related changes	0.0	0.0	-0.2	-0.1	0.0	0.0	0.1
New projection	12.2	13.4	14.8	15.6	14.1	13.3	13.5

Source: Member State

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

4.1. Institutional context in which those projections are made

The Finnish Centre for Pensions runs the earnings-related model, and the Social Insurance Institution of Finland runs the national pension model. There is no formal national peer review of the projections other than review experts in the Ministry of Finance, Finnish Centre for Pensions and the Social Insurance Institution.

4.2. Assumptions and methodologies applied

The results of this fiche have been calculated using the long-term projection model of the Finnish Centre for Pensions. The model simulates the functioning of the Finnish pension system and can be used to make projections for the purposes of planning and forecasting.

4.3. Data used to run the model

The earnings-related projection model requires the following data to describe the initial situation, specified by pension act as well as by the age and gender of the insured:

1. population distribution over different acts and different states under the acts
2. salaries of the insured
3. amounts of pension accrued
4. technical provisions and the amount of pension assets
5. amounts of the pensions payable
6. transition probabilities between different states

Figures describing the initial values for the projection (2012) come from the Finnish Centre for Pension's employment and pension registers, the joint statistics of the Social Insurance Institution and the Finnish Centre for Pensions, the Local Government Pension Institution and the State Treasury.

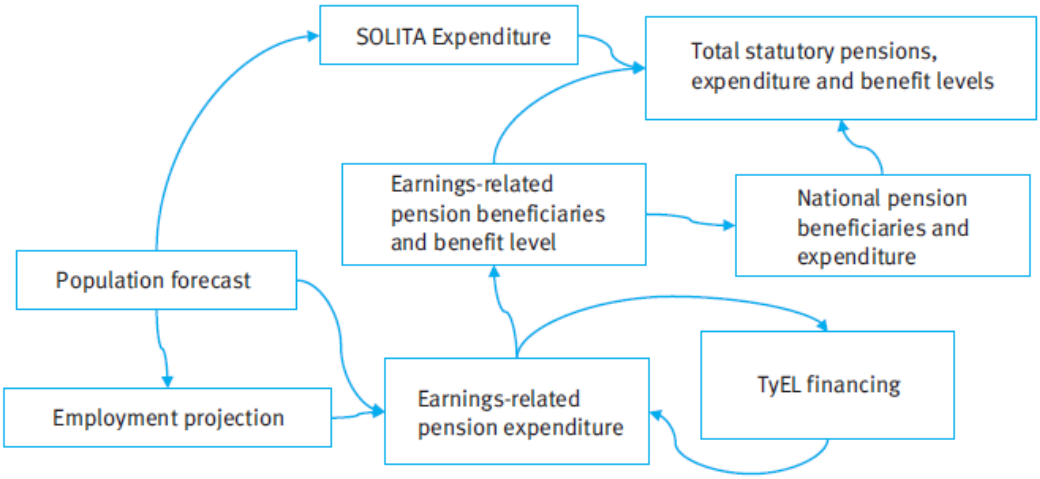
4.4. Reforms incorporated in the model

Please see above (section 1.2.) the reference to the reforms made into the earnings-related model and to the national pension scheme.

4.5. General description of the model(s)

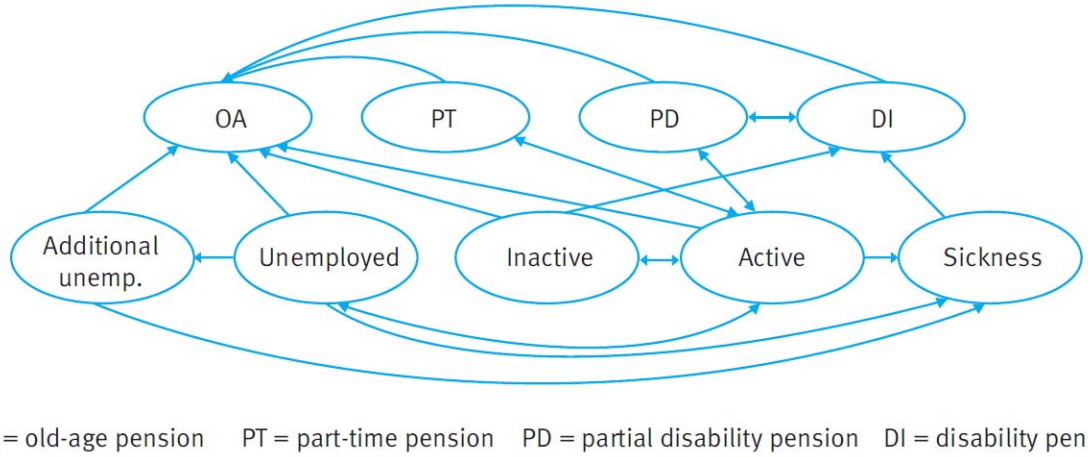
The results concerning the earnings-related pensions have been calculated using the long-term planning model of the Finnish Centre for Pensions. The model is deterministic and replicates the functioning of the earnings-related pension scheme. The model consists of several interconnected modules (see figure 8 below).

Figure 8 Modules of the projection model.



The earnings-related pension expenditure module. Earnings-related pension expenditure is projected separately for each earnings-related pension act. Pensions are paid out to pensioners on an annual basis, insured persons accrue future pensions, and persons move between different states (employed, unemployed, pensioner etc) according to given probabilities. The model's states and transitions between these states are presented in figure 9. Unemployment pensions were eliminated in 2011. In the future, the transition from unemployment will be made directly to old-age pension.

Figure 9 Main states in the projection model.



Those active in the model are in gainful employment, their earnings accrue a pension, and their contributions are levied on the basis of the earnings. The unemployed are divided into three different states in the model. Persons aged less than 61 who receive an earnings-related unemployment allowance are categorized as unemployed. Long-term unemployed persons aged over the age of 61 are entitled to an earnings-related unemployment allowance for additional days until their pension starts. These two groups of unemployed accrue an earnings-related pension during their periods of unemployment.

Other unemployed persons do not accrue a pension (currently about half of the unemployed) and they are categorized as inactive. Persons transferred to the category of inactive also include those who exit the labour force, and those who transfer from work covered by the act

under observation to work covered by some other act. The inactive are those persons who have accrued a pension under the act under observation, but who no longer work in a job covered by this act, and who are not drawing a pension.

In addition to the transitions presented in figure 9, new employees are added, on an annual basis, to the active category in accordance with population and employment forecasts. Persons in each state also die over the course of a year, and some of these deaths result in the award of a survivor's pension to living family member(s).

Within the model's states, people are grouped by the age and gender. An average technique is applied in these groups. For example, all 50-year-old men working in employment contracts covered by TyEL are assumed to be identical to each other. It is easier to use an average modelling technique as opposed to an individual-level projection, but at the same time it produces less information. For example, a distribution of pensions by size cannot be calculated.

The average technique used by the model does not prevent capturing the selectiveness of transitions between different states. The following phenomena have been included to the model:

1) Accrued pension and salary for projected pensionable service for those transferring to disability pension are typically lower than for those continuing in gainful employment.

2) The mortality for persons drawing a disability pension is higher than the average for the population in general, while the mortality for non-disabled persons is correspondingly lower.

3) Among old-age pensioners, a large pension is associated with low mortality when age and gender are taken in the account.

4) Pension accruals for those dying while still within the active age range are lower than average for the insured.

The private sector employees' act (TyEL) financing module is used to calculate the development of TyEL's contribution rate, technical provisions and assets. It contains a detailed description of the legislation and the bases of calculation pertaining to TyEL financing.

The financing module is joined to the TyEL expenditure module via a two-way connection: TyEL expenditure and wage sums affect the contribution level, and also affect the formation and dissolution of technical provisions. Conversely, the size of the employee's pension contribution affects pension accrual and therefore pension expenditure. Premium income is composed of a pooled component, a funded component and a remaining component which contains operating expenses and client bonuses. The pooled component is used to finance pay-as-you-go pensions, and the funded premium income is accumulated into technical provisions for the pension providers. Technical provisions are also dissolved to finance annually paid pensions. Since the required amounts of technical provisions are calculated per age group for each calendar year, the age-specific allocation of old-age pension liability supplements can be investigated with the help of the model.

The number of earnings-related pension recipients and the average earnings-related pension are calculated once the pension expenditure of all earnings-related pension acts is known. The number of insured persons and earnings-related pension recipients is calculated

by pooling all the earnings related pension schemes together. This projection is analogous to the scheme specific projections, but it encompasses all the insured persons and all pensioners in Finnish earnings related pension schemes.

In the national pension module, the number and the size of national pensions is calculated. The earnings-related pension projection serves as a basis for determining the national pensions. However, the model does not provide information on the size distribution of earnings-related pensions. Therefore, in order to calculate national pensions, it is assumed that the shape of the commencing earnings-related pension distribution remains unchanged across time.

The model allows the national pension index to be a pure price index, a pure earnings level index or a weighted average of these indexes. Since the 2008 increase, no decisions have yet been made regarding the next general increase in the national pension scheme. Historically, however, the practice has been to occasionally increase the real value of national pensions. In the baseline projection, increases have been taken into account by assuming that the national pension index is equal to half of price growth plus half of average earnings growth.

The SOLITA[3] module is a simple description of the development of SOLITA expenditure based on a population forecasts. The starting point for the projection is current SOLITA expenditure, by age and gender. For those of active age (18-62-year olds), SOLITA pensions grow at the same rate as the general wage level. For those who are 63 or older, SOLITA pensions grow at the same rate as the earnings-related pension index.

The national pension model

The national pension model that The Social Insurance Institution of Finland runs, estimates the total national pension expenditure and the number of recipients of the national pension. Old-age, disability, survival and guarantee pensions are treated separately. The model is deterministic and uses the population and employment forecasts as well as the information of changes in consumer prices and average earnings growth.

In order to determine the number of recipients of the national pension and guarantee pension, the total number of pensioners is first estimated. The number of the new national pensioners is calculated from the total number of the new pensioners using the distribution of earnings-related pension income. The shape of the distribution is not assumed to change over the time. The level of average earnings-related pensions is assumed to change in the future like in the near past considering the changes in average income and employment rates.

In the average level of the national pension in different age groups, the long-term changes in the employment level and the changes of the average wages is taken into account. In the model the level of the national pension is indexed to the one half of the price growth plus one half of the average earnings growth. Using the earnings growth in the indexation simulates the occasional increases of the real level of the national pension.

4.6. Additional features of the projection model

- Number of different persons modelled per generation.

[3] SOLITA-pensions refer to military accident and injury, traffic insurance and accident insurance laws.

- How is the replacement rate of new retirees calculated?

Total gross replacement rate is calculated by dividing the amount of new pensions (earnings-related old age pensions, earnings-related disability pensions and national pensions) by the number of new pensioners (pensioners who get earnings related pension and those who get only national pension). This number is divided by the economy-wide average wage at retirement to old age pension. It is assumed that persons, who do not get earnings-related pension, do not work before retirement which lowers the average wage at retirement.

Replacement rates of the earnings-related pension scheme are calculated by dividing the amount of new pensions by the number of new earnings-related pensioners. This number is divided by the economy-wide average wage at retirement.

- How are careers being modelled?

The employment projection is based on the population forecast, the assumed long-term equilibrium unemployment rate, and estimated entry and exit rates that depict changing labour force participation.

- How are survivors pension being calculated?

- How is the retirement age and its evolution over the projection period computed?

Retirement age is described by the effective expected retirement age. This is analogous to life-expectancy.

- Any other specific feature of the model that deserve to be mentioned

References

Methodological annex

Economy- wide average wage at retirement

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

	2010	2013	2020	2030	2040	2050	2060
Economy-wide average wage	33.9	36.9	43.2	59.2	83.9	119.1	169.1
Economy-wide average wage at retirement	35.4	38.5	45.1	62.0	87.7	124.9	177.6

Source: Commission Services

Disability pension

Table A2 – Disability rates by age groups (%)

	2010	2013	2020	2030	2040	2050	2060
-54	:	2.2	1.8	1.6	1.6	1.5	1.6
55-59	:	13.5	11.5	10.2	9.7	9.5	9.5
60-64	:	18.4	13.6	10.1	10.0	10.0	9.5
65-69	:	0.3	0.2	0.1	0.0	0.0	0.0
70-74	:	0.0	0.0	0.0	0.0	0.0	0.0
75+	:	0.0	0.0	0.0	0.0	0.0	0.0

Source: Member State

Alternative pension spending decomposition

TableA3 and Table A4 are equivalent to Table 8a and Table 8b.

Table A3 - Factors behind the change in public pension expenditures between 2013 and 2060 (in percentage points of GDP) - pensions

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

Source: Commission Services

Table A4 - Factors behind the change in public pension expenditures between 2013 and 2060 (in percentage points of GDP) - pensioners

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

Source: Commission Services