

Country fiche on pensions for the Netherlands-the 2017 round of projections for the Ageing Working Group

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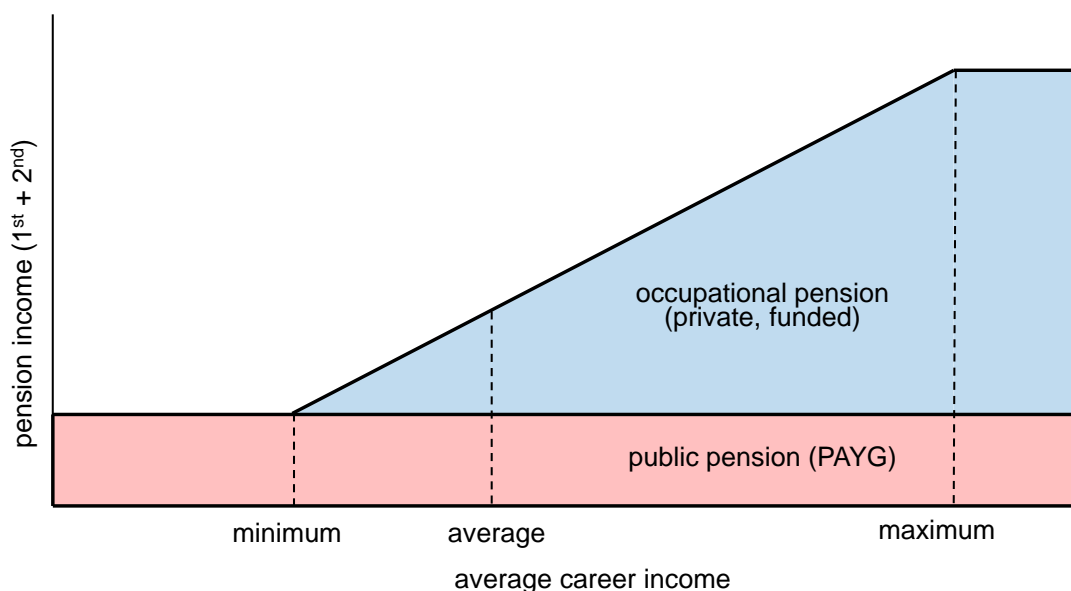
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1 Structure of the Dutch pension system¹

1.1 The composition of the pension system

The mandatory part of the Dutch pension system comprises the government provided basic old age pension scheme (first pillar), occupational pension schemes (second pillar), disability benefits and survivor benefits. The basic old age pension provides an equal income for all pensioners at a level related to the net minimum wage. The state pension in the Netherlands is only a part of the total old age pension system. The second pillar comprises the occupational pension schemes. It is funded, supplements the state pension and is related to past contributions and previously earned income. The annual build-up of pension rights is capped at an income level of 103,317 euros, a level that is indexed each year in line with wages. On average the two pensions are roughly equal in size. Due to the dependency on past income however, the weights for individuals differ substantially. Figure 1 sketches how both pensions are related to past earnings. In 2016 the aggregates of paid out public and occupational pensions were roughly equal in size, the public pension amounting to 5.3% of GDP and the occupational pension to 5.7%. Disability benefits and survivor benefits currently make up 1.8% and 0.1% of GDP respectively. The rest of this section describes these pensions separately.

Figure 1 Overall sketch of the 1st and 2nd pillar system of old age pensions



¹ This section and the next is partly based on "The old age pension system in the Netherlands; a brief outline" by the Ministry of Social Affairs and Employment.

1.2 First pillar: the state old age pension (AOW)

1.2.1 The system

The AOW is the statutory old age pension scheme of the Netherlands. Before the 2012 reform, which is discussed hereafter and involves a rise of the eligibility age, it provided all residents of the Netherlands a flat-rate pension benefit as from the age of 65. In 2017 the pension for a single amounts to 14,737 euros annually in gross terms and 13,941 euros in net terms. For a couple these figures are 20,357 euros and 19,258 euros respectively, each of the partners receiving half. It is a basic provision. In net terms, the pension equals around 78% of the minimum wage for singles. For a couple this is 102%. The pensions rise in line with minimum wages, which in turn are decided each year by the Minister of Social Affairs and Employment. There is no means-test for the eligibility of benefits; other forms of income have no effect on the AOW benefit. Until 2015, the benefit also applied to couples of which one of the partners had not yet reached the age of 65. As of that date however, this changes for new cases of which the younger partner has sufficient means of his or her own. This measure was legislated in 1996 and is expected to eventually curb the level of expenditure on this scheme by 3%. This effect is assumed to be reached in 2025.

All residents of the Netherlands between the ages of 15 and 65 are insured for the AOW. No distinction is made between men and women and between civil servants, employees and the self-employed. Past contributions have no effect on the benefit level. During the period of insurance, entitlement is accrued in 2% steps for every insured year. This leads to a 100% entitlement to the relevant pension benefit on reaching the age of 65, provided there are no gaps in the period of insurance. A gap, of 2% per year, occurs when a person resides outside the Netherlands during (part of) the insured period. People who are not entitled to the full AOW benefit and who have, together with other sources of income, a total income below the subsistence level (i.e. less than 70% of the legal minimum wage) are entitled to receive a supplementary social assistance benefit. In 2016, this supplement amounted to 245 mln euros, or 0.7% of the aggregate AOW expenditure in that year, and it involved around 42 thousand beneficiaries. The pensions are exportable. The supplementary benefit however is not. Currently about 10% of pensions is paid to a person living outside the Netherlands. However, of those with a full pension this is only 0.7%.

State old age pensions are financed according to the pay-as-you-go system: today's contributors finance the pension payments made to the pensioners of today. The administrative body for the AOW is the Social Insurance Bank (SVB). The SVB is independent of the government in its day-to-day operations. The Board of Directors manages the Bank in consultation with the Board of Advisors. The Ministry of Social Affairs and Employment (SZW) appoints the members of both the Board of Directors and Board of Advisors and approves its annual plan and budget. The SVB is subject to inspection by the Work and Income Inspectorate (IWI), part of SZW. SZW is also responsible for the design of the pension system as well as changes therein such as the 2012 pension reform (see below).

1.2.2 The 2012 reform: a rise of the eligibility age

The reform consists of a rise of the eligibility age for the public pension and an accompanying similar restriction in the room for saving for the 2nd and 3rd pillar pension in a standard tax favoured way.

The eligibility age for the public pension is raised by one month per year in the period 2013 till 2015, three months per year in 2016-2018 and four months per year in 2019-2021. In 2021 it will have reached the age of 67.² After that year it will be linked to the remaining life expectancy for 65 year olds, as projected by Statistics Netherlands, in a way that is laid down in law by the formula:

$$V = (L - 18.26) - (P - 65)$$

in which:

V = the increase of the eligibility age (in years)

L = projected average remaining life expectancy at the age of 65 as projected by Statistics Netherlands (in years)

P = the eligibility age in the year preceding the year in which the rise is considered (in years)

The formula is applied to all future years. If V is negative or smaller than 0.25 the eligibility age remains unchanged. However, if V exceeds the value of 0.25, the eligibility age is raised by three months. The rise is announced five years before it is to become effective and is based on the latest projection of life expectancies at the time.

According to the latest Statistics Netherlands projections³ this effectively leads to a further rise of the eligibility age to 72 years and 6 months in 2070, the last year of the projection.⁴ This will take place in 22 three month steps in 2022, 2024, 2026, 2029, 2031, 2032, 2034, 2036, 2038, 2041, 2043, 2045, 2047, 2049, 2051, 2054, 2056, 2058, 2061, 2064, 2066 and 2069.⁵ This time path is imputed in the calculations presented in section 3. Table 1 shows the accumulated effect for a selection of years. Changes in the projection of life expectancies will lead to corresponding adjustments of this time path, but not before five years after the change is made public by Statistics Netherlands. The level of the pension will remain unaffected. As the public pension remains to be a flat rate system the table features a uniform across the board rise in the eligibility age. Variables that are not relevant in the Dutch pension system, such as the contributory period, are left empty in table 1.

² This time path deviates slightly from the one presented in the previous round in 2014, in which the eligibility age of 67 was reached in 2023. This follows a policy change that was decided upon in 2015 and involves a temporary acceleration of the rise in the eligibility age. The policy change has no effect after 2023.

³ According to the current projection, average life expectancy (in years) as projected by Statistics Netherlands rises from its 2010 level of 19.34 to 20.36 in 2020, 22.76 in 2040, and eventually 25.94 in 2070.

⁴ The ages at which the pension rights are accrued move up in line with the eligibility age. They will remain to be built up in the 50 years preceding the eligibility age, at a rate of 2% for each year.

⁵ The projections for life expectancies that underlie the increases were specifically constructed by Statistics Netherlands for the purpose of this exercise. They are published at <https://www.cbs.nl/nl-nl/maatwerk/2017/27/geslachtsneutrale-levensverwachting-op-65e-verjaardag>. Although the total rise of the eligibility age until 2060 equals that in the previous round, the time path differs somewhat due to slight changes in the time path of the projected rise of life expectancy.

An additional effect of the rise of the eligibility age is that the duration of the social security arrangements for the under 65 year olds, i.e. the disability scheme, the survivor scheme, the unemployment scheme and social assistance, are prolonged accordingly. This entails a leakage in terms of cost savings for the government that amounts to around 40%.

Table 1 **Qualifying condition for retiring**

			2016	2020	2030	2040	2050	2060	2070
Qualifying condition for retiring with a full pension	Minimum requirements	Contributory period - men	-	-	-	-	-	-	-
		Retirement age - men	65+6m	66+8m	68	69+3m	70+6m	71+6m	72+6m
		Contributory period - women	-	-	-	-	-	-	-
		Retirement age - women	65+6m	66+8m	68	69+3m	70+6m	71+6m	72+6m
		Statutory retirement age - men	65+6m	66+8m	68	69+3m	70+6m	71+6m	72+6m
		Statutory retirement age - women	65+6m	66+8m	68	69+3m	70+6m	71+6m	72+6m
Qualifying condition for retirement WITHOUT a full pension		Early retirement age - men	-	-	-	-	-	-	-
		Early retirement age - women	-	-	-	-	-	-	-
		Penalty in case of earliest retirement age	-	-	-	-	-	-	-
		Bonus in case of late retirement	-	-	-	-	-	-	-
		Minimum contributory period - men	-	-	-	-	-	-	-
		Minimum contributory period - women	-	-	-	-	-	-	-
		Minimum residence period - men	see text	see text	see text	see text	see text	see text	see text
		Minimum residence period - women	see text	see text	see text	see text	see text	see text	see text

The reform also induces behavioural responses. The most important one is that it is expected to raise the labour participation rates of the elderly workers, the affected age groups. Combined with the effect of other factors, such as the rising educational levels of these age groups, the participation rate of the 55-59 year olds is projected to rise from 76.3% in 2013 to 82.9% in 2070, when the eligibility age is increased by 7½ years. For the 60-64 year olds it rises from 49.8% to 74.8% and for the 65-71 olds from 12.4% to 40.7%. The overall participation rate, i.e. that of the 20 to 74 year olds, rises from 71.3% to 75.0%.

1.3 Second pillar: occupational pensions

1.3.1 The system

In the Netherlands there are mainly four types of occupational pension providers:

1. company-specific pension fund providers that administer the pension scheme of a larger enterprise;
2. industry-wide pension fund providers that administer the pension scheme of a whole branch of industry;
3. insurance providers who have to deal with approximately 30,000 group life insurance contracts for separate enterprises;
4. pension funds for professional groups which have to do with self-employed professionals within a particular profession (there are only active members and pensioners and no employer).

The joint capital of these pension providers is estimated at around 1620 billion euros,⁶ which coincides with around 220% of the projected level of GDP for 2017. The pension sector is also concentrated. The largest fund, with an invested capital of 388 billion euros (The Dutch Civil Servants' Pension Fund ABP), represents around 24% of the total assets. The largest five funds share about half of the total assets. At present (end of second quarter of 2017), 261 pension funds are in operation, of which 192 are company-specific, 59 are industry-wide and 10 are pension funds for a particular profession. Other than these, 30,000 group pension agreements have been made with insurance providers by companies that do not have a pension fund. All these pension providers are being supervised by the Dutch Central Bank (DNB).

The vast majority of those employed in the Netherlands (over 90%) participate in an occupational pension scheme. This form of saving is attractive for most employees as it is tax favoured.⁷ As of 2015 it is capped. The current level at which it is capped is a gross income of 103,317 euros.

Occupational pensions are subject to negotiation between the social partners at industry level and are legally binding for all firms in that industry. Individual firms can be exempt from these if they offer a company specific pension scheme of comparable or better quality. The pension funds have to be financed by capital funding. A pension scheme is part of the employment conditions laid down in an agreement (which may be a collective agreement). A vast majority of pension funds currently have an average pay scheme promising a maximum yearly accrual rate of 1.875% of average career salary (including first pillar benefits). If the collective labour agreement lasts for 40 years, the total pension benefit (first plus second pillar) therefore will be 75% of the average salary. About 90% of all active members were participating in an average-wage scheme. Indexation of pension rights of the working population on average used to equal 50% of the wage rise and 50% of the price rise, though in recent years price indexation seems to become more dominant. For the retired these figures are respectively 35% and 65%. Occupational pension schemes are considered supplementary to the AOW state pension. The AOW benefit is therefore a factor included in most calculations of second pillar pension schemes in order to arrive at the 75% aim referred to above. This factor is known as the AOW franchise. Pension premiums are only paid over income above this franchise, and correspondingly only pension rights built up. On average, pension contribution rates amount to 24% of gross income above this franchise, of which roughly 70% is covered by the employers and 30% by the employees. Together these two parts of the contribution to pension funds currently amount to around 14% of aggregate gross labour income.

⁶ This is the figure for June 30 2017. It includes an estimation of the mandatory occupational pension savings that are not administered by pension funds but by life insurance companies. The capital of pension funds alone amount to 1390 billion euros. See <https://www.dnb.nl/statistiek/statistieken-dnb/financiele-instellingen/index.jsp> for the balance sheets of pension funds and life insurance companies. The part of life insurance companies that involve second pillar pensions is estimated to be 47%.

⁷ Saving via the occupational pension system falls under an EET arrangement. This means that the contribution to the pension fund is tax exempt (the first E), that the accrual of revenues to the pension fund are tax exempt as well (the second E) and that the paid out pensions are taxed (the T). As for many employees the tax rate at which the contributions to the fund can be deducted is higher than the tax rate that is due on the paid out pensions this form of saving is considered to be subsidized.

The third (non-mandatory savings via life insurance companies) and fourth pillar (free savings) in the Netherlands are relatively small. Together, they provide around 10% of pension income.

1.3.2 The financial position of pension funds

The second pillar of the Dutch pension system is characterised by the legal obligation of full funding for the nominal, i.e. non-indexed, liabilities of pension funds. Many pension funds have invested in equity and real estate. In order to compensate the higher risks involved in these investments, the supervisor requires that a Dutch pension fund hold additional reserves (buffers).

Since the 1990's certain developments took place, including a systemic increase in pension obligations (and costs) due to a higher life expectancy, a reduction of contributions paid (during the 1990's) and a continuous drop of the capital market interest rate. These developments caused a reduction of reserves and the erosion of prudence from the pension system itself. The erosion was even deepened by the shift towards high-risk investments and the turmoil on financial markets. Despite an increase in contributions paid during the first decade of the 21st century, these developments led to a sharp fall of the funding ratio. This ratio, which is defined as the ratio between assets and nominal, that is non-indexed, liabilities fell from approximately 230% in 1990, to 115% in 2004 and to a current level (end of second quarter of 2017) of 103%. In terms of the real, indexed, liabilities this figure obviously is far lower.

The supervisor subsequently tightened up the regulations for pension funds and intensified their supervision. Pension fund administrators then made arrangements in order to restore their financial positions. Most funds are currently on track to fulfill their *minimum* solvency requirement of 105%, but they still have not enough funding to fulfill the *required* solvency level of about 130%.

The supervision structure, the financial assessment framework (FTK), has recently been revised. The government, social partners, pension fund administrators and the supervising authority agreed that stop-gap regulations aimed at short-term financial stability could be counterproductive to the long-term quality of the pension system. Achieving a balance between short-term exigent requirements and the long-term robustness of the pension system remains to be a challenging task. Pension funds are allowed to base their indexation policies on the year-averaged funding ratio instead of the funding ratio at the end of the year. Moreover, current rules already allow that the cost-effective contribution rate to be based on the ten-year-averaged interest term structure. These measures intend to make the participants in the pension system less vulnerable to short-term fluctuations in the interest rate and the capitalization rate of the funds.

It is legally required for pension funds to determine a cost-effective contribution rate and a minimum solvency rate in order to guarantee their members a pension benefit. If the amount is less than this basic limit, pension funds are compelled to take measures to restore this level. According to the FTK, pension funds have to state in a clear way whether or not they

will index the pension rights and under what conditions they intend to do so. The parameters used in FTK will be assessed every five years (such as the expected returns on assets and expected inflation).

1.3.3 The 2012 reform

The reform also affects saving opportunities in the 2nd (and 3rd) pillar by raising the statutory retirement age to 67 in 2014. After 2014, it is linked to life expectancy using the same formula as for the public pension but with the difference that its implementation is ten years earlier and with full one-year steps. The statutory retirement age is raised to 68 in 2018. The second adjustment here is that the maximum annual accrual rate is reduced from 2.25% to 2.15% in 2014 and from 2.15% to 1.875% in 2015. The possibilities for early or late retirement will remain to be actuarially neutral. It is important to note that built up pension rights in the past are respected and not affected by either measure.

1.4 Disability benefits

The system of disability pensions consists of three parts: the WAO, the WIA and the Wajong. Around 800 thousand people currently depend on one of these schemes, corresponding to 10% of the workforce. The WAO and WIA are financed by social security contributions paid by employers, the Wajong is financed by general taxation.

The WAO covers individuals who became disabled before 2004 and had past earnings. For these people the old benefit levels apply. It involves a benefit that depends on past earnings, age and degree of disability. It can amount to a maximum of 75% of past earnings and is capped at around 40,000 euros (in 2017). Between 2002 and 2007 several reforms were implemented and the WAO was replaced by the WIA for new claimants. These reforms involved a number of measures that substantially affected the disability schemes. The reforms intend to curb the inflow into these schemes. This inflow had always been very high in the Netherlands and had resulted in a stock of beneficiaries that amounted to almost one million around the turn of the century.

The first round measures were threefold. First, it involved the extension from 1 to two years of the duration of the period in which employers have to continue to pay 70% of the wages of sick employees.⁸ This measure has a direct limiting effect on eligibility which sharply reduced the inflow in 2005. Apart from this, it is also expected to curb the future inflow by raising the incentives for employers to enhance working conditions and to increase the effort to fit the involved employees into the workforce. A further improvement may come from recovery from sickness during the period of the extension and from the incentives of the reduced earnings (max. 170% over 2 years) on employees. The second 2004 measure involves a restriction of eligibility by raising the requirements to qualify for these schemes. Not only the new claimants are submitted to the new, sharpened, criteria, the measure also applies to the existing stock of beneficiaries which undergo a one-off screening on the basis of the revised criteria. The third measure taken in 2004 was the abolition of the, separate, public scheme for the self-employed. These people have to resort to private insurers.

⁸ The organizations of employees and employers can agree on a higher level in collective agreements.

The 2006 measures distinguish between degrees of disability. The effect on the inflow has proven to be substantial. This results from the combination of three effects. The first is a restriction in the eligibility of those who are partially disabled. Especially those with a low degree of disability (smaller than 35%) can in the future not apply at all. For fully and permanently disabled a new benefit scheme is introduced that provides an earnings related benefit till the pensionable age.

Overall, the cost saving effect of the replacement of WAO by WIA results from the lower inflow. On average, benefit levels are only slightly affected. After the reforms the stock of persons that benefit from these schemes decreased substantially and between 2010 and 2040 it is expected to decline from around 600 thousand to 400 thousand, or by roughly one third. The reduction in the cost for government is corresponding.

The third part of the system of disability benefits, the Wajong, covers young individuals. Its benefit levels are low and generally do not exceed those of social assistance. In the last decade or so this part of the system has developed unfavourably. It has shown a sharp rise in the number of claimants that partially counteracts the favourable effects of the replacement of the WAO by the WIA. In the last decade the number of claimants roughly doubled to around 200 thousand. Most claimants did not participate in the labour market at all, even though a substantial number was expected to be able to do so (at least partially). In 2010 several changes were introduced in the Wajong, aiming to stimulate labour force participation among claimants. But although these changes have reduced the inflow into the Wajong, the number of claimants in the next decades is projected to rise further to around 400 thousand if policies remain unchanged, thereby almost fully offsetting the decrease resulting from the replacement of the WAO by the WIA.

The 2012 pension reform affects the disability scheme by prolonging the ages at which one can be eligible for this benefit. This age rises in line with the old age public pension.

1.5 Survivors benefits

The scheme of survivors benefits covers widowers, widows and orphans. The benefit level has a maximum of 70% of minimum wage. This level applies only to individuals with no income from labour. In net terms it equals the social assistance level. In case the involved individual has income from labour the benefit is reduced by a level that equals 50% of minimum wage plus two thirds of the surplus of labour income. Possession of personal wealth or incomes from pensions do not lead to a reduction of the benefit. A reform that was implemented in 1996, that mainly affects individuals born as from 1950, has substantially restricted the eligibility to this scheme and consequently curbed the inflow of claimants. This development is projected to continue until 2015. For individuals born as from 1950 it was required to have a degree of disability to work of at least 45% or to be responsible for the care of a child below the age of 18.

The pension reform only affects the survivor scheme by prolonging the ages at which one can be eligible for this benefit. This age rises in line with the old age public pension.

1.6 New entrants into the schemes

Tables 2a till 2c show the numbers of new pensioners in the three public arrangements for old age, disability and survivors discussed above. It shows that the old age pension features the largest number of entrants, all at the statutory retirement age. The new pensioners of the other schemes are younger. As only past years of residence play a role, the difference between men and women is very small and almost fully determined by demographic factors. This is not the case for the disability and survivor scheme, probably due to respectively a higher labour participation rate of men and a higher dependency rate of women.

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

Age group	All	Old age	Disability	Survivor	Other (including minimum)
15 – 49	11.314	0	11.146	168	0
50 – 54	2.902	0	2.828	74	0
55 – 59	3.458	0	3.399	59	0
60 – 64	3.457	0	3.395	62	0
65	102.028	101.885	131	12	0

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

Age group	All	Old age	Disability	Survivor	Other (including minimum)
15 – 49	10.911	0	9.803	1.108	0
50 – 54	3.150	0	2.728	422	0
55 – 59	3.662	0	3.221	441	0
60 – 64	4.014	0	3.221	793	0
65	102.506	102.301	90	115	0

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

Age group	All	Old age	Disability	Survivor	Other (including minimum)
15 – 49	22.225	0	20.949	1.276	0
50 – 54	6.052	0	5.556	496	0
55 – 59	7.120	0	6.620	500	0
60 – 64	7.471	0	6.616	855	0
65	204.534	204.186	221	127	0

2 Demographic and labour force projections

2.1 Demographic development

Table 3 provides an overview of the demographic development until 2070. It shows that the total size of the population will gradually increase from its current level of around 17 million to 19.6 million in 2070. This is largely due to net migration. Importantly, the age composition shows significant changes: the old age dependency ratio increases from 28.1% in 2016 to 48.4% in 2060. This results from two factors: an increase in the size of the cohorts that reach the age of 65 and beyond (relative to the working age population) and the increase in life expectancy at 65. The latter of the two rises by 5.0 years (from 18.4 to 23.4 years) for men and by 5.2 years (from 21.2 to 26.4 years) for women.

Table 3 Main demographic variables evolution

	2016	2020	2030	2040	2050	2060	2070	Peak year*
Population (thousand)	17.035	17.463	18.436	19.054	19.238	19.331	19.551	2070
Population growth rate	0,6	0,6	0,5	0,2	0,0	0,1	0,1	2017
Old-age dependency ratio (pop65/pop15-64)	28,1	30,7	38,9	43,9	42,5	44,3	48,4	2070
Ageing of the aged (pop80+/pop65+)	24,3	24,6	29,7	34,1	41,8	39,5	38,5	2053
Men - Life expectancy at birth	79,8	80,7	82,0	83,2	84,4	85,5	86,5	2070
Men - Life expectancy at 65	18,4	19,0	20,0	20,9	21,8	22,6	23,4	2069
Women - Life expectancy at birth	83,3	84,1	85,5	86,7	87,9	89,0	90,1	2070
Women - Life expectancy at 65	21,2	21,8	22,8	23,8	24,7	25,6	26,4	2069
Men - Survivor rate at 65+	88,9	89,8	91,2	92,4	93,4	94,2	95,0	2070
Men - Survivor rate at 80+	60,8	63,5	67,9	71,8	75,3	78,5	81,2	2070
Women - Survivor rate at 65+	91,7	92,4	93,6	94,5	95,3	96,0	96,6	2070
Women - Survivor rate at 80+	72,1	74,3	78,0	81,3	84,0	86,4	88,5	2070
Net migration	85,5	66,9	59,5	43,7	29,6	28,6	24,5	2016
Net migration over population change	0,9	0,6	0,7	1,1	4,3	2,0	1,0	2051

2.2 Labour force projections

Table 4 provides an overview of the main changes that are expected in the labour market among elderly workers in the period from 2016 and 2070. It shows that in this time period the labour force participation rates of the 55 to 64 year olds will rise from 68.4% to 78.8% and those of the 65 to 74 year olds from 10.6% to 32.8%.

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

	2016	2020	2030	2040	2050	2060	2070	Peak year*
Labour force participation rate 55-64	68,4	68,0	72,0	73,3	76,1	77,9	78,8	2070
Employment rate for workers aged 55-64	63,5	64,0	68,1	69,3	72,0	73,6	74,5	2070
Share of workers aged 55-64 on the labour force 55-64	92,8	94,1	94,5	94,5	94,6	94,6	94,5	2047
Labour force participation rate 65-74	10,6	15,3	21,6	23,6	26,9	30,6	32,8	2070
Employment rate for workers aged 65-74	10,1	14,8	21,0	23,0	26,2	29,8	32,0	2070
Share of workers aged 65-74 on the labour force 65-74	96,0	96,5	97,2	97,4	97,3	97,4	97,5	2041
Median age of the labour force	41,0	40,0	39,0	40,0	40,0	40,0	41,0	2016

Tables 5a and 5b focus on careers lengths and durations of retirement for respectively men and women. It shows that the average effective exit age rises by 3.6 years for men (from 65.4 to 69.0) and by 3.8 years for women (from 63.7 to 67.5). Women have a longer duration of retirement than men, currently 22.3 years versus 18.7, which can largely be attributed to their higher life expectancy. This also translates to a higher percentage of adult life spent at retirement.⁹

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

	2017	2020	2030	2040	2050	2060	2070	Peak year
Average effective exit age (CSM) (II)	65,4	66,1	67,1	67,6	68,2	68,8	69,0	2070
Contributory period	:	:	:	:	:	:	:	:
Duration of retirement	18,7	18,2	18,3	18,4	19,2	19,2	19,9	2070
Duration of retirement/contributory period	:	:	:	:	:	:	:	:
Percentage of adult life spent at retirement	28,3	27,4	27,2	27,0	27,7	27,4	28,1	2017
Early/late exit	2,9	1,8	1,9	1,3	1,7	1,5	0,0	2017

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

	2017	2020	2030	2040	2050	2060	2070	Peak year
Average effective exit age (CSM) (II)	63,7	64,3	65,3	65,8	66,5	67,1	67,5	2070
Contributory period	:	:	:	:	:	:	:	:
Duration of retirement	22,3	22,6	22,8	22,9	23,8	23,8	23,7	2069
Duration of retirement/contributory period	:	:	:	:	:	:	:	:
Percentage of adult life spent at retirement	32,8	32,8	32,5	32,4	32,9	32,6	32,4	2069
Early/late exit	5,9	3,5	3,4	2,6	3,1	2,6	0,0	2017

⁹ There are no data available regarding the contributory period. As explained in section 1.2.2 this is not relevant for the pension.

3 Pension projection results

3.1 Coverage

The coverage analysis is carried out for 2013 and 2014. Table 6 shows that the Eurostat's Esspros-definition of pensions for these years amount to respectively 13.2 and 13.3%. Of these respectively 7.1 and 7.2% of GDP are classified as public pension expenditure. In the AWG definition, the latter figures equal 6.8 and 7.2% of GDP. There is no difference between the two definitions in 2014. There is a difference of 0.3%-point in 2013 and the years before. This lies mainly in the fact that in these years a part of the items that constitute the disability arrangements were not included in the AWG-definition. These are the items that relate to supplementary public disability benefits (in Dutch: 'toeslagenwet', being 0,12% of GDP in size), sectoral funds (0,08% of GDP). Other, smaller, omitted items, such as a government early retirement scheme ('Remkes-regeling'), also amount to 0,1% of GDP.

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

	2007	2008	2009	2010	2011	2012	2013	2014
1 Eurostat total pension expenditure	11,5	11,3	11,2	12,4	12,7	13,1	13,2	13,3
2 Eurostat public pension expenditure	6,2	6,2	6,6	6,7	6,8	6,9	7,1	7,2
3 Public pension expenditure (AWG)	6,0	6,0	6,4	6,3	6,5	6,6	6,8	7,2
4 Difference (2) - (3)	0,2	0,1	0,2	0,3	0,3	0,3	0,3	0,0
<i>6 Expenditure categories not considered in the AWG definition (see text)</i>								
6.1 Toeslagenwet							0,1	0,0
6.2 Sectoral funds							0,1	0,0
6.3 Other							0,1	0,0

3.2 Overview of projection results

Table 7 presents the results of the projections for both public and occupational pensions. All variables are expressed as a percentage of GDP. It shows that the public pensions, comprising old age pensions, the disability benefits and survivors benefits, rise from 7.3% of GDP in 2016 to a level of 8.5% of GDP in 2040 and eventually 7.9% in 2070, when the effects of both the ageing population and the reforms have fully kicked in. The time path of expenditure on the separate schemes is discussed hereafter.

Public pension expenditure exceeds the directly designated contributions to these schemes as the Wajong part of the disability scheme is financed from general taxation and the designated contribution to the old age pension is capped.¹⁰ The remainder is supplemented

¹⁰ These contributions are capped at 17.9% of taxable income in the first two tax brackets. Individuals over the age of 65 are exempt from paying this contribution.

by the government from other forms of taxation. This cap aims to prevent unintended distributional effects, both between income groups and generations. As the direct contribution weighs more heavily on lower incomes it prevents differences in net income to increase. And as individuals over 65 are exempt from paying this tax it also avoids a disproportional part of the increasing costs of old age pensions to be borne by the (younger) workers.

Private occupational pensions will rise from its current level of 5.8% of GDP to eventually 6.0% in 2070. This rise is roughly in line with that of the public old age pensions (see hereafter).¹¹

The reform also has a large effect on future pension contribution rates. They will decline from their current level of 11% of gross labour income to eventually around 9% in 2070. This is the consequence of the reduced need to accumulate assets that results from the increase in the eligibility age.¹²

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

Expenditure	2016	2020	2030	2040	2050	2060	2070	Peak year*
Gross public pension expenditure	7,3	7,0	7,5	8,5	8,2	7,9	7,9	2040
Private occupational pensions	5,8	5,7	7,7	8,2	7,0	6,2	6,0	2040
Private individual pensions	:	:	:	:	:	:	:	:
<i>Mandatory private</i>	:	:	:	:	:	:	:	:
<i>Non-mandatory private</i>	:	:	:	:	:	:	:	:
Gross total pension expenditure	13,1	12,7	15,3	16,7	15,1	14,1	13,8	2040
Net public pension expenditure	6,2	5,9	6,4	7,3	7,0	6,7	6,7	2040
Net total pension expenditure	6,9	6,8	8,8	9,4	8,2	7,4	7,2	2040
Contributions	2016	2020	2030	2040	2050	2060	2070	Peak year*
Public pension contributions	7,0	7,0	7,6	8,5	8,0	7,6	7,5	2040
Total pension contributions	11,4	11,4	11,5	12,2	11,7	11,1	11,1	2040

Table 8 separately presents the projection of the three components of public pensions. It shows that the (state) first pillar old age pensions rise from 5.3% of GDP in 2016 to 6.6% in 2040 and 5.6% in 2070. Between 2016 and 2070 this ratio increases by 6%, which mainly results from two counterbalancing effects. The first is the rise by 72% of the old age dependency ratio (from 28.1% to 48.4%, see Table 2), which given the flat rate nature and linkage of benefit levels to wages, leads to an equal upward pressure on expenditure. The second is the effect of the sharp increase in the eligibility age by 7½ years, which reduces the number of beneficiaries. The expenditure still shows an increase, in spite of the full linkage to life expectancy, because the future cohorts of pensioners will be larger in size than the

¹¹ However, up to 2040 the rise is larger than that of the public old age pensions (see table 8). This is because pension rights that are accumulated before the rise in the eligibility age are preserved. This means that the effect of the higher eligibility age only affects full lifetime pension benefits as far as it involves the build-up of rights after the increase of the eligibility age. Over a long period of their working lives their accrual of pension rights is geared to a lower eligibility age than is eventually actually the case. Pensions are thus paid out over a smaller number of years but with, partly offsetting, higher amounts per year.

¹² As pension contributions are tax deductible, the lower pension contribution rates will lead to higher tax revenues on labour income. Unfortunately, this mechanism is not included in the AWG methodology of projecting tax revenues.

current ones. A minor cost saving change in the scheme (see section 1) and rising labour participation rates (see above) add to this downward effect.

Table 8 also shows that disability benefits are projected to increase slightly from 1.9% of GDP in 2016 to eventually 2.1% in 2070. There are a number of counterbalancing effects at work here. First, there is a shift within the disability schemes which were discussed in section 1. The future stock of claimants will, on average, have lower benefit levels (relative to wages) due to a shift between the parts of the disability scheme. The offsetting effect is the prolongation of this scheme that is related to the sharp rise of the eligibility age for the old age pension and leads to an increase in the number of claimants. This prolongation effect is shaped in such a way that the number of claimants at the age of 64, and the government expenditure related to it, is extended up until the age of eligibility for the public old age pension. Table 8 also shows that expenditure on survivors benefits will remain at 0.1% of GDP throughout the period.

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

Pension scheme	2016	2020	2030	2040	2050	2060	2070	Peak year *
Total public pensions	7,3	7,0	7,5	8,5	8,2	7,9	7,9	2040
of which;								
Old age and early pensions:	5,3	5,0	5,7	6,6	6,1	5,7	5,6	2040
<i>Flat component</i>	5,3	5,0	5,7	6,6	6,1	5,7	5,6	2040
<i>Earnings related</i>	:	:	:	:	:	:	:	:
<i>Minimum pensions (non-contributory) i.e. minimum income guarantee for people above 65</i>	:	:	:	:	:	:	:	:
Disability pensions	1,92	1,89	1,71	1,88	1,98	2,09	2,14	2069
Survivor pensions	0,09	0,09	0,08	0,09	0,08	0,08	0,08	2016

3.3 Description of main driving forces and implications

Table 9a decomposes the increase in the ratio of pension expenditures to GDP into the effects of changes in the dependency, coverage, employment, and benefit ratio and in changes in labour intensity and a residual¹³. It shows that the driving force behind the modest 0.6%-point rise in the ratio of public pension expenditure to GDP between 2016 and 2070 lies completely in the enormous increase in the dependency ratio which results from the ageing population.

The other factors exert mitigating effects. The coverage ratio mainly decreases due to the pension reform which substantially raises the eligibility age for public old age pensions. Over the full period this dampens the rise by 2.7%-points. The major part of this, 2.4%-point, is caused by the reduced claims of those over the age of 65 (due to the rise in the eligibility age). The effect of the age group under the age of 65 is 0.4%-points. This results from the its declining size relative to the 65-plus population.

¹³ Table 9b is not discussed separately as it equals table 9a.

Over the full period, the benefit ratio turns out to have no effect. This follows from the basic fact that public pensions are fully indexed to wages. Some small mitigating and upward pressures cancel out.

The labour market developments also exert a downward effect on the ratio of pension expenditure to GDP. Its total effect in 2016-2070 is -0.8%-points. Both the increasing labour participation rates of women and elderly workers below the age of 65 (employment ratio effect) as the rise of participation levels over the age of 65 (career shift effect) contribute to this in roughly equal terms.

Table 9a Factors behind the change in public pension expenditures between 2013 and 2060 using pension data (in percentage points of GDP) - pensions

	2016-20	2020-30	2030-40	2040-50	2050-60	2060-70	2016-70	Average annual change
Public pensions to GDP	-0,3	0,5	1,0	-0,4	-0,3	0,0	0,6	0,010
Dependency ratio effect	0,7	1,7	1,1	-0,3	0,3	0,7	4,2	7,7%
Coverage ratio effect	-0,4	-0,6	-0,3	-0,3	-0,5	-0,5	-2,7	-5,1%
<i>Coverage ratio old-age*</i>	-0,4	-0,5	-0,1	-0,3	-0,5	-0,5	-2,4	-4,4%
<i>Coverage ratio early-age*</i>	-0,3	0,6	0,5	-0,9	-0,1	0,6	0,4	0,4%
<i>Cohort effect*</i>	-0,4	-2,0	-1,4	1,0	-0,2	-1,0	-4,1	-8,2%
Benefit ratio effect	-0,3	-0,2	0,3	0,2	0,1	-0,1	0,0	0,0%
Labour Market/Labour intensity effect	-0,1	-0,2	-0,1	0,0	-0,2	-0,1	-0,8	-1,6%
<i>Employment ratio effect</i>	-0,1	-0,1	-0,1	0,0	0,0	0,0	-0,4	-0,8%
<i>Labour intensity effect</i>	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0%
<i>Career shift effect</i>	-0,1	-0,1	0,0	0,0	-0,1	-0,1	-0,5	-0,8%
Residual	0,0	-0,1	0,0	0,0	0,0	0,0	-0,2	-0,1%

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

Table 10 shows the development of the replacement rate at retirement (RR) and the benefit ratio (BR). Over the full period the changes turn out to be small. The higher level for private occupational pensions in the intermediate period 2030 till 2050 is a result of the preserved rights effect, discussed before, which leads to higher occupational pensions per year of retirement. The RR's are lower than the BR's because the Netherlands features a strong rise of wages with age. Wages just before retirement are therefore relatively high, leading to a larger decline in income at retirement.¹⁴

¹⁴ The decline in net terms however is far smaller because pensioners face lower tax rates. They are exempt from paying the social security premium that is designated for old age pensions.

Table 10 Replacement rate at retirement (RR), benefit ratio (BR) and coverage by pension scheme (in %)

	2016	2020	2030	2040	2050	2060	2070
Public scheme (BR)	36%	33%	32%	33%	34%	34%	34%
Public scheme (RR)	30%	27%	26%	28%	28%	28%	28%
Coverage	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Public scheme old-age earnings related (BR)	:	:	:	:	:	:	:
Public scheme old-age earnings related (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Private occupational scheme (BR)	50%	47%	54%	53%	49%	46%	45%
Private occupational scheme (RR)	42%	39%	45%	44%	41%	38%	37%
Coverage	56,8	57,6	60,2	60,8	59,7	58,3	57,4
Private individual scheme (BR)	:	:	:	:	:	:	:
Private individual scheme (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Total (BR)	64%	60%	64%	65%	63%	61%	60%
Total (RR)	53%	50%	53%	54%	53%	51%	50%

Table 11 provides an insight in the dependency ratios and the impact of demographic factors on the financial sustainability of public pension schemes. It shows that, over the full period, the number of pensioners will increase by 20% (from 4.040 million to 4.866 million) and that employment rises by 11% (8.509 million to 9.466 million). This leads to an increase in the Pension System Dependency Ratio (SDR, row 3) from 47.5% to eventually 51.4%, a rise of 8%.

Comparing this rise to the, much steeper, purely demographically determined rise in the old age dependency ratio (row 6) reveals how other factors than demographic ones affect the SDR. It turns out that these are highly beneficial by exerting a strong dampening effect on this rise. This effect is expressed in the System efficiency variable (last row) which shows a strong decrease by one third from 1.7 to 1.1 over the full period, meaning that the rise in the SDR would be around 50% larger without these factors. The effect follows from the increase of the eligibility age, which curbs the number of pensioners, and the rise of the labour participation rates.

Table 11 System dependency ratio and old-age dependency ratio

	2016	2020	2030	2040	2050	2060	2070
Number of pensioners (thousand) (I)	4040,3	4188,9	4779,0	5182,9	4984,6	4871,8	4866,5
Employment (thousand) (II)	8509,0	8818,8	9074,8	9133,6	9396,6	9529,6	9466,4
Pension System Dependency Ratio (SDR) (I)/(II)	47,5	47,5	52,7	56,7	53,0	51,1	51,4
Number of people aged 65+ (thousand) (III)	3125,5	3453,0	4329,3	4867,6	4848,6	5021,7	5376,7
Working age population 15 - 64 (thousand) (IV)	11121,9	11246,5	11141,5	11091,0	11407,2	11323,6	11102,1
Old-age Dependency Ratio (ODR) (III)/(IV)	28,1	30,7	38,9	43,9	42,5	44,3	48,4
System efficiency (SDR/ODR)	1,7	1,5	1,4	1,3	1,2	1,2	1,1

Tables 12a and 12b present the ratio of pensioners to respectively the inactive population and the total population by age group. Tables 13a and 13b do the same for the female population alone. The most important feature in these tables is that they all show a marked decline in these ratios among the 65-69 age group. This is due to the rise in the eligibility age of the old age pension. It is only partially offset by an increase of people that draw from the disability and survivor schemes that are accordingly prolonged in their age coverage. After 2045, when the eligibility age reaches 70, nobody in this age group is anymore entitled to the old age benefit. All the pensioners, around 20% of the total population (table 12b), are then individuals who draw from the disability and survivor schemes. This decline is far stronger than that of inactivity and results in a drop in the number of pensioners relative to that of the inactive population in this age group (table 12a). The remaining, uncovered, part of the population will have to resort to alternative means, such as the income of spouses, living off private wealth or earlier withdrawal of occupational pension income.¹⁵

To a smaller extent these developments also take place after 2047 in the 70-74 age group. This is because the eligibility age for the old age pension then rises above the age of 70, pushing down the number of pensioners by eventually around 40% in 2070, when this age has become 72½ years (see tables 12b and 13b). The drop of the ratios in table 12a and 13a show that the decline in the number of pensioners in this age group (the numerator) is larger than that of inactivity (the denominator). This results from the fact that labour participation is projected to remain relatively low, featuring a rise from its current level of 5% to only around 20%. This implies that the denominator falls by 16%, far less than the 40% (see above) with which the numerator is reduced.

For females alone the ratios in these age groups are somewhat lower (see tables 13a and 13b). There are two reasons for this. The first is that females feature fewer disability claimants as result of their lower labour participation, leading to a lower numerator. The second, which applies to the comparison of 13a with 12a, is that inactivity among females is higher (participation lower), which pushes up the denominator.

Pensioners in the age groups under 65 are in either the disability scheme or the survivor scheme. The future increases in the ratios for these groups in tables 12a and 13a mainly reflect the decrease in inactivity (the denominator) and are not the result of more people becoming dependent on these schemes (the numerator). Tables 12b and 13b, where these pensioners are expressed as a share of the total population in these age groups, makes this clear. Slightly counterintuitively, it turns out that the 55-59 age group in tables 12a and 13a features higher percentages than the 60-64 age group. Here too, it is the result of the denominator. It is caused by the fact that participation rates of the 60-64 group are lower than those of the 55-59 group and this outflow is only partially absorbed by the public pension schemes. The remaining part covers the period up to 65 by living from privately accumulated savings or private early retirement pensions.

¹⁵ Most pension funds offer this possibility on an actuarially neutral basis.

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

	2016	2020	2030	2040	2050	2060	2070
Age group -54	8,5	8,8	9,8	9,7	9,3	9,0	9,3
Age group 55-59	72,6	69,9	72,9	79,2	82,3	84,0	89,8
Age group 60-64	56,7	48,9	49,5	58,8	62,8	69,8	76,2
Age group 65-69	106,3	100,2	73,7	49,3	32,5	34,7	37,4
Age group 70-74	118,5	107,4	116,6	117,4	110,0	92,5	74,7
Age group 75+	107,8	110,7	108,4	107,9	105,9	106,9	101,7

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

	2016	2020	2030	2040	2050	2060	2070
Age group -54	3,2	3,2	3,7	3,7	3,5	3,4	3,5
Age group 55-59	16,3	15,1	14,2	16,0	15,0	14,8	15,4
Age group 60-64	23,8	21,3	17,7	19,7	18,9	18,7	19,2
Age group 65-69	91,6	75,2	51,3	32,6	20,2	19,9	20,4
Age group 70-74	111,2	101,9	103,4	101,2	93,3	76,7	60,0
Age group 75+	107,8	110,7	108,4	107,9	105,9	106,9	101,7

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

	2016	2020	2030	2040	2050	2060	2070
Age group -54	6,9	7,2	8,0	8,0	7,7	7,5	7,7
Age group 55-59	43,6	42,6	45,9	52,1	57,5	59,1	63,9
Age group 60-64	36,8	32,9	32,7	39,0	43,1	47,8	52,4
Age group 65-69	98,4	88,1	63,6	40,0	23,7	25,6	27,5
Age group 70-74	113,7	103,9	111,2	111,6	103,7	85,9	68,3
Age group 75+	107,5	109,8	107,8	107,4	105,5	106,4	101,5

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

	2016	2020	2030	2040	2050	2060	2070
Age group -54	2,7	2,8	3,1	3,1	3,0	2,9	3,0
Age group 55-59	13,5	12,5	11,7	13,2	12,4	12,3	12,9
Age group 60-64	19,5	17,4	14,5	16,0	15,6	15,4	15,8
Age group 65-69	90,9	73,6	49,0	29,3	16,4	16,3	16,7
Age group 70-74	110,6	101,5	103,0	101,1	92,6	75,0	57,8
Age group 75+	107,5	109,8	107,8	107,4	105,5	106,4	101,5

Table 14 focuses on new old age public pensions. The first two rows respectively show the development of expenditure on this item and the number of new pensions. The time path of the latter results from demographic factors (ageing) and the fact that some of the selected years (2016 and 2020) feature a rise of the eligibility age (see section 1.2.2) while the other years do not. Years with such a rise obviously feature a lower number of new pensions. The rise of the average new pension (row 3) follows the development of wages.

Table 14 Projected and disaggregated new public old age pension expenditure (flat rate)

	New pension	2016	2020	2030	2040	2050	2060	2070
I Projected new pension expenditure (millions EUR)		1634,6	1512,7	3515,1	4823,1	5812,1	9186,1	13850,1
II. Number of new pensions ('000)		152,6	136,3	235,6	224,8	190,9	212,7	225,2
III Average new pension		10,7	11,1	14,9	21,5	30,4	43,2	61,5

3.4 Financing of the pension system

Table 15 shows the system of contributions to the public old age scheme. Employees, either public or private, and the self-employed are taxed at a rate of 17.9% over the first two tax brackets. The government supplements the shortfall between the expenditure on the old age pension and the funds raised by the 17.9% tax levy. The survivor scheme is financed by a tax levy of 0.1% over the first two tax brackets. The disability scheme is financed by both general taxation (Wajong) and a levy on employers (WAO and WIA). There is no minimum contribution. The maximum contribution from the first two tax brackets is 5050 euros¹⁶ (in 2017).

Table 15 Financing system of the public old age scheme

	Public employees	Private employees	Self-employed
Contribution base	First two tax brackets	First two tax brackets	First two tax brackets
Contribution rate/contribution			
<i>Employer</i>	-	-	0,179
<i>employee</i>	0,179	0,179	
<i>State</i>	-	-	-
<i>Other revenues</i>	Government supplements shortfall between expenditure and funds raised by the 17.9% tax levy.	Government supplements shortfall between expenditure and funds raised by the 17.9% tax levy.	Government supplements shortfall between expenditure and funds raised by the 17.9% tax levy.
Maximum contribution	5050	5050	5050
Minimum contribution	-	-	-

Table 16 shows the contributions to the three schemes. The employer and employee contributions grow more or less in line with the growth rate of the economy. The state contribution however grows at a far higher pace. The reason for this is twofold. The first is that the state picks up the shortfall in the revenues that is caused by the combined facts that the social security premium is capped at 17.9% of wages in the first two tax brackets (see above) and expenditure on public old age pensions are still projected to grow faster than wages. The second is the rise of the state financed Wajong (see section 1.4).

¹⁶ This figure equals 17.9% of the first two tax brackets. The actual contribution to the public pension scheme however is lower as a result of a deduction that accounts for the effect of a general tax rebate.

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

	2016	2020	2030	2040	2050	2060	2070
Public contribution	49135	54721	81068	124973	171418	235245	327280
<i>Employer contribution</i>	11631	12650	18022	25828	37321	53295	74436
<i>Employee contribution</i>	26094	26970	36864	52833	76341	109016	152260
<i>State contribution</i>	11410	15101	26182	46312	57756	72935	100584
<i>Other revenues</i>	0	0	0	0	0	0	0
Number of contributors (I)	8892	9325	9636	9619	9877	10014	9840
Employment (II)	8509	8819	9075	9134	9397	9530	9466
Ratio of (I)/(II)	1,0	1,1	1,1	1,1	1,1	1,1	1,0

3.5 Sensitivity analysis

Table 17 presents the effects on public (upper part) and total pensions (lower part) under assumptions that deviate from the baseline assumptions. The higher life expectancy scenario basically shows small effects on public pensions. This simply reflects the fact that the eligibility age is linked to life expectancy. The same basically applies to total pensions that show a small rise of 0.1%-points over the full period.

In the higher and lower labour productivity growth scenarios the ratios of public pensions remain unchanged. This reflects the wage indexation rules of public schemes. The ratios of total pensions to GDP however decline somewhat in the high growth scenario and increase somewhat in the low growth scenario, due to a lagging increase of occupational pensions. The reason for this lies in the average pay schemes. In such schemes, higher growth rates lead to a lower accrual of pension entitlements relative to GDP. The low productivity growth scenario shows the opposite effects. The risk scenario shows the same pattern as the lower productivity scenario, which follows from the fact that it effectively boils down to such a scenario.

Both higher employment scenarios (the general one and the one for older workers) lead to a small drop in public pensions relative to GDP. This is purely due to an increase in GDP (the denominator). Public pensions (the numerator) are not affected by an increase in employment. In contrast, occupational pensions do increase in line with employment, and GDP, as this scheme links pension entitlements to past (average) wages. The effect on total pensions therefore equals that on public pensions.

The higher migration scenario shows a downward effect on the pension expenditure to GDP ratio that eventually (in 2070) amounts to 0.4% of GDP. This is mostly due to the increase in the denominator (GDP). The change in the numerator (pension expenditure) is far smaller. This is because a large part of the immigrants, who typically enter the country at a young age, haven't yet reached the eligibility age for the old age pension before 2070. The lower migration scenario has similar effects, though with the opposite sign.

The lower fertility scenario features a substantial increase in public pensions relative to GDP. As in the migration scenarios, this is largely due to the drop in GDP (the denominator). There is only a small effect on pension expenditure (the numerator) as none of the newborns reaches the eligibility age for the old age pension before 2070. There is only a small effect on the disability and survivor schemes.

The policy scenario is not carried out as the eligibility age for public old age pensions are already linked to life expectancy at 65. It would be equal to the baseline.

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

	2016	2020	2030	2040	2050	2060	2070
Public Pension Expenditure							
Baseline	7,3	7,0	7,5	8,5	8,2	7,9	7,9
Higher life expectancy (2 extra years)	0,0	0,0	-0,1	0,0	0,1	0,1	0,0
Higher lab. productivity (+0.25 pp.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Lower lab. productivity (-0.25 pp.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Higher emp. rate (+2 pp.)	0,0	0,0	-0,2	-0,2	-0,2	-0,2	-0,2
Lower emp. rate (-2 pp.)	0,0	0,0	0,2	0,2	0,2	0,2	0,2
Higher emp. of older workers (+10 pp.)	0,0	-0,1	-0,4	-0,4	-0,2	-0,2	-0,2
Higher migration (+20%)	0,0	0,0	-0,2	-0,3	-0,4	-0,4	-0,4
Lower migration (-20%)	0,0	0,0	0,2	0,3	0,4	0,4	0,4
Lower fertility	0,0	0,0	0,0	0,2	0,5	0,8	1,1
Risk scenario	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Policy scenario: linking retirement age to increases in life expectancy	:	:	:	:	:	:	:
Total Pension Expenditure							
Baseline	13,1	12,7	15,3	16,7	15,1	14,1	13,8
Higher life expectancy (2 extra years)	0,0	-0,1	-0,5	-0,2	0,2	0,3	0,1
Higher lab. productivity (+0.25 pp.)	0,0	0,0	-0,1	-0,3	-0,5	-0,6	-0,6
Lower lab. productivity (-0.25 pp.)	0,0	0,0	0,1	0,4	0,6	0,6	0,7
Higher emp. rate (+2 pp.)	0,0	-0,1	-0,4	-0,4	-0,3	-0,3	-0,2
Lower emp. rate (-2 pp.)	0,0	0,1	0,4	0,4	0,3	0,3	0,2
Higher emp. of older workers (+10 pp.)	0,0	-0,2	-1,1	-0,8	-0,3	-0,2	-0,2
Higher migration (+20%)	0,0	-0,1	-0,3	-0,6	-0,7	-0,7	-0,6
Lower migration (-20%)	0,0	0,1	0,4	0,7	0,8	0,8	0,7
Lower fertility	0,0	0,0	0,0	0,4	0,9	1,4	2,0
Risk scenario	0,0	0,0	0,1	0,3	0,3	0,3	0,3
Policy scenario: linking retirement age to increases in life expectancy	:	:	:	:	:	:	:

It should be noted that the effects on government finances of the migration and low fertility scenarios up until 2070 do not show the structural (ultimate) effects of these scenarios and therefore are inappropriate to derive the sustainability effects from. This would require an analysis that covers the full life cycle of immigrants and newborns and thus also the years in which the built up pension entitlements are actually paid out. In our analysis, which only covers the period up to 2070, this is not the case. This is reflected in the small changes in

pension expenditure in these scenarios. In the migration scenarios there is also a second reason. It is that immigrants may have economic characteristics that differ from those of the native population which are neglected here.

3.6 Comparison with previous projections

Table 18 compares the rise in the public pension to GDP ratio in this round of projections to their equivalents in the previous rounds. As the 2006 and 2009 projections are similar the difference between these will not be discussed and we will focus only on the differences between the later projections.

The table shows that the 2012 projection differs much from the previous one in 2009. The 2.2%-point lower overall increase in public pension expenditure of the 2012 projection, 1.7% of GDP versus the 3.9%, is mainly the result of the reform. This explains 1.8%-point of it.¹⁷ The remaining 0.4%-point stems mainly from the rising employment which increases GDP and in this way reduces the rise of the ratio of pensions to GDP.

In the 2015 round the rise in pension expenditure drops by a further 0.8% of GDP, 0.9% versus 1.7% in the 2012 round. This can mainly be attributed to the fact that the Statistics Netherlands projection of life expectancy at 65, on which the increase of the eligibility age is based, is now higher than in 2012 round. It results in a 6½ year increase in the eligibility age over the full time horizon compared to 4¾ in the 2012 round. As the Eurostat projection of life expectancy remained basically unchanged, this leads to a smaller number of benefit claimants.¹⁸ The current 2018 round shows a further drop, by 0.4%-points, to 0.6% of GDP. Demographic factors form the most important explanation for this: the old age dependency ratio now rises less sharply than in the previous round.

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

	Public pensions to GDP	Dependency ratio	Coverage ratio	Employment effect	Benefit ratio	Labour intensity	Residual (incl. Interaction effect)
2006 *	3,81	6,28	-1,62	-0,22	-0,36	:	-0,26
2009 **	3,97	6,62	-1,51	-0,16	-0,57	:	-0,41
2012 ***	1,74	5,59	-2,02	-0,55	-0,58	0,03	-0,73
2015****	0,94	4,78	-2,23	-0,51	-0,49	0,02	-0,64
2018*****	0,56	4,20	-2,66	-0,37	0,01	0,03	-0,65

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

Table 19 attributes the difference between the current public projection and the previous (2015) one to its causes in terms of changes in modeling assumptions, policy etc.. It does so for selected years in the projection period. In the intermediate period there were no changes

¹⁷ This is presented in table 13a of the country fiche for the Netherlands in the 2012 round, which dealt with the effects of the 2012 pension reform.

¹⁸ In the 2012 round the Statistics Netherlands projection of life expectancy was about 1 year lower than that of Eurostat. In their latest update SN raised their projection by around 2 years thereby surpassing Eurostat that kept its projection of this variable roughly unchanged.

in the coverage or modeling of the pension projection, nor was there a change in policy or in the interpretation of constant policy. The revision of the National Accounts led to a 7.8% higher GDP level for past years, a level that also forms the base for the projections for future years. This has a downward effect of 0.6%-points for all years. The rest of the difference is a result of changes in assumptions regarding the demographic development, and employment and GDP growth.

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

	2016	2020	2030	2040	2050	2060	2070
Ageing report 2015	7.7	7,6	8,2	8,9	8,6	8,3	-
Revision of National accounts	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	
Change in assumptions	0,1	0,2	-0,1	0,2	0,2	0,2	:
Improvement in the coverage or in the modelling	:	:	:	:	:	:	:
Change in the interpretation of constant policy	:	:	:	:	:	:	:
Policy related changes	;	:	:	:	:	:	:
New projection	7,3	7,0	7,5	8,5	8,2	7,9	7,9

4 Description of the model

This section describes the methodology that is used to carry out the long term projections of pensions. The two pillars that form the pension system are treated separately. The projections are made by using a partial equilibrium model of the Netherlands, GAMMA, developed by the CPB Netherlands Bureau for Economic Policy Analysis. The model itself does not distinguish between males and females. It works with (weighted) averages. In the projections presented in this paper this distinction was made by supplementary calculations.

4.1 The first pillar

The flat rate nature of the Dutch system of public pensions entails that a relatively simple methodology suffices to carry out projections. GAMMA relates the development of public old age pension expenditure to only two factors: the productivity in the economy and the number of people over the age of 65. The dependency on productivity is linear and reflects the fact that the pensions are linked to the (minimum) wage level. In turn, wage levels are assumed to increase in line with productivity. The dependency on the number of over 65 year olds is slightly more complicated. Some age-specificity within this group is introduced to take account of the positive correlation between age and the share of singles. As described above, singles are more expensive than married couples on a per capita basis. It is clear that, in the absence of any policy change such as an increase in the eligibility age, this system leads to an increase of the ratio of public pensions to GDP that almost exactly coincides with the rise of the old age dependency ratio.

Technically, the starting point in the exercise is realized aggregate public pensions in the base year. From this we derive the average pension per person for each age, thereby taking account of the slightly rising pensions per person with age (due to the fact that a married couple gets less than twice of what single gets, and the share of singles rises with age). This age profile is subsequently extrapolated into the future by letting it rise with the growth rate of (minimum) wages. Aggregate expenditure in year t is then calculated by multiplying this resulting vector for year t with the vector of the numbers of people of each age of t .

The projections for the disability and survivor benefits are exogenously imputed by using projections made by specialists. In this way it is possible take account of the effects of the reforms of these schemes.

4.2 The second pillar

To project the development of contribution rates, pension payments, assets of pension funds etcetera, the pension funds in the Netherlands are assembled in a model of a single average pension fund. This average pension fund offers a pre-funded average pay scheme, aiming at a replacement rate of 75% of average pay in case of 40-year career. Survivors pensions are

not modelled explicitly but are taken into account through a surcharge on the old age pension. The existence of the flat rate public pension, the AOW, is taken into account by the pension fund through a franchise. Only workers with a wage above this franchise are building up an occupational pension. The accumulated assets are invested in a mixed portfolio of bonds and equity. For the baseline case the portfolio mix is 50-50. Furthermore, actuarial cost-effective contribution rates are charged. It should be noted that the contribution rate is cost effective on an aggregate level, i.e. for the whole pension fund. Because building up pension rights is usually linear, e.g. 1.825% of the pension wage per year worked, the contribution rate is not cost-effective on an individual level. Younger workers pay more than the actuarial value of the additional pension right they receive, older workers pay less.

Most pension funds in the Netherlands aim at wage or price indexation. It is, however, not guaranteed but conditional on the financial position of the fund (coverage ratio). In recent years many pension funds have constructed more explicit indexation rules, providing no indexation at all if the funding ratio is below 110%, full indexation if the funding ratio is above an upper bound and a linear cut in indexation in between. Our average pension fund aims therefore at a mixture of wage and price indexation and gives full indexation at a funding ratio of 130% (of the nominal liabilities) or more. For workers, indexation of pension rights equals the average of the rise in wages and prices. For the retired, it is 35% of the wage rise and 65% of the price rise.

The pension fund has to follow the supervision rules of the FTK. These rules prescribe, among other things, the required levels of the funding ratio and which part of the liabilities has to be covered by the cost-effective contribution rate. For our average pension fund, the funding ratio required by the FTK is 130% of the nominal, i.e. non-indexed, liabilities. For a pension fund with a 50-50 portfolio mix, a buffer of 30% is sufficient to guarantee the nominal liabilities with 97.5% certainty. In the long term, the pension fund aims at full funding of the indexed liabilities. Given the indexation assumptions, the interest rate, inflation rate and real wage growth, a nominal funding ratio of 130% is more or less equivalent with a 100% funding of the indexed liabilities in the model.

The pension model, as well as the GAMMA model, contains 99 overlapping generations. For the first year of the projections, the total level of occupational pension liabilities is divided over the different generations. For every subsequent year the liabilities of each generation grow with the additional rights build up through an additional year of work. Of course, only workers build up occupational pension rights. The level of the pension benefit depends on the number of contributing years and the average wage. The assets grow with the contribution rates paid by the workers, the investment returns minus the pension benefits paid to the retirees.

In case shocks occur that affect the funding ratio (e.g. stock market crashes, changes in the interest rate, productivity shocks, etcetera) the pension fund restores the funding ratio by cutting indexation as well as raising contribution rates. Because of the ageing of the population, the wage sum will become much smaller relative to the size of the liabilities. As a result, cutting indexation will become a more important instrument to deal with shocks than increasing contribution rates.

Appendix

Table A1 performs an alternative decomposition of the development of public pensions to GDP than the one carried out in table 9a. It shows that the dependency ratio effect over the full period (2016-70) now becomes 5.3% of GDP which is larger than the 4.2%-point effect in Table 9a where it was calculated with the moving public pension to GDP basis. For the same reason the coverage ratio effect becomes smaller in absolute terms. The combined effect of the two lead to a larger residual. It increases from -0.1 to -1.7% of GDP.

Table A1 Factors behind the change in public pension expenditures between 2013 and 2060 using pension data (in percentage points of GDP) - pensions

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