

Economic Policy Committee - Ageing Working Group

2024 Ageing Report

Norway - Country Fiche

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Introduction

The present country fiche for Norway is part of the 2024 Ageing Report, which provides long-term projections of the economic and budgetary impact of population ageing at unchanged policy. The 2024 edition is the eighth update and covers the period up to 2070.

This fiche was prepared by the Norway Ministry of Finance with assistance with model simulations from Statistics Norway. The pension projections presented in this fiche incorporate the macroeconomic assumptions and methodologies agreed within the *Ageing Working Group* of the *Economic Policy Committee*. The projections have been peer reviewed by the other Member States and the European Commission within the *Ageing Working Group*. The projections were finalised in the autumn of 2023 and represent the situation of the pension system on 01/12/2023.

Section 1 provides a general overview of the pension system in Norway. Section 2 describes the demographic and labour market assumptions underlying the pension expenditure projections presented in Section 3, which also discusses the sensitivity scenarios around the baseline. Finally, Section 4 gives an overview of the model used to produce the pension projections, with complementary data provided in the methodological annex.

1. Overview of the pension system

1.1. Description of the pension system

Elements in the Norwegian old age pension system

The Norwegian old age pension system consists of the following elements:

- A universal public old age pensions system
- Mandatory government occupational pension schemes
- Mandatory (from 2006) private sector occupational pension schemes
- Private individual pension schemes.

The present public old age pension system ('the reformed system') came into effect in 2011.

Public (social security) old age pensions include a minimum income guarantee and an earnings-related benefit. It is financed on a pay-as-you-go basis. Individuals who have resided in Norway for at least three years between age 16 and 66 are entitled to the guarantee pension. A full guarantee pension is granted after forty years of residence, and is reduced proportionally for shorter periods. With retirement at age 67, the before-tax replacement rate for pensioners with average income amounts to 51 pct. in the reformed old age pension system. The after-tax replacement rate, including supplementary pensions, amounts to 72 pct.

The reformed Norwegian system is based on the NDC-formula with fixed contribution/accrual rates over the active life-phase and with accumulated pension wealth being transformed into an annuity upon retirement. Entitlements are indexed with wage growth (w). The reformed system is phased in gradually for cohorts born after 1953 and fully implemented for cohorts born after 1962. Accumulated entitlements ('pension wealth') is given by (1).

$$(1) \quad W_A = \alpha \cdot \sum_{i=0}^{A-1} I_i \cdot (1 + w)^{A-i}$$

W_A pension wealth by age of retirement (A)

α rate of earning of pension entitlements (18,1 per cent of pensionable income up to a ceiling of 7,1 times the basic amount (corresponds to approximately 115 per cent of the average wage for a full-time employee))

I_i pensionable income by age i (pension entitlements can be earned from age 13 to age 75)

w nominal wage growth applied to index pension rights

To convert accrued entitlements into the actual pension benefit, the present public old age pension system applies a life expectancy adjustment of pensions, flexible retirement from the age of 62 (provided the pension level exceeds the level of the guaranteed pension at the age of 67) and rules for indexation of pensions. As from 2021, wage indexation with a fixed adjustment factor (0,75 per cent per year) subtracted from wage growth was replaced with price and wage indexation (with equal weights). As a rule of thumb, wage and price indexation is less generous compared to the previous indexation rule if real wage growth exceeds 1,5 per cent. At the time of retirement, the annual pension benefit ($B_{K,A}$) is calculated by dividing the accumulated pension entitlements by an annuity divisor ($\Phi_{K,A}$) mainly reflecting remaining life expectancy, see (2).

$$(2) B_{K,A} = \frac{W_A}{\Phi_{K,A}} = \frac{W_A}{\sum_{x=A}^{\infty} p_{K,A,x} \cdot \frac{(1 + 0,5 \cdot (w + cpi))^{x-A}}{(1 + w)^{x-A}}}$$

$p_{K,A,x}$ average of the probabilities of person from cohort K surviving to respectively x and x+1 years from age of retirement A

cpi consumer price growth

Thus, accumulated entitlements are converted into an annuity over the average expected remaining lifetime. An increase in average life expectancy reduces the annual benefits. The old age pension arrangement implies that the present value of public old age pension expenditures is invariable to an individual's timing of retirement and shifts the expenditure risk associated with increases in longevity from taxpayers to each cohort of pensioners.

Life expectancy for a cohort is calculated based on period mortality in the decade preceding the cohort reaching the age of 60. This rule is also applied in the projections. The annuity divisor is gender neutral despite the significant difference in life-expectancy between men and women.

Taking into account the annuity divisor and the combined price and wage indexation, annual pension benefits at age x may be expressed by

$$(3) B_{K,A,x} = \frac{W_A}{\sum_{x=A}^{\infty} p_{K,A,x} \cdot \frac{(1 + 0,5 \cdot (w + cpi))^{x-A}}{(1 + w)^{x-A}}} \cdot (1 + 0,5 \cdot (w + cpi))^{x-A}$$

The reformed system also introduces increased flexibility by allowing continued employment for old age pensioners, without a reduction in the pension benefit.

The present system allows flexible retirement from the age of 62. The information on the statutory age under the new system in Table 1 reflects limitations to the flexibility. The guarantee pension can be drawn only from age 67 and disability pensioners will not become old age pensioners before age 67. 67 years also functions as a reference age for the calculation of annuity divisors. Compared to the previous system retiring earlier than 67 years implies a reduction in annual pension payments.

Other old age pensions

The **government occupational pension schemes** supplement the public old age pension system. Following an agreement in 2019, the previous system guaranteeing government sector employees gross pension benefits (including public old age pensions) of at least 2/3rd of final gross wages from age 67 for persons born in 1963 and later is replaced by a system with mechanisms resembling the public old age pension system. In particular, the new system increases flexibility as employees may counteract life expectancy adjustments by working longer. In addition, the new system enables switching between government and private employment without loss of pension entitlements.

The central government occupational pension scheme is a pay-as-you-go scheme, financed by employee contributions (2 per cent of wages) and additional funding from employers. Local government occupational pension schemes are funded systems, with premiums from employees at 2 per cent of wages and additional funding provided by employers. The pension funds are administered by insurance companies or locally.

The **mandatory private sector occupational pension** was introduced in 2006, but non-mandatory defined benefit schemes (and since 2001 also defined contribution schemes) have existed for a long time. The introduction was a part of the pension reform process. As the system matures, the private sector occupational pension schemes ensure supplementary pensions also to private sector employees. The legislation on mandatory private sector occupational schemes covers the entire private sector. Under the legislation, it is possible to choose between three occupational schemes; a defined benefit (DB) scheme, a defined contribution scheme (DC) and a mixed scheme (DC when employed, DB after retirement).

Neither government nor private sector occupational pension schemes are included in the projections. The expenditures associated with government occupational schemes amounts to approximately 1 per cent of Mainland GDP.¹

TABLE 1 – QUALIFYING CONDITIONS FOR RETIREMENT

		2022	2030	2040	2050	2060	2070
Qualifying condition for retiring with a full pension	Statutory retirement age - men ¹⁾	67	67	67	67	67	67
	Statutory retirement age - w omen ¹⁾	67	67	67	67	67	67
	Minimum require ments	not applicable					
Qualifying condition for retirement without a full pension	Early retirement age - men ²⁾	62	62	62	62	62	62
	Early retirement age - w omen ²⁾	62	62	62	62	62	62
	Penalty in case of earliest retirement age	not applicable					
	Bonus in case of late retirement						
	Minimum contributory period - men						
	Minimum contributory period - w omen						
	Minimum residence period - men						
	Minimum residence period - w omen						

¹⁾ Statutory retirement age in old system, reference age in the new system

²⁾ Pension reform with flexible age of retirement from 62 years coming into effect in 2011

Source: Norwegian Ministry of Finance

¹ Because of the substantial contribution of crude oil and natural gas on the Norwegian GDP, official statistics use the concept Mainland GDP, which excludes ocean transport and petroleum extraction.

Disability pensions

The purpose of disability benefits is to ensure subsistence income for people whose earning ability is permanently impaired by at least 50 per cent due to illness, injury or disability. Disability pensions are granted if there are no prospects of an improvement in earning ability. Disability pension amount to 66 per cent of income prior to disability. The disability pension is in principle a permanent benefit but can be reassessed with changes in income and health of the recipient. Recipients of disability pensions who reach age 67 will automatically have their pension converted to an old-age pension.

The number of persons receiving disability pensions (364 000) measures up to 11,4 per cent of the population in the age group 20 – 64 in 2022. This contributes to a relatively high level of disability pension expenditure (3,2 per cent measured as a share of Mainland GDP in 2022).

Survivor pensions

Survivors' pensions are being phased out. The current survivor's pension will in 2024 be replaced by an adjustment allowance. The allowance is a time-limited benefit that normally only lasts 3 years. An exception is made for individuals born in 1962 or earlier with low earned income in the last five years before the death, who may keep the benefit until age 67. The projections do not include this adjustment allowance.

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

As from 2021, wage indexation with a fixed adjustment factor (0,75 per cent per year) subtracted from wage growth, which was the indexation governing old age pensions in the AR21 projections, was replaced with price and wage indexation (with equal weights).

2. Overview of the demographic and labour force projections²

2.1. Demographic projections

Table 2 gives an overview of Eurostat's EUROPOP2023 projections for the main demographic variables. Total population is projected to increase from 5,4 million persons in 2022 to 6,5 million persons in 2070. Key assumptions (fertility, slightly lower net migration and slightly increased life expectancy) are fairly similar to EUROPOP2019 projections, where total population in 2070 was projected to be 6,7 million persons and the old age dependency ratio (65+/20-64) increased from 29,4 in 2019 to 52,4 in 2070, compared to 54,4 in the new projections.

² For more details, see European Commission and EPC (2023), ['2024 Ageing Report: Underlying assumptions and projection methodologies'](#), European Economy, Institutional Paper 257.

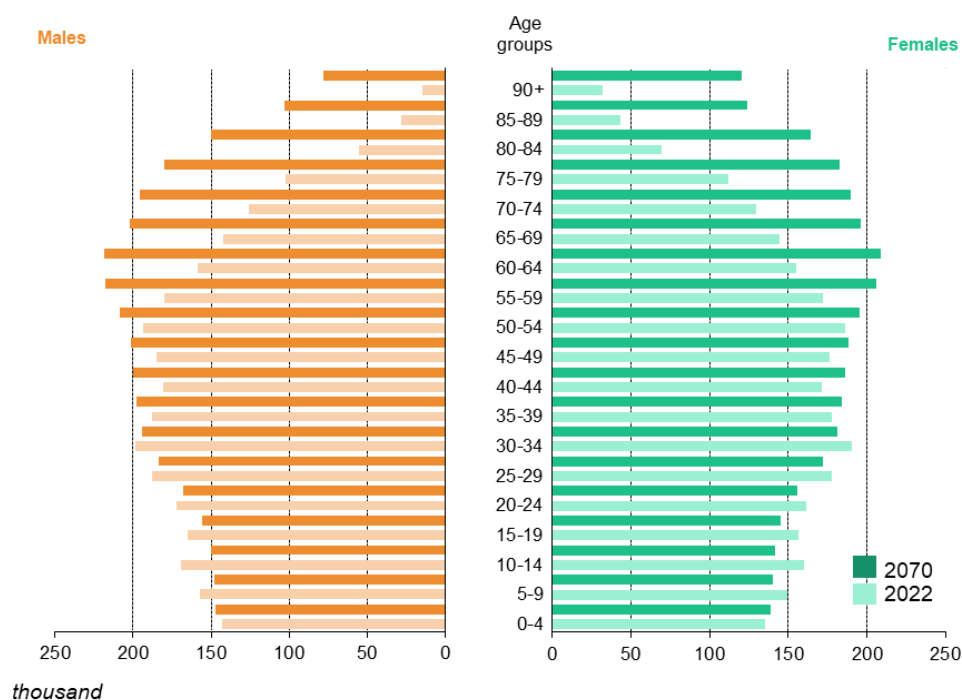
TABLE 2 – MAIN DEMOGRAPHIC VARIABLES

	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Population (thousand)	5 446	5 680	5 987	6 225	6 383	6 516	6 516	2070	1 070
Population growth rate	0,7%	0,6%	0,5%	0,3%	0,2%	0,2%	0,7%	2022	-0,5%
Old-age dependency ratio (pop 65+ / pop 20-64)	31,2	35,8	41,7	44,7	49,7	54,4	54,4	2070	23,2
Old-age dependency ratio (pop 75+ / pop 20-74)	12,2	15,1	18,0	21,5	22,9	25,9	25,9	2070	13,7
Ageing of the aged (pop 80+ / pop 65+)	24,4	29,9	32,4	37,1	37,8	39,2	39,2	2070	14,9
Men - Life expectancy at birth	82,1	82,8	84,1	85,2	86,3	87,3	87,3	2070	5,2
Women - Life expectancy at birth	85,1	86,1	87,3	88,5	89,6	90,7	90,7	2070	5,6
Men - Life expectancy at 65	20,2	20,8	21,7	22,5	23,4	24,2	24,2	2070	4,0
Women - Life expectancy at 65	22,3	23,1	24,1	25,1	26,0	26,9	26,9	2070	4,6
Men - Survivor rate at 65+	91,1	91,8	92,8	93,7	94,5	95,2	95,2	2070	4,1
Women - Survivor rate at 65+	94,0	94,6	95,4	96,0	96,5	97,0	97,0	2070	2,9
Men - Survivor rate at 80+	66,9	69,3	73,0	76,3	79,2	81,8	81,8	2070	14,9
Women - Survivor rate at 80+	75,6	78,2	81,4	84,1	86,5	88,6	88,6	2070	13,0
Net migration (thousand)	35,5	27,4	28,2	27,2	26,5	26,4	35,5	2022	-9,1
Net migration (% population previous year)	0,7%	0,5%	0,5%	0,4%	0,4%	0,4%	0,7%	2022	-0,2%

Source: Eurostat, European Commission.

Figure 1 further illustrates how Norway shares the same challenges related to an ageing population as the EU member states: a growing number of older people and fewer younger people.

FIGURE 1 – AGE STRUCTURE: 2022 VS 2070



Source: Eurostat, European Commission.

2.2. Labour force projections

Table 3 imply relatively stable participation rates for age group 65 – 74 towards 2070. Any effects on labour market participation related to average life expectancy effects on average annual benefits are not included in the projections.

TABLE 3 – PARTICIPATION RATE, EMPLOYMENT RATE AND SHARE OF WORKERS

	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Labour force participation rate 20-64	83,0	82,9	84,1	84,4	84,6	84,5	84,6	2058	1,5
Employment rate of workers aged 20-64	80,8	80,4	81,6	81,9	82,1	82,0	82,1	2058	1,3
Share of workers aged 20-64 in the labour force 20-64	97,3	97,0	97,0	97,0	97,1	97,0	97,3	2022	-0,3
Labour force participation rate 20-74	74,2	73,0	72,8	73,7	72,8	72,7	74,2	2022	-1,5
Employment rate of workers aged 20-74	72,3	70,8	70,7	71,6	70,7	70,6	72,3	2022	-1,7
Share of workers aged 20-74 in the labour force 20-74	97,4	97,0	97,1	97,1	97,1	97,1	97,4	2022	-0,3
Labour force participation rate 55-64	75,5	70,2	70,2	71,3	72,9	73,2	75,5	2022	-2,3
Employment rate of workers aged 55-64	74,5	69,2	69,2	70,2	71,8	72,1	74,5	2022	-2,4
Share of workers aged 55-64 in the labour force 55-64	98,7	98,5	98,5	98,5	98,5	98,5	98,7	2022	-0,2
Labour force participation rate 65-74	22,2	17,5	16,8	17,9	19,1	20,2	22,2	2022	-2,0
Employment rate of workers aged 65-74	22,0	17,3	16,6	17,7	18,8	20,0	22,0	2022	-2,0
Share of workers aged 65-74 in the labour force 65-74	99,1	98,8	98,8	98,8	98,8	98,8	99,1	2022	-0,2
Median age of the labour force	40,0	39,0	40,0	41,0	42,0	41,0	42,0	2059	1,0

Source: European Commission.

Regarding the ‘dynamics’ in the average contribution period relative to the average effective working career in Table 4, the following mechanisms are at work in the pension projections:

- The contributory period (associated with new pensioners) for immigrants (also including those who have repatriated after spending a part of their working life in Norway) will on average be shorter compared to contributory periods for persons spending their entire working career in Norway. Immigrants on average spend fewer years in Norway compared to natives and accordingly obtain fewer years of accumulation of pension entitlements.
- Towards 2050, an increasing share of new old age pensioners located abroad (see Figure 5 below and Table A3 in the annex) thus contributes to a decreasing contributory period on average, whereas their decrease thereafter contributes to a reversal in the average contributory period towards 2070.

TABLE 4 – LABOUR MARKET EXIT BEHAVIOUR

TOTAL	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Average effective retirement age*	64,1	63,1	63,3	63,8	63,4	62,8	63,8	2055	-1,3
Average labour market exit age (CSM)**	65,0	65,1	65,2	65,3	65,5	65,6	65,6	2070	0,6
Contributory period	33,7	31,2	28,9	26,8	29,0	34,1	34,1	2070	0,4
Duration of retirement***	20,9	22,0	22,9	23,8	24,7	24,6	24,8	2061	3,8
Duration of retirement/contributory period	62 %	70 %	79 %	89 %	85 %	72 %	90 %	2055	10 %
Percentage of adult life spent in retirement****	32 %	33 %	34 %	34 %	35 %	35 %	35 %	2061	3 %
Early/late exit*****	1,4	1,6	1,4	1,5	1,3	1,2	1,7	2032	-0,3

MEN	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Average effective retirement age*	63,9								
Average labour market exit age (CSM)**	65,0	65,1	65,2	65,3	65,5	65,6	65,6	2070	0,6
Contributory period	33,1	30,1	27,0	24,8	27,9	33,6	33,6	2070	0,4
Duration of retirement***	18,5	20,8	21,7	22,5	23,4	23,3	23,6	2063	4,8
Duration of retirement/contributory period	56 %	69 %	80 %	91 %	84 %	69 %	91 %	2052	14 %
Percentage of adult life spent in retirement****	28 %	32 %	32 %	33 %	34 %	34 %	34 %	2063	6 %
Early/late exit*****	1,2	1,5	1,3	1,3	1,2	1,1	1,5	2031	-0,1

WOMEN	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Average effective retirement age*	64,3								
Average labour market exit age (CSM)**	65,0	65,1	65,2	65,3	65,5	65,6	65,6	2070	0,7
Contributory period	34,2	32,6	31,4	29,2	30,2	34,6	35,4	2025	0,3
Duration of retirement***	23,2	23,1	24,1	25,1	26,0	25,9	26,1	2061	2,7
Duration of retirement/contributory period	68 %	71 %	77 %	86 %	86 %	75 %	89 %	2055	7 %
Percentage of adult life spent in retirement****	35 %	34 %	35 %	36 %	36 %	36 %	36 %	2061	1 %
Early/late exit*****	1,7	1,8	1,5	1,6	1,4	1,2	1,9	2024	-0,4

* The 'average effective retirement age' is the age at which people start receiving a pension benefit (old-age, early or disability). It is calculated on the basis of the administrative data on new pensioners for 2022, showing projected data for the other years for the total. ** 'Average labour market exit age (Cohort Simulation Model)' refers to 2023 instead of 2022. *** 'Duration of retirement' is the remaining life expectancy at the average labour market exit age. **** The 'percentage of adult life spent in retirement' is calculated as the ratio between the duration of retirement and the life expectancy minus 20 years. ***** 'Early/late exit' is the ratio between those who exit the labour market before reaching the statutory retirement age and those who exit at or beyond the statutory retirement age. For 2022, the value refers to 2023.

3. Pension projection results

The projections illustrate how AWG assumptions on demographic and macroeconomic developments give rise to developments in public pension expenditures between 2022 and 2070. The projections of pension expenditures are carried out by means of the dynamic micro simulation model MOSART developed and maintained by Statistics Norway (see Section 4). The model combines a detailed description of the Norwegian old age and disability pension schemes with assumptions on macroeconomic developments for projection purposes. The model takes into account the phasing-in of the reformed public old age pension system from 2011, distinguishing between pensioners earning pension entitlements under the previous and the reformed old age pension scheme.

3.1. Coverage of the pension projections

The AWG projections cover public old age and disability pensions. The results are reported as shares of Mainland GDP (also referred to as GDP in the remainder), which equals total GDP minus value added by petroleum extraction and ocean transport. Table 5 compares historical EUROSTAT and AWG definition figures on pension expenditure.

TABLE 5 – ESSPROS AND AWG DEFINITION OF PENSION EXPENDITURE (%GDP)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	change 2013- last available year
Eurostat total pension expenditure	8,8	9,3	10,2	10,8	10,6	10,4	10,9	11,8	:	3,0
Eurostat public pension expenditure (A)	8,8	9,3	10,2	10,8	10,6	10,4	10,9	11,8	:	3,0
Public pension expenditure (AWG: outcome) (B)	9,6	9,8	10,4	10,6	10,7	10,7	10,8	11,2	11,1	1,5
Difference Eurostat/AWG: (A)-(B)	-0,8	-0,5	-0,2	0,2	-0,1	-0,3	0,1	0,6	:	1,4

Source: Eurostat, European Commission.

3.2. Overview of projection results

Projected public pensions increase from 10,8 per cent measured as a share of Mainland GDP in 2022 to 12,5 per cent in 2070, see Table 6. Regarding contributions and the associated reported balance of the public pension system in Table 6, it should be noted that employer and employees public pension contributions are not directly linked to the financing of public pension expenditure but – similar to other taxes – used to finance government expenditure in general.

TABLE 6 – PROJECTED GROSS AND NET PENSION SPENDING AND CONTRIBUTIONS (%GDP)

	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Expenditure									
Gross public pension expenditure	10,8	12,1	12,1	12,0	12,2	12,5	12,5	2070	1,7
Private occupational pensions	:	:	:	:	:	:	:	:	:
Private individual mandatory pensions	:	:	:	:	:	:	:	:	:
Private individual non-mandatory pensions	:	:	:	:	:	:	:	:	:
Gross total pension expenditure	:	:	:	:	:	:	:	:	:
Net public pension expenditure*	8,3	9,3	9,3	9,2	9,4	9,6	9,6	2070	1,3
Net total pension expenditure*	:	:	:	:	:	:	:	:	:
Contributions									
Public pension contributions	11,5	11,3	11,3	11,3	11,3	11,3	11,5	2022	-0,1
Total pension contributions	:	:	:	:	:	:	:	:	:
Balance of the public pension system (%GDP)**	0,6%	-0,8%	-0,8%	-0,7%	-0,9%	-1,2%	-1,2%	2070	-1,8%

*Net pension expenditure excludes taxes on pensions and compulsory social security contributions paid by beneficiaries. **Public pension contributions - gross public pension expenditure (peak value/year shows most negative value).

Source: European Commission, EPC.

Table 7 shows that the increase is due to developments in old age pensions. The decline in the share of minimum pensions as a share of total (public) old age pensions is due to the phasing-out of basic pensions in the reformed public old age pension system. In the previous system, old age pensions consisted of a basic amount (equal for all) and additional income-related pensions calculated from a positive threshold income level. The new system also has a minimum guarantee pension, but income-related pensions are calculated from total income (not only from income above a threshold level). Thus, total pensions will on average consist of a substantially larger fraction of income-related pensions (with income-related pensions now covering both the basic pension and income-related pensions in the previous system). With the phasing-out of the old pension system the proportion of the population receiving pensions calculated as a sum of basic (non-income-related) pensions and income-related pensions from the previous old age pensions system will decline over time. However, also under the new system there will be a fraction of the pensioners who are only entitled to minimum/guarantee (not-income-related) pensions. The level of a full guarantee pension is comparable to the basic pension under the previous system.

TABLE 7 – GROSS PUBLIC PENSION SPENDING BY SCHEME (%GDP)

	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Total public pensions	10,8	12,1	12,1	12,0	12,2	12,5	12,5	2070	1,7
Old-age and early pensions	7,6	8,5	8,7	8,5	8,9	9,2	9,2	2070	1,6
<i>Flat component</i>	:	:	:	:	:	:	:	:	:
<i>Earnings-related</i>	5,1	6,5	7,6	7,9	8,3	8,7	8,7	2070	3,6
<i>Minimum pensions (non-contributory)</i>	2,5	2,0	1,1	0,6	0,5	0,5	2,6	2023	-2,0
Disability pensions	3,2	3,6	3,4	3,5	3,3	3,3	3,6	2030	0,1
Survivor pensions	:	:	:	:	:	:	:	:	:
Other pensions	:	:	:	:	:	:	:	:	:

Source: European Commission, EPC.

3.3. Description of main driving forces behind the projection results and their implications

To help identify the driving demographic and macroeconomic forces - based on the common AWG methodology - behind the pension projections, the arithmetic decomposition [1] in figure 2 has been used to link growth of the pension expenditures to developments in the dependency, coverage and benefit ratios as well as labour market changes. A further decomposition of the coverage ratio [2] aims at investigating contributions from the take-up ratios for old age pensions and early pensions. The labour market indicator is further disaggregated according to equation [3] in Figure 2.

FIGURE 2 – DISAGGREGATION OF PUBLIC PENSION EXPENDITURE

$$\frac{\text{pension expenditure}}{\text{GDP}} = \frac{\text{dependency ratio}}{\frac{\text{population 65+}}{\text{population 20-64}}} \times \frac{\text{coverage ratio}}{\frac{\text{number of pensioners}}{\text{population 65+}}} \times \frac{\text{benefit ratio}}{\frac{\text{average pension income}}{\frac{\text{GDP}}{\text{hours worked 20-74}}}} \times \frac{\text{labour market effect}}{\frac{\text{population 20-64}}{\text{hours worked 20-74}}} \quad [1]$$

$$\frac{\text{number of pensioners}}{\text{population 65+}} = \frac{\text{coverage ratio old-age}}{\frac{\text{number of pensioners 65+}}{\text{population 65+}}} + \left(\frac{\text{coverage ratio early-age}}{\frac{\text{number of pensioners } \leq 65}{\text{population 50-64}}} \times \frac{\text{cohort effect}}{\frac{\text{population 50-64}}{\text{population 65+}}} \right) \quad [2]$$

$$\frac{\text{population 20-64}}{\text{hours worked 20-74}} = \frac{1/\text{employment rate}}{\frac{\text{population 20-64}}{\text{employed people 20-64}}} \times \frac{1/\text{labour intensity}}{\frac{\text{employed people 20-64}}{\text{hours worked by people 20-64}}} \times \frac{1/\text{career shift}}{\frac{\text{hours worked by people 20-64}}{\text{hours worked by people 20-74}}} \quad [3]$$

Source: European Commission, EPC.

Applying this decomposition in Table 8, population ageing and the associated increase in the dependency ratio contributes substantially to an increase in the pensions expenditure-to-GDP ratio. Population ageing in the current exercise is less pronounced than the most recent national demographic projections. For instance, national demographic projections provided by Statistics Norway from June 2022 (adjusted for increased migration from Ukraine in 2022-2024) imply an increase in the number of people in the age group 67+ as a share of population 20 - 66 years of age from 21 per cent in 2022 to 48 per cent in 2060, whereas the EUROPOP2023 demographic projections give an increase to 43 per cent in 2060. Higher life expectancy and lower net migration contribute to a more pronounced population ageing in the national projections.

TABLE 8 – FACTORS BEHIND THE CHANGE IN PUBLIC PENSION EXPENDITURE BETWEEN 2019 AND 2070 (PPS OF GDP) – PENSIONERS

	2022-30	2030-40	2040-50	2050-60	2060-70	2022-70
Public pensions to GDP	1,2	0,1	-0,1	0,2	0,3	1,7
Dependency ratio effect	1,6	1,9	0,9	1,3	1,1	6,8
Coverage ratio effect*	1,0	0,1	0,6	0,1	-0,8	1,1
Coverage ratio old-age	1,3	0,9	0,9	0,4	-0,7	2,8
Coverage ratio early-age	1,8	-0,6	-0,4	-0,4	0,1	0,5
Cohort effect	-1,5	-1,9	0,0	-0,9	-0,9	-5,2
Benefit ratio effect	-1,4	-1,6	-1,5	-1,1	0,0	-5,6
Labour market effect	0,1	-0,2	-0,1	-0,1	0,0	-0,3
Employment ratio effect	0,0	-0,2	0,0	0,0	0,0	-0,2
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0
Career shift effect	0,1	0,0	0,0	-0,1	-0,1	-0,1
Residual	-0,1	-0,1	-0,1	-0,1	0,0	-0,4

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

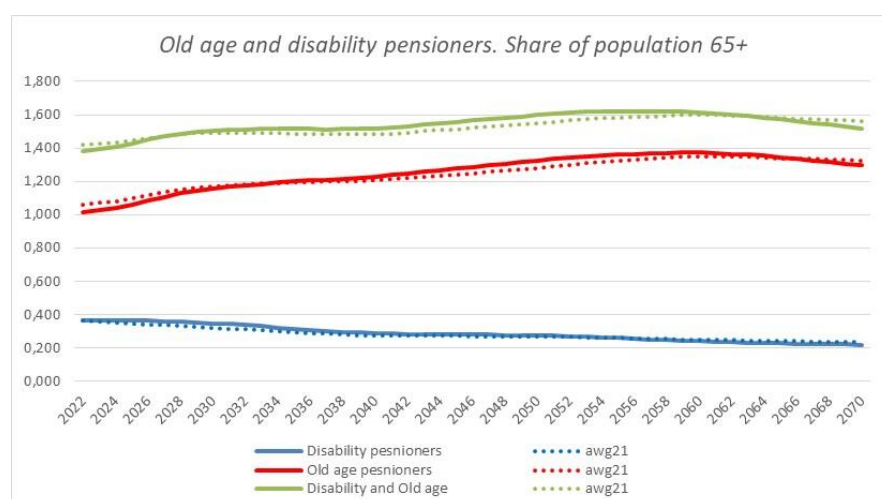
Source: European Commission, EPC.

The increased coverage ratio, contributing to an increase in the public pension to GDP ratio by 1,1 percentage points towards 2070, can be traced back to an increase in the ratio of old age pensioners to persons 65 years and above (see Figure 3). The increase in the coverage ratio associated with old age pensioners, similar in magnitude to the AR21 projections, results from including pensioners living abroad³ (see Figure 4) in the projections as well as taking into account an increased number of persons who choose to combine work with old age pension claiming.

The uptick in the coverage ratio in the period 2022 – 2030 is related to the final transmission to the reformed old age pension system for the government sector. Pensioners born prior to 1963 would prefer to postpone taking up old pensions until 67 years of age in order to take advantage of separate pension arrangements (an early retirement scheme negotiated by social partners) applying for workers between 62 and 67 years of age. Pensioners born in 1963 and subsequent years will instead rely on the reformed (flexible claiming age from 62 and onwards) old age pension system if they should choose to take out pensions from the age of 62 and onwards.

The reduction in the number of disability pensioners works in the other direction. In the projections, the number of disability pensioners follows from demographics through age- and educational attainment-specific transition rates. In addition, calibration of the projections to the employment assumption (resulting from the cohort simulation model) is carried out by means adjusting the transitions into disability – in particular for the 50 – 61 year age group. This procedure is in principle unchanged between projection rounds, but updates of population projections and associated changes in labour market projections involves some practical challenges with regard to ensuring consistency between projection rounds.

FIGURE 3 – OLD AGE AND DISABILITY PENSIONERS. SHARES OF POPULATION 65+

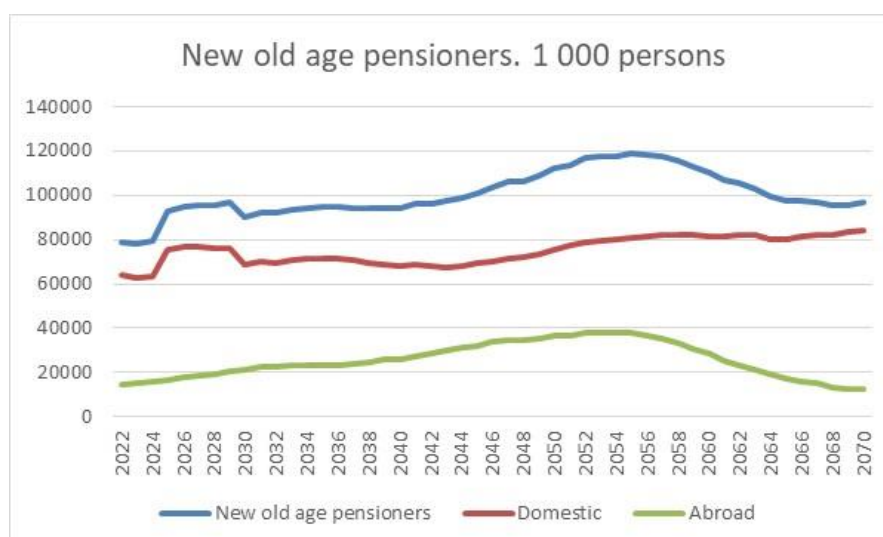


³ Repatriated immigrants or expatriated persons born and employed in Norway, neither of which are counted in the population figures.

FIGURE 4 – OLD AGE PENSIONERS – HOME AND ABROAD. SHARES OF TOTAL



FIGURE 5 – NEW OLD AGE PENSIONERS – HOME AND ABROAD. 1 000 PERSONS



The reformed pension system, allowing for continued work while receiving old age pensions, has contributed to a substantial increase in the number of old age pensioners from 2010 to 2022 not being reflected in corresponding declines in participation rates for older persons (participation rates for older persons have instead increased since 2011). The increase in the number of persons 62 years and above receiving old age pensions while working at the same time contributes to lower average replacement rates compared to the replacement rates by retirement at 67 years of age. With pension wealth (pension entitlements) being divided by expected remaining living years in order to determine annual pension payments (see Section 1), this development has given rise to a decline in annual pension payments at the individual level (compared to the case of postponing the take-up of pension benefits).

The decline in the benefit ratio reported in Table 9^{4,5} reflects the introduction of life expectancy adjustment for new pensions since 2011. The combined price and wage indexation of pension benefits also contributes to the decline in benefit ratios. Inclusion of pensioners living abroad in the projections, with shorter spells of work and accumulation of pension entitlements in Norway, also contributes to the

⁴ The benefit ratio (BR) measures the average pension benefit against the average, economy-wide wage (see Figure 2).

⁵ The replacement rate at retirement (RR) is defined as the average first pension of those who retire in a given year over the average wage they earned before retirement.

decline in the aggregate benefit ratio (this effect dampens the effect of foreign pensioners on the coverage ratio).

The introduction of an average of price and wage indexation contributes to a reduction of pension expenditure compared to the old pension system.

The increase in pension expenditure towards 2030 is related to the transmission effect of changes in arrangements for taking out early pensions for employees in the public sector as well as cohort effects associated with increased labour participation for women during the 1970s and 1980s.

The continued modest increase in pension expenditure as a share of GDP towards 2060 reflects a combination of the following factors:

- The new method for longevity adjustment (also applied in the projections) – based on observed mortality (averaged over 10 years) at the time of cohorts reaching 60 years instead of assumptions-based projections of mortality – may involve lag effects compared to actual development measured ex post.
- Disability pensioners born after 1953 are not exempted from longevity adjustments even though they have no possibility of counteracting the effect by working longer. This feature of the system is incorporated for the entire projected period by assumption despite being likely to change in the future.

TABLE 9 – BENEFIT RATIO (BR), REPLACEMENT RATE AT RETIREMENT (RR) AND COVERAGE BY PENSION SCHEME (IN %)

	2022	2030	2040	2050	2060	2070	change 2022-2070 (pps)
Public scheme (BR)	57 %	52 %	45 %	40 %	36 %	36 %	-20 %
Coverage	100 %	100 %	100 %	100 %	100 %	100 %	0 %
Public scheme: old-age earnings related (BR)	44 %	45 %	47 %	47 %	47 %	49 %	4 %
Public scheme: old-age earnings related (RR)	21 %	22 %	19 %	17 %	18 %	20 %	-2 %
Coverage	60 %	61 %	60 %	56 %	53 %	51 %	-8 %
Private occupational scheme (BR)	:	:	:	:	:	:	:
Private occupational scheme (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Private individual schemes (BR)	:	:	:	:	:	:	:
Private individual schemes (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Total benefit ratio	:	:	:	:	:	:	:
Total replacement rate (earnings-related benefits)	:	:	:	:	:	:	:

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. In case data on pensioners are not available, the calculation is based on the number of pensions.

Source: European Commission, EPC.

In line with the comments on developments in the coverage ratio above, developments in the Pension System Dependency Ratio (SDR - pensioners divided by employees) and Old Age Dependency Ratio in Table 10 may be somewhat obscured due to pensioners living abroad and pensioners using the option of continued work both amplifying the growth in number of pensioners in the projections. The effects on pension expenditure are in both cases dampened by the same developments contributing to a reduction in average pension benefits.

TABLE 10 – SYSTEM DEPENDENCY RATIO AND OLD-AGE DEPENDENCY RATIO

	2022	2030	2040	2050	2060	2070	change 2022-2070
Number of pensioners (thousand) (I)	1383	1787	2156	2488	2791	2857	1475
Employment (thousand) (II)	2856	2916	3023	3101	3138	3132	276
Pension system dependency ratio (SDR) (I)/(II)	0,5	0,6	0,7	0,8	0,9	0,9	0,4
Number of people aged 65+ (thousand) (III)	1000	1187	1421	1556	1730	1885	884
Working-age population 20-64 (thousand) (IV)	3210	3315	3404	3479	3478	3466	256
Old-age dependency ratio (OADR) (III)/(IV)	0,3	0,4	0,4	0,4	0,5	0,5	0,2
System efficiency (SDR/OADR)	1,6	1,7	1,7	1,8	1,8	1,7	0,1

Source: European Commission, EPC.

In Tables 11 and 12 the number of pensioners by age groups (total and female) is divided by total and inactive population respectively. The inclusion of pensioners living abroad in the projections contributes to ratios above 100 for the older age groups.

TABLE 11 – PUBLIC PENSIONERS TO (INACTIVE) POPULATION BY AGE GROUP (%)

<i>pensioners / inactive population</i>	2022	2030	2040	2050	2060	2070
Age group -54	12,4	12,6	13,5	12,8	12,7	12,1
Age group 55-59	96,2	101,9	100,1	107,0	104,5	101,9
Age group 60-64	140,2	147,4	138,7	142,4	153,7	157,7
Age group 65-69	138,1	147,0	146,0	159,4	154,2	138,6
Age group 70-74	115,1	135,6	139,6	156,2	158,7	131,2
Age group 75+	103,8	108,1	122,8	130,2	140,2	140,2

<i>pensioners / total population</i>	2022	2030	2040	2050	2060	2070
Age group -54	4,8	4,5	4,7	4,4	4,4	4,2
Age group 55-59	19,4	22,0	21,9	21,9	20,4	20,1
Age group 60-64	41,2	56,2	53,0	53,2	53,4	53,4
Age group 65-69	92,6	107,9	107,5	115,4	108,8	95,2
Age group 70-74	103,3	125,8	130,1	144,9	146,1	119,7
Age group 75+	103,8	108,1	122,8	130,2	140,2	140,2

Source: European Commission, EPC.

TABLE 12 – FEMALE PENSIONERS TO (INACTIVE) POPULATION BY AGE GROUP (%)

<i>female pensioners / inactive population</i>	2022	2030	2040	2050	2060	2070
Age group -54	14,2	13,6	13,6	12,6	12,5	11,9
Age group 55-59	97,7	102,6	102,8	104,2	107,0	105,0
Age group 60-64	110,7	139,4	130,4	135,4	149,1	154,5
Age group 65-69	121,2	138,8	136,3	149,3	150,8	140,3
Age group 70-74	108,8	123,2	126,2	135,4	144,6	124,9
Age group 75+	103,3	103,0	112,4	116,7	123,5	127,8

<i>female pensioners / total population</i>	2022	2030	2040	2050	2060	2070
Age group -54	5,7	5,1	4,8	4,4	4,4	4,2
Age group 55-59	23,8	25,4	23,2	22,1	20,8	20,4
Age group 60-64	40,2	58,2	54,1	53,6	53,7	53,8
Age group 65-69	88,9	106,1	104,3	111,7	110,6	100,1
Age group 70-74	102,1	115,7	118,7	127,2	135,1	115,9
Age group 75+	103,3	103,0	112,4	116,7	123,5	127,8

Source: European Commission, EPC.

Table 13 reports developments in expenditure on new public pensions (total, men and women respectively) and how they are linked to the average contributory period, average pension earnings, average accrual rates and the number of new pensioners.

The decomposition attempts a reporting consistent with the phasing-in of the reformed old-age pensions system. Thus the figures capture, in line with the pension projections, a weighed effect of accumulation of pension entitlements for persons earning pensions under the old and new system. The accrual rate (adjusted for length of pension period) for 2022 (see item III in the table) thus reflects to some extent accumulation of pension earnings under the old system, which is below a hypothetical accrual rate which would apply for a pensioner (born in 1952) in 2022 with accumulation of pension earnings under the new system. Phasing-in effects thus contributes to a temporary increase in the accrual rate. The temporary increase is stronger for women than for men. Based on current observed patterns of behaviour, men to a larger degree than women opt for early take-out of pensions (often in combination with continued work). This tendency is assumed to continue in the projections and contributes to dampening the increase in accrual rate adjusted for the length of pension period. Regarding the development in the accrual rate towards 2070, it will gradually decrease under the new system due to adjustments embodied in the new old age pension system for increases in expected lifetime towards 2070. A pensioner deciding to retire at a given age in 2022 will enjoy higher yearly pensions (relative to pensionable income) compared to a pensioner retiring at the same age in 2070. The effect of immigration on declining average contributory periods towards 2050 is also less pronounced for women than for men.

TABLE 13 – BREAKDOWN OF NEW PUBLIC PENSION EXPENDITURE (OLD-AGE AND EARLY EARNINGS-RELATED PENSIONS)

TOTAL	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	1257	1718	2174	3161	4490	6127
I. Number of new pensions (1000)	76,5	87,7	91,4	108,9	107,2	93,9
II. Average contributory period (years)	33,7	31,2	28,9	26,8	29,0	34,1
III. Average accrual rate (%) (c/A)	0,9%	0,9%	0,9%	0,9%	0,9%	0,8%
<i>Notional-accounts contribution rate (c)</i>	13,7%	16,9%	16,9%	16,9%	17,1%	17,0%
<i>Annuity factor (A)</i>	15,9	17,8	18,3	19,1	20,1	21,3
IV. Monthly average pensionable earnings (1000 EUR)	4,7	5,5	7,4	10,2	14,2	20,0
V. Sustainability/adjustment factors	1,0	1,0	1,0	1,0	1,0	1,0
VI. Average number of months paid the first year	12	12	12	12	12	12
Monthly average pensionable earnings (% of monthly economy-wide average wage)	1,2	1,2	1,2	1,1	1,1	1,2

MEN	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	715	943	1178	1707	2456	3370
I. Number of new pensions (1000)	40,6	47,7	50,8	60,3	57,0	48,4
II. Average contributory period (years)	33,1	30,1	27,0	24,8	27,9	33,6
III. Average accrual rate (%) (c/A)	0,8%	0,9%	0,8%	0,8%	0,8%	0,8%
<i>Notional-accounts contribution rate (c)</i>	12,6%	15,2%	15,3%	15,6%	16,1%	16,0%
<i>Annuity factor (A)</i>	16,3	17,8	18,1	18,9	20,0	21,2
IV. Monthly average pensionable earnings (1000 EUR)	5,7	6,4	8,5	11,5	16,0	22,9
V. Sustainability/adjustment factors	1,0	1,0	1,0	1,0	1,0	1,0
VI. Average number of months paid the first year	12	12	12	12	12	12
Monthly average pensionable earnings (% of monthly economy-wide average wage)	1,4	1,4	1,3	1,3	1,3	1,3

WOMEN	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	542	775	996	1454	2033	2757
I. Number of new pensions (1000)	35,9	40,0	40,7	48,7	50,1	45,4
II. Average contributory period (years)	34,2	32,6	31,4	29,2	30,2	34,6
III. Average accrual rate (%) (c/A)	1,0%	1,1%	1,0%	1,0%	0,9%	0,9%
<i>Notional-accounts contribution rate (c)</i>	15,6%	19,7%	19,3%	18,6%	18,6%	18,4%
<i>Annuity factor (A)</i>	15,4	17,9	18,4	19,3	20,3	21,4
IV. Monthly average pensionable earnings (1000 EUR)	3,6	4,5	6,2	8,9	12,2	17,0
V. Sustainability/adjustment factors	1,0	1,0	1,0	1,0	1,0	1,0
VI. Average number of months paid the first year	12	12	12	12	12	12
Monthly average pensionable earnings (% of monthly economy-wide average wage)	0,9	1,0	1,0	1,0	1,0	1,0

*New pension expenditure equals the product of I, II, III, IV, V & VI.

Source: European Commission, EPC.

3.4. Financing of the pension system

Table 14 gives an overview of the-pay-as-you-go financing of public pension expenditure.

TABLE 14 – FINANCING OF THE PUBLIC PENSION SYSTEM

	Public employees	Private employees	Self-employed
Contribution base	Wages	Wages	Income
Contribution rate/contribution			
Employee	7,9%	7,9%	11,1%
Employer	14.1% in 2022 (temporary increase in 2023 by 5% for wages exceeding NOK 750.000)	14.1% in 2022 (temporary increase in 2023 by 5% for wages exceeding NOK 750.000)	
State	-	-	-
Other revenues	-	-	-
Maximum contribution	-	-	-
Minimum contribution	-	-	-

Source: European Commission, EPC.

Table 15 records projected developments in employer and employee contributions. Employer and employees public pension contributions are not directly linked to financing of public pension expenditures, but – similar to other taxes – used to finance government expenditures in general. Related to this, the Government Pension Fund (GPF) is not directly linked to financing pension expenditures. GPF is rather a general vehicle to decouple yearly expenditures from income streams from the petroleum sector. With a budget rule stating that non-oil budget deficits over time shall evolve in line with expected real return (3%) from SPF, SPF gives a lasting contribution to the financing of government (pension and other) expenditure.

TABLE 15 – REVENUE FROM CONTRIBUTIONS AND NUMBER OF CONTRIBUTORS IN THE PUBLIC SCHEME

	2022	2030	2040	2050	2060	2070	change 2022-2070 (pps)
Public pension contributions (%GDP)	11,5	11,3	11,3	11,3	11,3	11,3	-0,1
Employer contributions	6,4	6,3	6,3	6,3	6,3	6,3	-0,1
Employee contributions	5,1	5,0	5,0	5,0	5,0	5,0	-0,1
State contribution*	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Other revenues*	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Number of contributors (I) (1000)	2780	2838	2943	3019	3054	3048	268
Employment (II) (1000)	2856	2916	3023	3101	3138	3132	276
(I) / (II)	0,97	0,97	0,97	0,97	0,97	0,97	0,0

Source: European Commission, EPC.

3.5. Sensitivity analysis

Table 17 illustrates the sensitivity of the baseline projection presented above to different demographic and economic assumptions. Important factors may be summarised as follows:

- Higher life expectancy contributes to an increase in the number of old age pensioners. The effect on pension expenditure is counteracted by the conversion of the implicit pension wealth of accumulated entitlements into an annuity over an increased average expected remaining lifetime. The net effect amounts to an increase in the GDP-ratio of pension expenditures by 0,3 percentage points compared to the baseline towards 2070. This effect reflects lags in life expectancy adjustments referred to above.
- Lower (higher) migration reduces (increases) pension expenditure, but the associated decrease (increase) in mainland GDP produces a net increase (decrease) in the pension expenditure-to-GDP ratio compared to the baseline
- Lower fertility has a substantial effect on pension expenditure towards 2070, reflecting reductions in Mainland GDP and tax bases relative to the number of pensioners.
- In the high inflation scenario, with proportional increases in prices and wages, the public pension expenditure-to-GDP ratio is unchanged compared to the baseline.
- Under scenarios with higher and lower TFP growth, the combined price and wage indexation of old age pension benefits contributes to a decrease and an increase, respectively, in the pension expenditures to GDP ratio. This in contrast to similar scenarios in the 2021 Ageing Report (with wage indexation of old age pensions then contributing to neutral effects of productivity changes on public pension expenditures to GDP ratios).
- The scenarios with higher employment among older persons as well as the hypothetical introduction of a link between the retirement age and increases in life expectancy reflect changed developments in macroeconomic variables (employment and GDP) whereas the number of pensioners and average pension benefit in fixed terms are unchanged compared to baseline. The denominator effects give rise to decreases in the pension expenditure -to-GDP ratios.
- The scenario with constant retirement age also reflects changed developments in macroeconomic variables (employment and GDP), assuming that a change in the number of old age pensioners would be exactly offset by the change in average pensions.

TABLE 16 – EXPENDITURE PROJECTIONS UNDER DIFFERENT SCENARIOS (PPS DEVIATION FROM BASELINE)⁶

<i>Public pension expenditure</i>	2022	2030	2040	2050	2060	2070	change 2022-2070 (pps)
Baseline (%GDP)	10,8	12,1	12,1	12,0	12,2	12,5	1,7
Higher life expectancy at birth (+2y)	0,0	0,0	0,1	0,2	0,2	0,3	0,3
Higher migration (+33%)	0,0	-0,1	-0,3	-0,4	-0,5	-0,5	-0,5
Lower migration (-33%)	0,0	0,1	0,2	0,4	0,5	0,5	0,5
Lower fertility (-20%)	0,0	0,0	0,0	0,3	0,6	1,0	1,0
Higher inflation scenario (2% by 2052)	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Higher employment rate of older workers (+10 pps)	0,0	-0,3	-0,5	-0,5	-0,5	-0,5	-0,5
Higher productivity (TFP converges to 1%)	0,0	0,0	0,0	0,0	-0,1	-0,2	-0,2
Lower productivity (TFP converges to 0.6%)	0,0	0,0	0,0	0,1	0,2	0,2	0,2
Policy scenario: link retirement age to longevity	0,0	0,0	-0,1	-0,2	-0,4	-0,6	-0,6
Policy scenario: constant retirement age	0,0	0,0	0,0	0,1	0,1	0,2	0,2
Policy scenario: constant benefit ratio	:	:	:	:	:	:	:

Source: European Commission, EPC.

3.6. Changes in comparison with previous Ageing Report projections

Table 18 compares the present pension projections with the projections in previous Ageing Reports. Changes in the demographic assumptions together with updated labour market projections contribute to the decrease in growth in pension expenditure toward 2070 compared to the 2021 Ageing Report projections.

TABLE 17 – DISAGGREGATION OF THE CHANGE IN THE PUBLIC PENSION EXPENDITURE-TO-GDP RATIO IN CONSECUTIVE AGEING REPORTS (PPS OF GDP)

	Public pension expenditure	Dependency ratio effect	Coverage ratio effect	Benefit ratio effect	Labour market effect	Residual (incl. interaction effect)
2006 Ageing Report (2004-2050)	:	:	:	:	:	:
2009 Ageing Report (2007-2060)	4,7	8,2	-1,2	-2,4	0,3	-0,2
2012 Ageing Report (2010-2060)	4,9	8,0	-1,1	-1,6	0,0	-0,3
2015 Ageing Report (2013-2060)	2,5	5,6	-0,5	-2,2	-0,2	-0,2
2018 Ageing Report (2016-2070)	2,1	7,6	-0,9	-3,9	-0,3	-0,3
2021 Ageing Report (2019-2070)	2,6	7,4	1,1	-5,5	0,0	-0,4
2024 Ageing Report (2022-2070)	1,7	6,8	1,1	-5,6	-0,3	-0,4

- The disaggregation for 2006/2009/2012 is on the basis of the number of pensions; for the other vintages it is on the basis of pensioners.

- The projection horizon has been extended over consecutive Ageing Reports, limiting comparability over time.

Source: European Commission, EPC.

Table 19 shows how the difference between the 2021 projections and outcome figures for 2019 – 2022 is to a limited extent due to a coverage effect, namely excluding survivors' pensions from the scope of the projection exercise. Towards 2070, the differences are primarily due to changes in the assumptions (see Table 20).

⁶ For more information on the design of the sensitivity scenarios, see Chapter 5 of Part I in European Commission and EPC (2023), '[2024 Ageing Report: Underlying assumptions and projection methodologies](#)', European Economy, Institutional Paper 257.

TABLE 18 – DISAGGREGATION OF THE DIFFERENCE BETWEEN THE 2021 PROJECTIONS AND ACTUAL PUBLIC PENSION EXPENDITURE IN 2019-2022 (%GDP)

	2019	2020	2021	2022
Ageing Report 2021 projections (%GDP)	11.0	11.7	11.4	11.4
<i>Assumptions (pps of GDP)</i>	-0.1	-0.4	-0.2	-0.5
<i>Coverage of projections (pps of GDP)</i>	-0.1	-0.1	-0.1	-0.1
<i>Constant policy impact (pps of GDP)</i>				
<i>Policy-related impact (pps of GDP)</i>				
Actual public pension expenditure (%GDP)	10.8	11.2	11.1	10.8

Source: European Commission, EPC.

TABLE 19 – DISAGGREGATION OF THE DIFFERENCE BETWEEN THE 2021 AND THE NEW PUBLIC PENSION PROJECTIONS (%GDP)

	2022	2030	2040	2050	2060	2070
Ageing Report 2021 projections	11.4	12.3	12.6	12.7	13.2	13.6
<i>Change in assumptions (pps of GDP)</i>	-0.5	-0.2	-0.5	-0.7	-1.0	-1.1
<i>Improvement in the coverage or in the modelling (pps of GDP)</i>	-0.1	-0.1	0.0	0.0	0.0	0.0
<i>Change in the interpretation of constant policy (pps of GDP)</i>						
<i>Policy-related changes (pps of GDP)</i>						
New projections	10.8	12.1	12.1	12.0	12.2	12.5

Source: European Commission, EPC.

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

The tax and pension systems are typically detailed and complex, involving a large degree of individual heterogeneity. Accordingly, there are substantial aggregation problems when calculating the total effect on government budgets of changes in tax or pension systems. To overcome these problems, micro simulation models represent a socioeconomic system by a sample of decision units (e.g. persons), and then model the behaviour of these primary units. Contrary to what is possible in aggregate models, inhabited by one or a few representative agents, the detailed and complicated tax and benefit rules may be exactly reproduced.

The dynamic micro simulation model MOSART⁷ is designed to analyse effects on individual pension entitlements, benefits, and government pension expenditure of changes in the Norwegian public pension system. The model simulates the life courses of the Norwegian population, using a set of transition probabilities to determine the occurrence of socio-demographic events, emphasizing what is relevant for individuals' accumulation of public pension entitlements. It captures the following events: migration, deaths, births, marriages, divorces, educational activities, retirement, and labour force participation. The model covers social security old age pensions and disability pensions.

Transitions between states over the life course depend on individual characteristics, and the transition probabilities have been estimated based on historical data. For retirement decisions, adjustments have been implemented in order to capture incentives for postponement of retirement in the reformed old age pension system. The model includes an accurate description of the pension system and captures relevant details of the population dynamics, as well as the heterogeneity of individual age-earnings profiles and individual public pension entitlements.

The macro assumptions from the AWG are calibrated and translated to the model population in the micro simulation model, maintaining the heterogeneity of the model population while respecting aggregate assumptions from the AWG concerning demographic developments (including net immigration), participation rates etc. by age and gender.

Statistics Norway maintains the MOSART-model and runs the projections for the government. The model is well established as the central tool for evaluating developments in pension expenditure in Norway, and is updated on a regular basis in order to capture changes in demographic projections as well as changes in social security old age and disability pensions systems

⁷ Andreassen, L., Fredriksen, D., Gjefsen, H.M., Halvorsen, E. and Stølen, N.M. 2020. The dynamic cross-sectional microsimulation model MOSART. *International Journal of Microsimulation* 13(1); 92–113.
https://www.microsimulation.org/IJM/V13_1/ijm.00214.pdf

Methodological annex

Economy-wide average wage at retirement

In the projections labour productivity is driving the evolution of the economy-wide average wage, while seniority effects are also taken into account for projections of economy-wide average wage at retirement.

TABLE A1 – ECONOMY-WIDE AVERAGE WAGE AT RETIREMENT (1000 EUR)

	2022	2030	2040	2050	2060	2070
Economy-wide average gross wage at retirement	76,5	106,1	147,5	200,4	281,5	392,3
Economy-wide average gross wage	48,9	66,8	89,9	126,3	175,7	242,9

Source: Norway, European Commission, EPC.

Pensioners vs pensions

Only the number of pensioners is specified in MOSART.

Pension taxation

The projections assume unchanged tax revenues as a share of pension expenditure.

Disability pensioners

The evolution of the disability pension expenditure and the number of pensions/pensioners entitled to a disability pension follows from the demographic developments through age- and gender specific transition probabilities. In addition, calibration of the projections to the employment assumptions (resulting from the cohort simulation model) is carried out by means of adjustment of the transition rates – in particular for the 50 – 61 year age group. Disability pensioners become old age pensioners at the age of 67.

TABLE A2 – DISABILITY RATES BY AGE GROUPS (%)

	2022	2030	2040	2050	2060	2070
Age group -54	7,1	6,6	6,7	6,4	6,3	6,1
Age group 55-59	19,4	22,0	21,9	21,9	20,4	20,1
Age group 60-64	25,5	31,6	29,9	30,2	28,0	27,7
Age group 65-69	12,7	15,0	13,6	14,0	13,1	12,8
Age group 70-74	0,0	0,0	0,0	0,0	0,0	0,0
Age group 75+	0,0	0,0	0,0	0,0	0,0	0,0

Source: Norway.

Survivors' pensions

Survivors' pensions are not included in the projections, see Section 1.

Non-earnings-related minimum pension

In the previous system, pensions consisted of a basic amount (equal for all) and additional income-related pensions calculated from a positive threshold income level. The new system also has a minimum guarantee pension, but income-related pensions are calculated from total income (not only from income above a threshold level). However, also under the new system there will be a fraction of the pensioners who are just entitled to minimum/guarantee (not income-related pensions) pensions. The level of this guarantee pension is comparable to the basic pension under the previous system.

Contributions

Employer and employees public pension contributions are not directly linked to financing of public pension expenditures, but – similar to other taxes - used to finance government expenditures in general. Implicit contribution rates are assumed to remain constant over the projection period.

Pensioners abroad

Table A3 gives developments in the share of old age and disability pensioners that are living abroad. Implications of these developments for coverage ratios, average benefits and contribution periods are discussed higher in the fiche.

TABLE A3 – OLD AGE AND DISABILITY PENSIONERS: RECIPIENTS ABROAD, SHARE OF TOTAL (%)

	2022	2030	2040	2050	2060	2070
all	5.5	11.3	17.5	22.7	25.2	21.4
-64 year	1.8	1.4	1.7	1.7	1.7	1.6
65-69 years	15.7	18.1	20.4	26.9	22.1	10.7
70-74 years	4.2	23.0	25.7	33.7	33.7	19.2
+75 years	3.4	8.3	20.2	25.3	30.9	30.8

Source: Norway.