Statistics Netherlands

Discussion Paper

Constructing the Supplementary Pension Table for the Netherlands

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1. Introduction

1.1 Motivation

Demographic changes represent a major challenge for governments all over the world. Especially within the European Union, the population is ageing due to a risen life expectancy and lower fertility rates. As a consequence, governments are facing a wealth of aging-related policy making problems, among which the sustainability of the current pension, health- and long-term care systems.

Concerning pension arrangements in the Netherlands, a significant component of most retirees' income is the state-pension. Government sponsored pension schemes are based on the pay-as-you-go (PAYGO) principle, that is, current contributions are financing current benefits. As long as the impact of the "grey pressure"[1] was reasonably low, PAYGO-based social security schemes worked fine, causing neither a burden, nor a threat to the general public finances or the financial stability of economies at large.

At this point in time the ability of many governments to rely on contributions from future participants to pay benefits is uncertain. Consequently, policy-makers should have an interest in obtaining a comprehensive picture on both sides of the pension sustainability problem, thus from the citizen's perspective as a receiver (and funder) of these social benefits, and from the managing authority's perspective: the government. Moreover, national accounting should guarantee a complete picture of saving and wealth of households, and of pension expenses and pension liabilities of employers, which is comparable between countries, despite whether pension schemes are funded or unfunded.

The former international national accounting standards provided a somewhat scattered picture of pension arrangements which made international comparability of statistics difficult, because of the diversity in pension schemes among countries (Van der Wal, 2014). The new European System of Accounts (ESA 2010) allows for a better analysis and international comparability of the pension systems within and between countries, by introducing a supplementary table on pension schemes. Recommendations on how to compile this table have been collected in a compilation guide (Eurostat, European Central Bank, 2011). Since its release in 2011, this guide has served as the main reference for all European Union National Statistical Offices for completing the supplementary pension table, and compiling statistics on pension obligations of those schemes for which no actuarial estimations have previously been estimated.

1.2 The pension system in the National Accounts

Today's pension receipts originate from previously built up pension entitlements. Depending on the kind of pension scheme, pension entitlements usually accumulate as a result of premium payments, sometimes enforced by law. Often the premiums and accumulated entitlements are related to the levels of income earned.

As in several other countries, the Dutch pension system consists of three so-called pillars. The first pillar is the state pension, called the General Old Age Pension Act (abbreviated AOW in Dutch). Dutch residents start to accumulate entitlements at the age of 15 years. The

[1] defined as the number of persons above the retirement age as a percentage of the potential labor force

accumulated pension entitlements at the age of retirement depend on the number of years one lived in the Netherlands. This implies each year entitlements roughly accrue by 2% per year. One is entitled to a full benefit when lived in the Netherlands for 50 years, given the 65 year retirement age[2]. For those years one has lived outside the Netherlands entitlements will not accrue, except in case of voluntary insurance. State pension contributions depend on income levels, but the benefits don't. The latter depend on the composition of the household however[3]. In the ESA 2010, pension contributions and benefits are recorded in the secondary distribution of income account. Due to the nature of the state pension scheme (PAYGO), no accumulation of pension funds is being observed in terms of financial transactions and balance sheets.

The second pillar is represented by the supplementary (collective) pension schemes, mainly employment related. Although these are private schemes, they are just as in the first pillar, regulated by law which means participation is obligatory. In the national accounts, pension contributions are recorded as part of compensation of employees. Related pension benefits will be found in the secondary distribution of income account. In the case of funded and defined benefit pension schemes, households are in the national accounts identified as the ultimate owners of pension entitlements. This implies that under such schemes pension benefits are simultaneously recorded as income (in the secondary income distribution account) and as a decline in pension claims (in the financial accounts).

The third pillar represents supplementary individual pension schemes which are similar to the second pillar private, but are nevertheless not part of social insurance. Pension contributions and benefits are shown in the secondary distribution of income account. Accumulated funds are shown as assets in the balance sheet of households as life insurance and annuity entitlements. Entitlements under the third pillar are not recorded in the supplementary pension table, as ultimately such individual savings may not be used for pension funding purposes.

The households' net worth in relation to the second and the third pillar are explicitly shown in the core national accounts balance sheets. Measuring the size of the first pillar is one of the main features of the supplementary pension table. Just as the assets held by households in pension entitlements equal the liabilities of the pension funds, the state pension entitlements held by households must equal the corresponding liabilities of, in this case, the general government. This paper will focus on the first and the second pillar, just as the supplementary table does. The third pillar is neglected in the remainder of this paper.

1.3 State of art and related work

The supplementary table on pension schemes is mandatory for all EU-countries on a three year basis, starting with 2015. However, several countries have already made efforts to produce the table on a voluntary basis. For the Netherlands previous estimates were published by Schmitz (2010), completing the supplementary table for 2006-2008. The model used for those estimates is not the same model as used in this paper, but a more simplified version. Moreover the parameters used in that model differ substantially from the ones used here. Therefore, the previous results and the current results are difficult to compare. The experimental results

[2] The retirement age increases incrementally, to 67 years in 2023. For this paper the retirement age used is still 65, because our focus is on the situation as it was in 2012.

[3] The level of benefits differ for singles and couples. Currently a further distinction for couples is made, depending on the age of the partner.

derived by Schmitz (2010) already showed that the results were quite sensitive to the necessary choices of parameters. This issue is further examined in this paper.

Also the UK National Statistical Office (ONS) published the table as experimental statistics as the methodology followed was still under revision (Levy, 2011a) (Levy, 2011b). As in most other countries, pension statistics in the UK only include the liabilities in connection to those pension schemes which are funded. The liabilities will usually not include pension obligations which are unfunded and thus follow a PAYGO funding principle. ONS confirms the usefulness of the supplementary table, but also concludes that the work to compile the table is complex. Also here the sensitivity of the (unfunded) schemes to the parameters used is described extensively. They show that a 1% increase or decrease in the choice for the nominal discount rate can lead up to 14-16 percent increase or decrease in the estimated entitlements (Levy, 2011b, p. 22). These findings are close to ours.

Recently, several other attempts to compile the supplementary table on pension schemes were reported. The Research Center for Generational Contracts estimated for Latvia the unfunded public pension schemes, following the Freiburg model (Müller & Raffelhüschen, 2014). This exercise showed that in Latvia the pension liabilities were relatively low in comparison with other European countries. The Netherlands was ranked in the middle, where the accrued to date pension liabilities were valued at 236% of GDP (for 2006). This outcome is not in line with the results presented in this paper. The difference largely originate from disability and survivor benefits, which are taken into account by Müller, Raffelhüschen, & Weddige (2009) but not in the pension table presented in this paper.

The present paper is not a sustainability survey into government expenses. It merely focuses on the construction of the supplementary pension table, which provides the possibility for international comparison of different pension systems. Sustainability research of government finances has a broader scope, and take into account more than the pension system, but all expenses and income of the government (see among others: CPB, 2014).

1.4 Paper organization

The paper is organized as follows. Section 2 provides an outline of the supplementary pension table. Sections 3 and 4 describe the methodology used, and the choices made by Statistics Netherlands in completing this table for 2012. Section 3 focuses on the methodology used to include the state pension entitlements, and section 4 on the employment related pension schemes. The closing section 5 summarizes and draws conclusions.

The authors want to thank Dirk van der Wal ((DNB), Jens Grütz (Eurostat), Marcel Lever (CPB), Harry ter Rele (CPB), and Cristoph Müller (Universität Freiburg) for their useful comments on the draft of this discussion paper.

2. Outline of table T.29

The supplementary pension table consists of 11 columns (labeled A-K), and 11 rows. The rows represent the transactions, more or less consistent with the distributive and financial transactions in the SNA.

Code	*Row No.*	*Column number*
		Opening balance sheet
XAF63LS	1	Pension entitlements (incl contingent pension entitlements)
		Changes in pension entitlements due to transactions
XD61p	2	Increase in pension entitlements due to social contributions
XD6111	2,1	Employer actual social contributions
XD6121	2,2	Employer imputed social contributions
XD6131	2,3	Household actual social contributions
XD6141	2,4	Household social contribution supplements [5)]
XD6151	2,5	Less: Pension scheme service charges
XD619	3	Other (actuarial) change of pension entitlements in social security pension schemes
XD62p	4	Reduction in pension entitlements due to payment of pension benefits
XD8	5	Changes in pension entitlements due to social contributions and pension benefits
XD81	6	Transfers of pension entitlements between schemes
XD82	7	Change in entitlements due to negotiated changes in scheme structure
		Changes in pension entitlements due to other flows
XK7	8	Changes in entitlements due to revaluations [6)]
XK5	9	Changes in entitlements due to other changes in volume [6)]
		Closing balance sheet
XAF63LE	10	Pension entitlements (incl. contingent pension entitlements
		Related indicator
XP1	*11*	*Output*

Figure 1: Rows of the supplementary table

The columns (A-H) identify the various pension sponsors, the type of risk-sharing between the sponsor and the pension holder and whether or not the pension scheme is recorded in the core national accounts. Column I equals the sum of the previous columns, and columns J-K provide a further breakdown of the entitlements into those of residents and non-residents.

Standard national accounts						Not in the standard accounts		Total Pension Schemes	Counter-parts:	Counter-parts:
Non-general government			General government							
Defined contri-bution	Defined benefit schemes	Total	Defined contributi on	Defined benefit schemes for Classified in	Classified in general	Classified in general	Social security		Pension entitlements of resident	Pension entitlements of non-resident
XPC1W	XPB1W	XPCB1W	XPCG	XPBG12	XPBG13	XPBOUT13	XP1314	XPTOT	XPTOTRH	XPTOTNRH
A	B	C	D	E	F	G	H	I	J	K

Figure 2: Columns of the supplementary table

2.1 Columns

Within the pension scheme, different roles can be identified for the parties involved. In this paper the pension administrator, pension manager, sponsor, and the participant are identified. However, these terms cannot be uniquely assigned to the parties in the Netherlands, the difficulty being that one party may take on more than one role. The pension administrator handles the day-to-day administration of the pension scheme. The pension manager takes care

of the long term policy of the scheme, and is responsible for the investments made. Ultimately, the manager is responsible for the pension entitlements. The term sponsor is used in this paper to identify those who contribute to pension funding, i.e. the employer. The table identifies two kinds of sponsors: general government or non-general government (private parties). The government is by definition the sponsor of the unfunded state pension. Finally, the participant is the beneficiary of the pension entitlements.

The supplementary table allows for introducing accounting conventions which differ from those underlying the core national accounts system. In the case of the Netherlands, pension liabilities resulting from the state pension funds and a few additional minor pension schemes, for example the military pensions, are now explicitly shown. These entitlements, coinciding with the first pillar, are not recorded in the standard national accounts, however related contributions and benefits are. The fund needed to ensure the future state pension claims is recorded in column H of the supplementary table. Other public PAYGO schemes will be recorded in column G, of which the related pension entitlements are equally not shown in the core accounts. Also non-government PAYGO schemes exist, but there is no specific column available to record these, therefore these are recorded in A or B. Section 3 gives a detailed description of the methodology used to complete column H.

Risk-sharing concerns the distinction between defined benefit (DB), and defined contribution (DC) schemes. In DB-schemes the risk of providing a predetermined pension benefit lies with the sponsor. The value of the entitlements to date is the result of an actuarial calculation, and actuarial risks and investment risks are pulled with other pension claim holders. On the other hand, pure DC-schemes are not based on risk sharing but are purely personal, which implies these schemes represent de facto nothing more than a claim on a capital fund. Its size depends on the value of the capital investments at a particular point in time. Thirdly, in hybrid schemes the actuarial risks are shared among the sponsor and the claim holders, the latter takes all investment risks. In the supplementary table of ESA2010, these hybrid schemes are recorded as DB-schemes (ESR 2010, par. 17.59). Section 4 describes in detail the methods and assumptions needed to complete the columns other than column H.

2.2 Rows

The rows in the table equal more or less the transactions in the system of national accounts, starting with the opening balance sheet of entitlements in row 1 and ending with the closing balance sheet in row 10. The changes in entitlements due to transactions are recorded in rows 2 until 7, and changes due to other flows in row 8 and 9.

Contributions paid to private pension schemes result in an increase of the entitlements, benefits paid out of these schemes lead to a decrease. For unfunded pension schemes the state pensions entitlements increase because the participant simply lives in the Netherlands, regardless of contributions are paid or not. The contributions are recorded in row 2, further distinguished into 2,1-2,5. These rows coincide with the distributive transactions of ESA2010. The actual social contributions paid by the employer are recorded in row 2,1, the imputed social contributions in row 2,2. The contributions paid by households are recorded in row 2,3, and the supplementary contributions in row 2,4. These supplementary contributions equal the property income earned from the funds that are invested. This income is not actually paid out to the participants, but reinvested. This flow is therefore considered both income and social

contribution in the SNA. The costs of the pension schemes are recorded as a negative value in row 2,5.

Row 3 is only used for social pension schemes (column H) and records imputed transactions like experience effects (when the observed assumptions differ from the levels assumed), and the imputed contribution in case the actual contributions differ from the actuarial contributions based on the internal rate of return. These values can be positive or negative. In row 4, the benefits paid out are recorded. Row 5 is a balancing item of the previous rows.

Row 6 is important for the recording of flows moving between the different columns. When individuals change jobs, the sponsor might change, and a flow occurs between the old and the new sponsor. The sum of these flows equals zero by definition, because the inflow of one scheme is the outflow of the other, conditional that they do not flow abroad.

Row 7 highlights the changes in pension entitlements due to negotiated reforms. These reforms might be the change in retirement age, or the change from a DC to a DB scheme. Two issues are important to classify a flow in this row: (i) the reform must be formally enacted, and (ii) the change must be agreed upon by the parties involved, or, in case of government schemes, by the parliament. If a change is not negotiated, the occurring flows are recorded in row 9.

The last two rows, 8 and 9, include the changes in parameters used in the modeling. In row 8 the other flows due to revaluations (changes in discount rate, inflation or wage rate) are recorded. In row 9 the changes due to other changes in the volume of assets are recorded. This includes the changes in demographic variables, but also the non-negotiated changes mentioned above.

3. First pillar

3.1 Estimation model

As mentioned the state pension is a PAYGO system. To be able to compare the obligations inherent to this system with the funded (employment related) pensions, the ESA2010 table T29 estimates the assets needed by the government *as if* the state pension was funded. All the results presented refer to the opening balance sheet of the reference year, which equals the closing balance sheet of the previous year. The state pension scheme is addressed in column H. Even though this column is labeled as being outside the standard national accounts, this is not true for all rows or transactions presented in this column. What is outside the standard national accounts are the estimated funds needed to fulfill all future obligations, and the financial flows related to these entitlements. This section explains the estimation methods underlying the pension entitlements shown in rows number 1 and 10.

The model presented here is an adapted version of the Freiburg model (Heidler, Müller, & Weddige, 2009) (Eurostat, European Central Bank, 2011). It comprises three components; it combines the current age profile of the state pension, demographic data (the current population figures and the life expectancy projection), and the real discount rate. Estimates are made both for men and women. This is the first exercise in this subject, and only covers the situation as it is in 2012. The estimates should ideally include the pension reforms which have already been enacted in the base year for calculations (Eurostat, European Central Bank, 2011, p. 101), however the current figures do not fully comply with this demand. The shift of the retirement age is enacted in 2012 by the Senate (Eerste Kamer der Staten-Generaal, 2012), and also changes in the couples benefit are already decided upon. These are not taken into account in the figures presented here, but will be part of further research.

Also the technical compilation guide and ESA2010 distinguish two approaches regarding indexation of the results, accrued benefits obligations (ABO) versus projected benefits obligations (PBO). It is stated that this choice should be based on implicit or explicit factors for wage increases in the pension formula. In this research we did not yet include the indexation of the AOW, following the ABO concept only.

3.1.1 Age profiles

The age profile of the state pension shows the average AOW benefit by age and gender. It is a cross section of the population in a given year, taken from the Income Panel Survey (IPS). The Income Panel Survey aims to describe the composition and distribution of the income of individuals and households in the Netherlands. It is a sample survey taken from a register panel with information from different administrative sources, including tax data. It covers approximately 271 thousand people in over 93 thousand households. The survey records detailed income and wealth information by individual and household characteristics, among which the received state pension benefits.

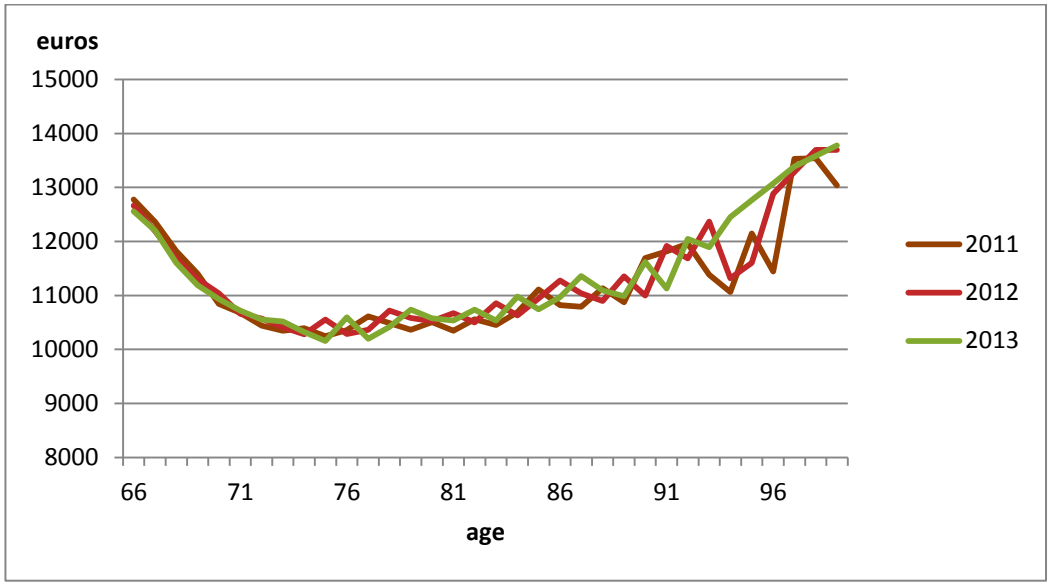

Figure 3: State pension age profiles for men

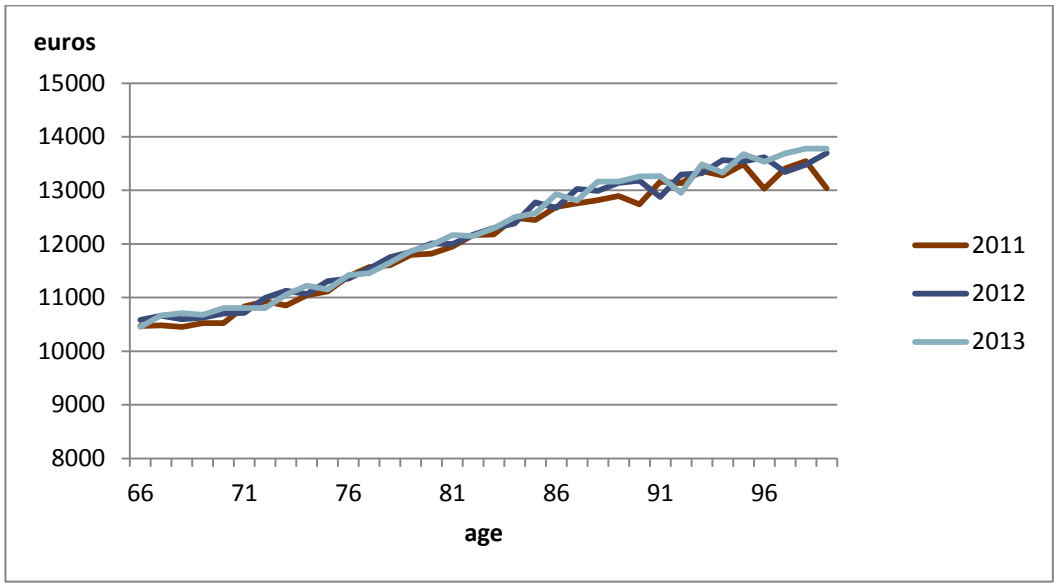

Figure 4: State pension age profiles for women

The age profiles for men and women are given in figures 3 and 4 above, both for three years. For example, a woman aged 85 years receives on average about 12.5 thousand euros in AOW benefits in 2013, a woman aged 70 only 10.8 thousand euros. Even though the AOW benefit is a flat rate, independent of age, on the level of the age group the average amount received differs. This difference in household composition becomes even more apparent in figure 6, where the age profiles of men and women are shown in one graph. It is clear that men aged 65 in 2012, received on average a higher benefit than women of that age. However, older men received on average less than women of the same age. This is due to the different levels of benefits for singles and couples, and differences in household composition between the age groups. Because men are often older than their partners they start out their retirement with a couples benefit including a full allowance. When they grow older more and more partners will reach the retirement age as well, the age profile will reach the level of the couples benefit without an

allowance. When age further increases more people will become single, and the age profiles will increase to that level. For women the profile is different, because they are often younger than their partner and start out with the couples benefit without an allowance. Also for women the AOW income age profile is getting higher with age when they become single.

Also in figure 5, an estimate is made for the level of entitlements of future retirees, that is the population that is aged 15 and over in the base year. It is in these ages that one accumulates AOW entitlements. Both men and women accumulate 2 percent per year, as explained in the introduction. In our model we assume that this future benefit is equal to the average pension benefit of the current retirees in the base year. Assuming this implies that future retirees have a similar history[4] as the future retirees. The entitlements for future retirees are equal for men and women.

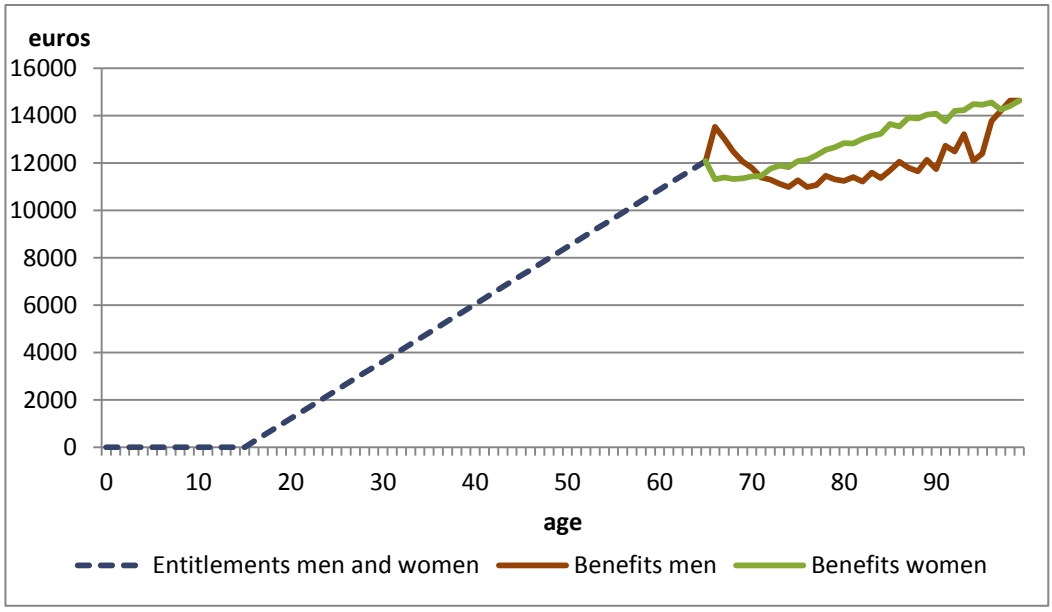

Figure 5: Age profiles of imputed claims and actual contributions (2012)

It is because of these household composition effects that are included in these age profiles that we favor to use these cross-sections as a prediction of the future benefits, rather than the cohort approach recommended in the technical compilation guide. Under the cohort approach the AOW benefit of a 75 year old in 2022 will equal the AOW benefit of a 65 year old in 2012. This foregoes the explained changes in household composition, which is the only factor effecting the level of the benefit. This is different from employment related pension schemes, where the income received during the working years greatly defines the height of the benefit. Our approach does imply that the household composition effects in 2012 will remain in the future.

The age profiles in figure 3 and 4 are directly taken from micro data. The sum of the age profiles over all individuals should equal the total sum paid out to the elderly as state pensions. However there are differences between the micro source (IPS) and the macro data, one of them being that the former only takes into account the individuals that are alive at the last day of the

[4] Entitlements are only accumulated while living in the Netherlands, or when voluntary insured. The difference between the maximum entitlements (100%) and the actual entitlements, is called the AOW-gap. The approach presented here implies that the current and future retirees have similar AOW gaps.

year. The SNA includes all individuals and their income flows in the year. This difference could lead to discrepancies between the micro sum of AOW benefits and the national accounts sum. To be consistent with the SNA data the micro age profiles are balanced to the SNA sum, by using a simple coefficient.

$$C = \frac{SNA}{\sum(AOW_i * P_i)} \quad (1)$$

Where SNA equals the SNA value for the state pension benefits, AOW_i equals the AOW benefit age profile for age group i, and P_i equals the population in each age group i. The age groups are limited to the current retirees (i = {65-99}.

AOW benefits		2008	2009	2010	2011	2012	2013	2014
SNA	1000 euros	25.2	26.4	27.6	28.6	30.0	31.4	32.7
IPS	1000 euros	24.2	25.5	27.1	28.1	29.3	30.7	31.6
Coefficient (SNA / IPS)		1.04	1.04	1.02	1.02	1.02	1.02	1.04

Table 1: Micro and macro totals of AOW benefits

The age profile taken from the micro source is balanced to the national accounts total using the coefficient in table 1. The use of this coefficient implies that the underrepresentation of the micro data is the same for each age group. Lacking more detailed information on this gap this is the best available method.

3.1.2 Demographic data

Demographic figures are available for a number of subgroups (singles and couples for example), but life expectancy only for men and women (by age). Therefore the most detailed projections can be made by gender only. The number of years one will receive an AOW benefit can be determined, given the age of a person, his or her life expectancy and the retirement age. The population pyramid, given in figure 5 below, shows the population by age and gender for 2013, and the projected distribution in 2060. This figure makes clear that the age distribution will change drastically, resulting in more elderly people. Based on these projections it is estimated that the retirement age will increase to 71.5 years in 2060 (Van Duin & Stoeldraijer, 2012).

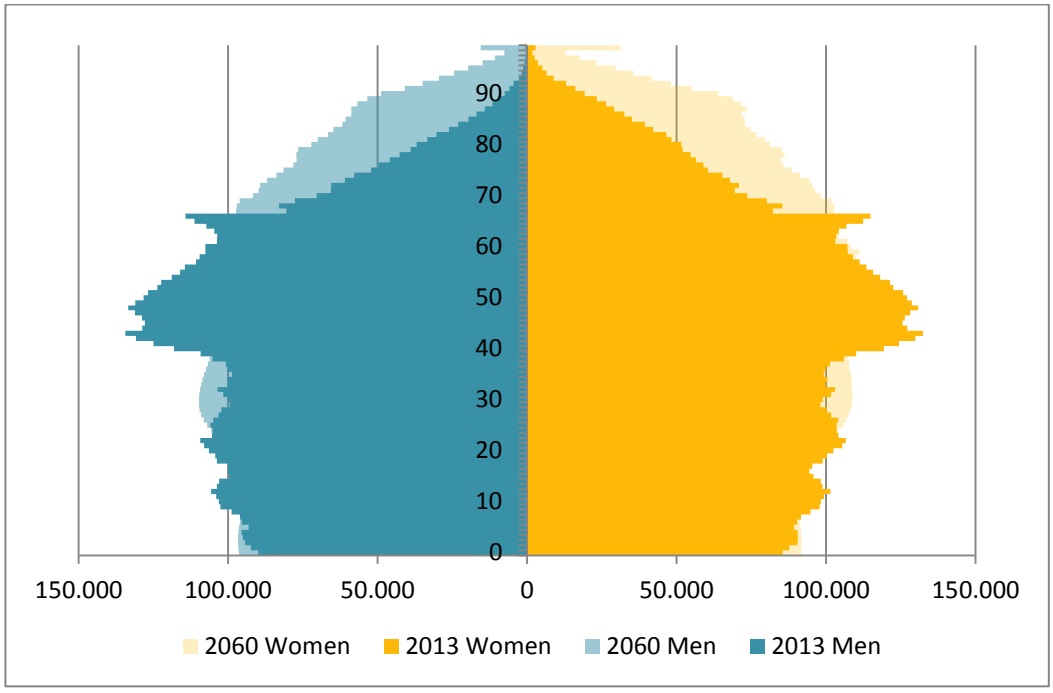

Figure 6: Population pyramid for 2013 and the projection of 2060

A small deviation from the Freiburg model is that instead of the population projections we use the projected life expectancy. The published population projections of Statistics Netherlands in numbers include migration, by using the current population and their life expectancy we stay clear from this, which is the same scope as the Freiburg model uses. Also the available time span of the population projections is insufficient. The model should be able to follow the youngest participating age group (15 years old) until they reach the highest age group. This means we need a span of 85 years, and therefore in 2012 projections until 2097. This is beyond the currently published projections of Statistics Netherlands, which go until 2060. Instead of working with the number of people by age group in later years, we use the remaining years the current age groups still have to live, and the value of the benefit they will receive in those years.

3.1.3 Discount rate and results

To calculate the net present value of the future benefits, the latter are discounted using a real discount rate. Because the projections extend over decades, the results are very sensitive to the assumptions used, in particular to this discount rate.

The technical compilation guide proposes a fixed real discount rate of 3% or nominal of 5% each year, based on the criteria that (i) it should be a risk-free interest rate, (ii) the maturity of the debt securities should be similar to those of pension entitlements, (iii) EU countries must use the same discount rate to assure comparability, and (iv) it should be stable over time, in order to avoid fluctuating outcomes (Eurostat, European Central Bank, 2011, p. 45). The proposed real rate of 3% is used by multiple committees, like the Working Group on Ageing Populations and Sustainability (2011), and in several publications regarding generational accounting (CPB, 2011) (CPB, 2014) and aging studies (Bettendorf, Van der Horst, Draper, Van Ewijk, De Mooij, & Ter Rele, 2011), but it is used merely because an alternative is lacking.

The choice of the discount rate can be debated. Comparability between countries is not reached by members using the same discount rate, but by member states using the discount rate that is best representing their situation. A low discount rate means governments or pension funds have lower future returns, and therefore need higher current obligations. A high discount rate would mean they yield a higher return and their current obligations could be lower. When the entitlements of the state pension scheme and the employment related pension schemes have a similar objective, the use of a similar approach is a logical consequence, even though they might not yield the same return, in fact the investment of the state pension contributions is merely fictional. An alternative view is to assume that state pensions are financed with money that the state collects in the market (government bonds). The price that has to be paid for this way of financing is the market interest rate, which is embodied in the term structure DNB prescribes.

Still estimating the state pension funds is a similar exercise as estimating the funds needed for the employment related pension schemes. For the latter pension funds are obliged to follow strict rules in order to have sufficient assets available at all times. One of these rules is the actuarial rate of interest used, which is published by De Nederlandsche Bank. For pension funds the discount rate used depends on the length of the outstanding obligations. The nominal interest rate term structure shows for each term the corresponding discount rate, see the figure below.

In this subsection the proposed fixed discount rate of 3% for each year is used, but also an alternative, flexible, discount rate, resembling the market interest rates. The later resembles more the market discount rate, and results in a more comparable time series with the private pension schemes. These two approaches will be referred to as the Eurostat approach and the Statistics Netherlands approach in the remainder of this paper.

Eurostat approach

Eurostat and the ECB (2011, p. 45) suggest the use of a fixed real discount rate of 3%, which results in a rather flat time series, because it only depends on changes in the life expectancy, the population, and the age profiles. These three elements are rather stable over time.

Following the Eurostat approach, using a 3% real discount rate results in the short time series presented in figure 8. The increase over time mainly results from the increase of the level of the benefits, and the increasing number of retirees. The change in life expectancy is very small in these years.

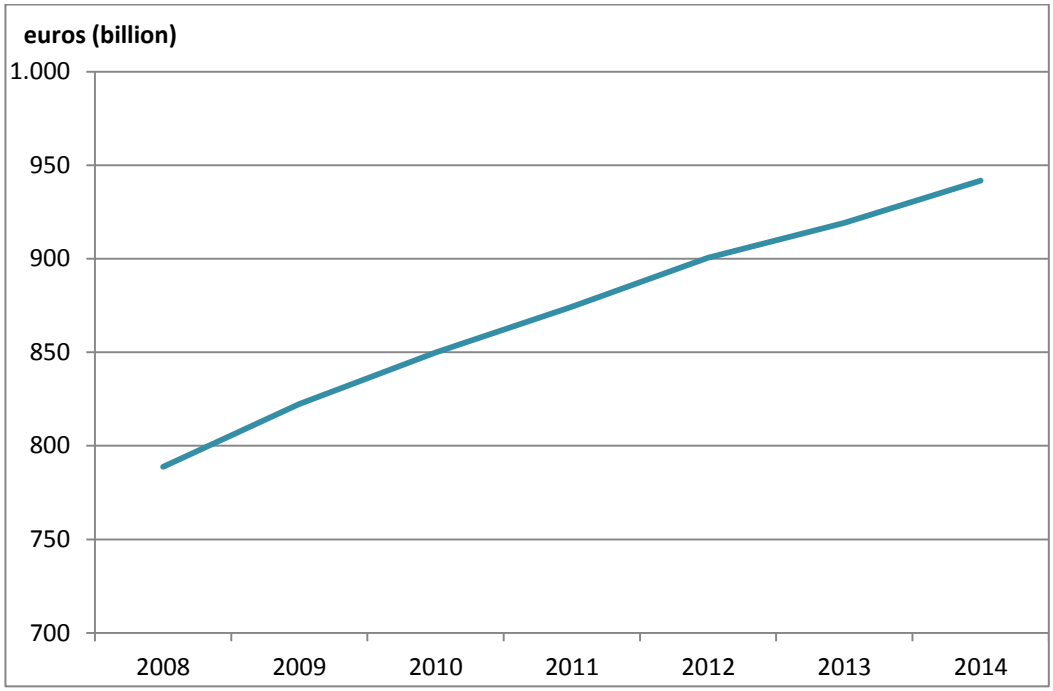

Figure 7: NPV of state pensions, (Eurostat) real discount rate = 3% in every year

Alternative approach

The alternative approach by Statistics Netherlands is based upon the approach compulsory to the pension funds. The discount rates used by pension funds depend on the terms of the obligations; these terms are different for each person. A young person just entering the pension scheme will have a long outstanding entitlement, whereas the entitlements of current retirees will have shorter terms. Pension funds discount these obligations differently, using the interest rate term structure in figure 8 below. DNB prescribes the discount rate needed to determine the net present value of future pension obligations in an interest rate term structure based on zero coupon rates and converging to a UFR (ultimate forward rate) of 4,2%.

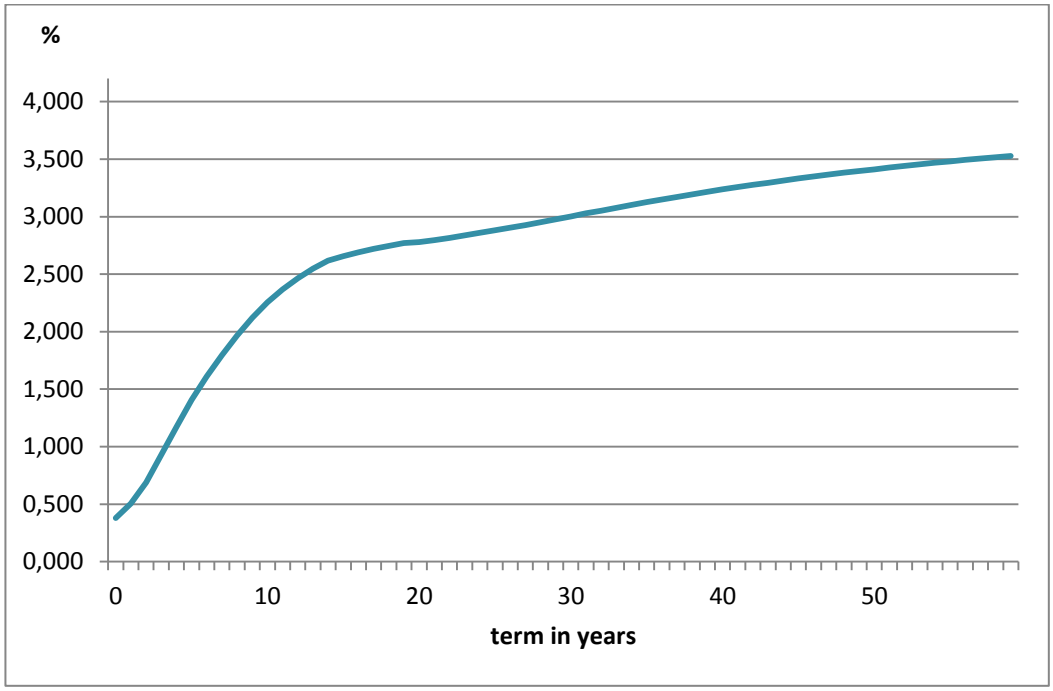

Figure 8: Nominal interest rate term structure (31-12-2012)

The model presented here however is limited to one discount factor for the entire population, using the average term. This average term is calculated using the average age of the AOW-profile in figure 4, and the age when the obligations end. The latter is again different for each individual, but using the life expectancy tables, an average age for the entire population is found.

The average age $\tilde{x}$ of the AOW profile (shown in figure 6) is given by the formula:

$$\tilde{x} = \frac{\sum xP(x)A(x)}{\sum P(x)A(x)} \tag{2}$$

Where x is the age, $P(x)$ the population size in age group x, and $A(x)$ the AOW profile for age group x.

The average term $\tilde{t}$ of the state pension obligations is the difference between the average age of the pension entitlements, $\tilde{x}$, and the average age of death, $\tilde{d}$.

$$\tilde{t} = \tilde{d} - \tilde{x} \tag{3}$$

Table 2 shows the resulting average term $\tilde{t}$, the corresponding real discount rate (r), and the resulting net present value (NPV) of the AOW pension entitlements. The average age increases, as the population is ageing, but because the life expectancy increases as well the average term of the entitlement remains stable at around 26 / 27 years. As we estimate the entitlements at the first of January of each year, we use the three month average interest rates of December of the previous year. These rates are given by the central bank[5]. The interest rate term structure

[5] http://www.statistics.dnb.nl/index.cgi?lang=nl&todo=Rentes

provides nominal interest rates; assuming a constant inflation rate of 2% each year, the real discount rates can be derived.

		2008	2009	2010	2011	2012	2013	2014
$\tilde{t}$	year	27	26	27	26	27	26	26
r	%	2.939%	1.591%	2.049%	1.616%	0.777%	0.507%	0.881%
NPV	billion euros	797	1,050	998	1,107	1,332	1,429	1,356

Table 2: parameters and results of alternative approach

Comparison of both approaches

The alternative discount rate results in time series that is more comparable to the employment related pension schemes that are already included in the national accounts. Both schemes (funded and unfunded pensions) have similar characteristics, and, when discounted the same way, should yield similar results. Figure 9 shows that the fluctuations in the chosen discount rate result in a steeper time series than the fixed rate. The NPV increases sharply when the discount rate drops, because future benefits decline less in value. The years mentioned in this graph are opening balance sheets, which equal the closing balance sheets of the previous year.

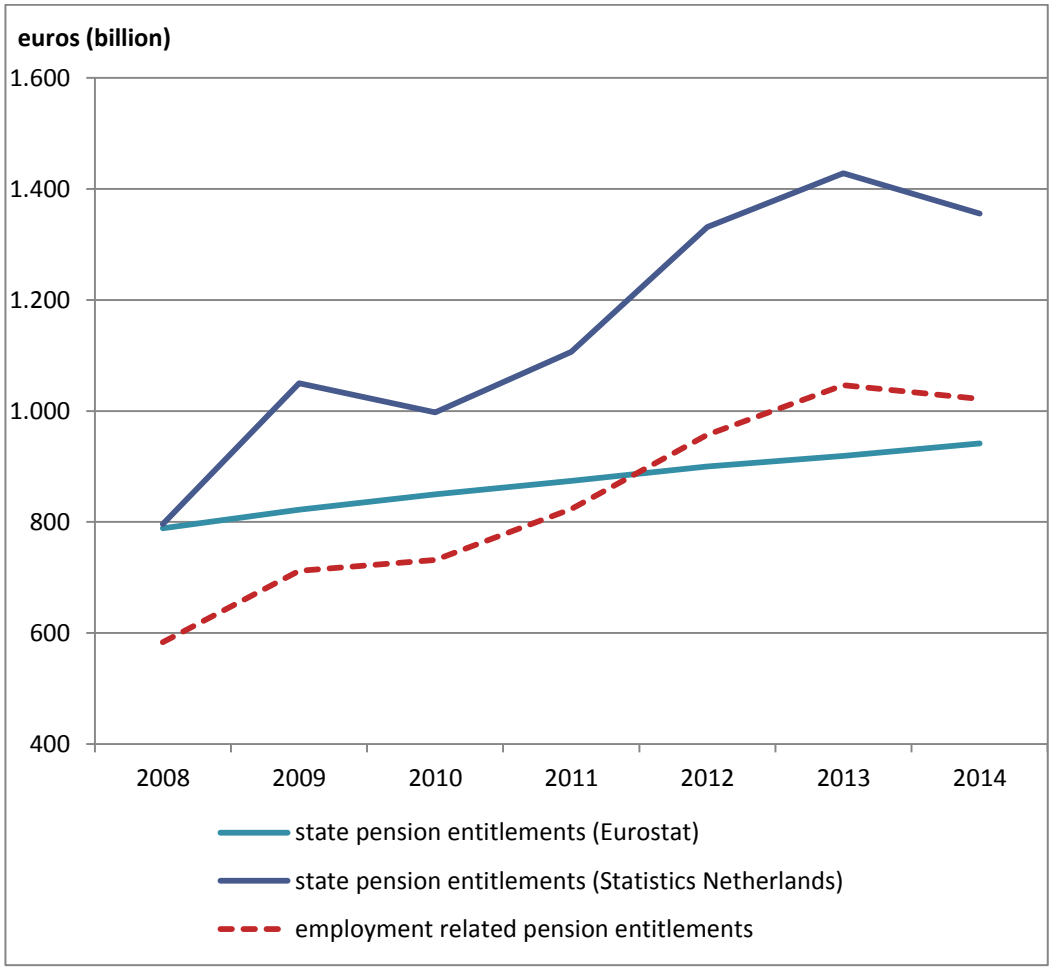

Figure 9: State pension entitlements for both approaches and employment related pension entitlements at the beginning of the year

Figure 9 shows that the results of the state pension entitlements depend greatly on the approach taken. Using a discount rate for years far in the future leads by definition to a margin of error in the results, but because of the settings of both approaches, not only the level of the entitlements differ, but also the year-on-year developments. We feel it is more plausible to use different discount rates for different years, to mimic as closely as possible the economic reality as embedded in the interest rate term structure. Where the Eurostat approach is stable in the outcome over the years, the relative importance of state versus private pensions fluctuates strongly. The approach by Statistics Netherlands yields in this respect far better results.

3.1.4 Sensitivity and gender breakdown

A sensitivity analysis shows this dependency of the discount rate as well. For both approaches an upper bound and a lower bound estimate is calculated, around the results discussed above. These bounds are calculated using a discount rate of 1%-point above or below the rate used for the base estimate. In case of the Eurostat approach the upper bound equals a discount rate of 2%, and the lower bound 4% for each year. For the Statistics Netherlands approach the upper bound discount rate became negative when the base rate was close to zero. The difference between the upper bound estimate and the lower bound estimate is for the Eurostat approach 262—296 billion euros, and for the approach by Statistics Netherlands 266-580 billion euros (figure 10).

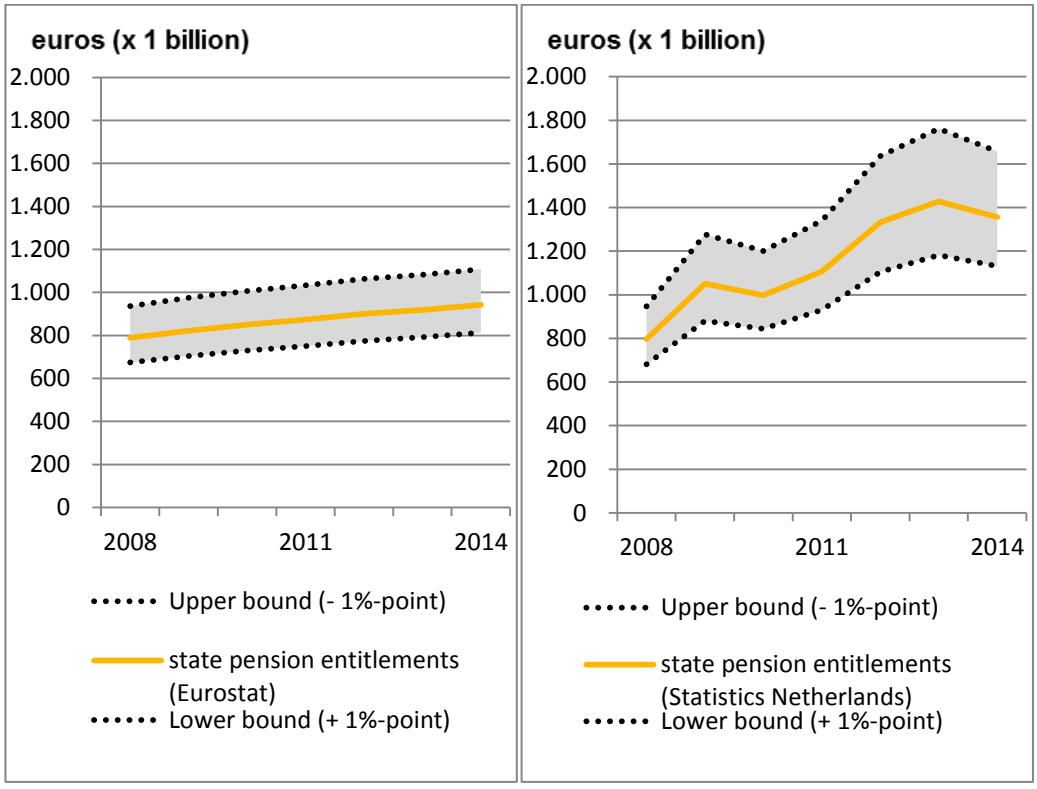

Figure 10: sensitivity of discount rates

The entitlements resulting from this model are sensitive to the settings of other parameters as well. This sensitivity will be smaller than presented here for the discount rate, and are currently not further investigated.

The model distinguishes men and women, and the results can be broken down to gender as well. For 2013 the breakdown of the NPV to age and gender is shown in figure 11 and figure 12. The first graph shows the average NPV per person in each age group, the second graph shows the total NPV of the age group. The sum of the two coloured areas in figure 12 equals the NPV for 2013.

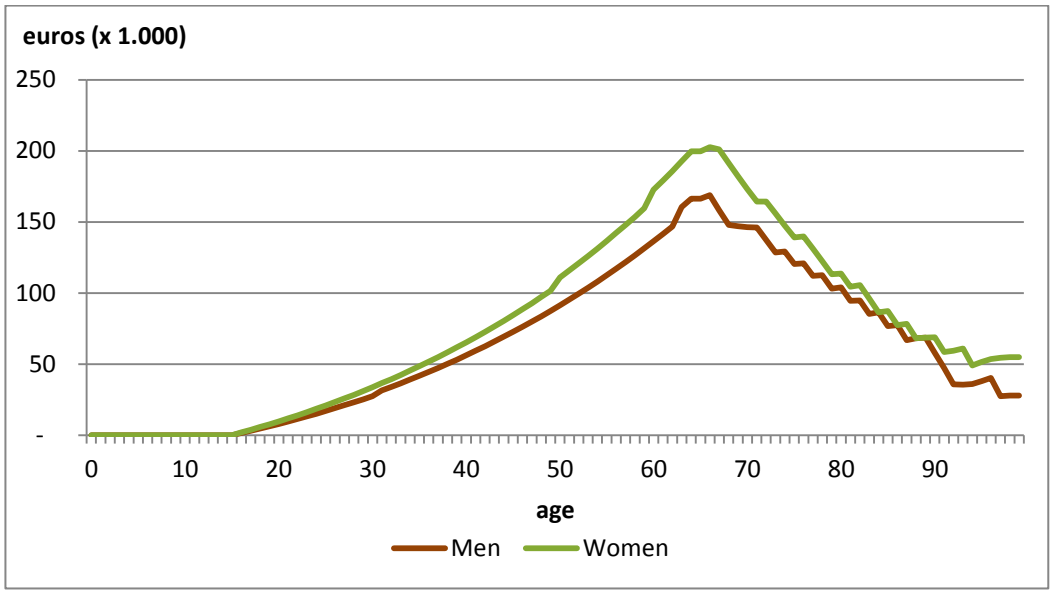

Figure 11: Average NPV of state pensions by age and gender (2013)

Over all the entitlements of women are larger than for men. This is the result from the higher life expectancy of women, and from the higher benefits received after the age of (around) 70. This is also reflected in the aggregates, which combine the averages with the population numbers in each age group.

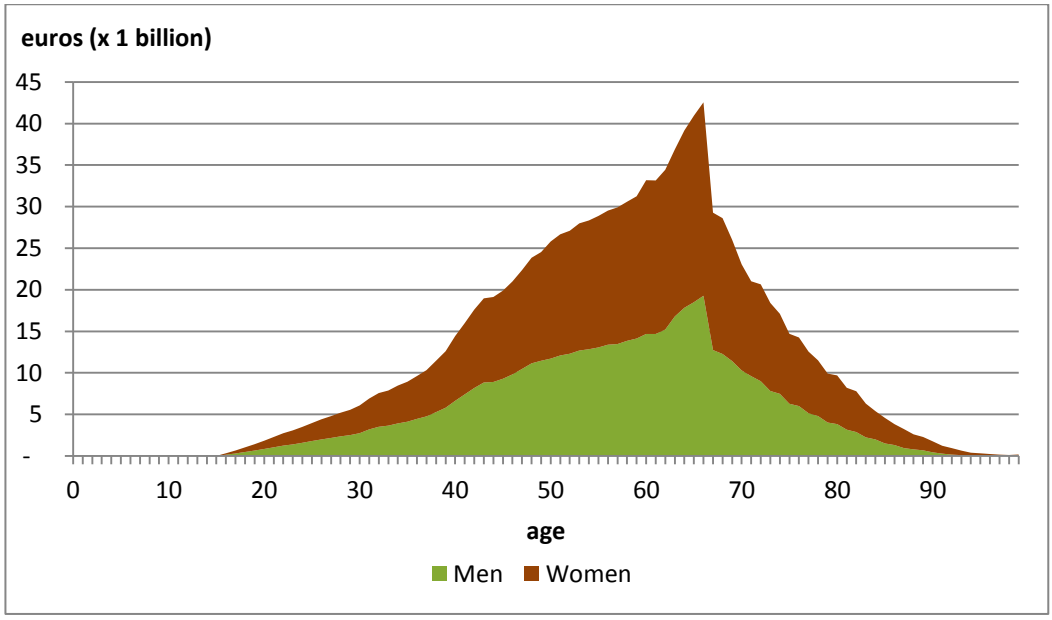

Figure 12: Aggregate NPV of state pensions by age group and gender (2013)

4. Second pillar

The main purpose of the supplementary table on pensions is to provide a mutual comparable picture of all pension arrangements throughout EU member countries. The table ensures that for each country a complete overview of pension entitlements is provided, whether these are funded or unfunded. However, the data demands of the supplementary table may go beyond of what is available in terms of source statistics. In addition the implementation of ESA 2010 regulations including the supplementary pension table must be applied to, and interpreted according to, the economic conditions of a particular country, in our case the Netherlands. This section presents the required steps taken to complete the table for those pensions headed under the second pillar, being the funded pension schemes and some PAYGO arrangements. There are no conceptual differences between the recording of the funded pension schemes in the supplementary table versus the core national accounts. The totals of the rows in the supplementary table (excluding columns G and H) are directly comparable to the totals in the standard national accounts.

Besides these funded schemes some pay-as-you-go pension schemes for early retirement or direct payments are carried out in the Netherlands. These are currently not fully recorded in the core accounts, but they are in the supplementary table, therefore causing a difference with the national accounts totals.

The columns of the table identify the various pension sponsors, the type of risk-sharing between the sponsor and the pension holder and whether or not the pension scheme is recorded in the core national accounts, the practical way of completing these columns are described in section 4.1. The rows represent the transactions, more or less consistent with the distributive and financial transactions in the SNA, these are described in section 4.2, focusing mainly on the rows 2,2 and 8 which need to be specified different from ESA 2010 for the Netherlands. The results of the supplementary table on pensions are presented in 4.3.

4.1 Columns

All pension funds under the second pillar and insurance companies must comply with Dutch pension laws under supervision of the Dutch central bank (DNB). In this role DNB collects information on the pension schemes, which is equally used for statistical purposes. This source of information does not provide much information on the collective pension insurance contracts with insurance companies, and also the distribution of the total over DB and DC schemes is not known. For funded non-general government schemes, this total is in column C. The distribution over column A (DC schemes) and B (DB schemes) is made using a fixed key for all rows. This key is based upon the share of DB versus DC contributions (known by type of pension fund, coming from different source of DNB), and is used to divide all rows in the table. In 2012 the keys used for the different types of pension funds are shown in the table below. The part of DC schemes is growing at the expense of DB schemes under the influence of the discussion on the sustainability of the pension system in the Netherlands.

Type of pension fund	DC	DB	Total
Industry-wide pension funds	0.3%	99.7%	100%
Company pension funds	2.4%	97.6%	100%
Professional pension funds	22.7%	77.3%	100%
Collective pension insurance	24.8%	75.2%	100%

Table 3: Share of DB and DC schemes in the total

Two government sponsored funds (ABP; the pension fund for civil servants, and FVP; a pension institution for the unemployed in liquidation since 2012) are DB schemes, but excluded from column B and allocated to column E. Beside the funded pension schemes, column B also reports on early retirement schemes (which will end in 2015), arranged by private employers and some other pay-as-you-go pension arrangements by private employers. The value of these PAYGO entitlements at the end of the year are calculated using the average benefit in 2012, indexed with an expected wage development in the forthcoming years, and the (partly estimated) number of benefits in the few years the arrangement still exists. This is discounted at the same interest term structure used by pension funds (3 year term: 1,75%). The other variables (contributions, benefits) of the early retirement pension entitlements are derived from the financial accounts.

The pension benefits paid directly by private employers are of minor importance (less than 0.1 pro mille). For simplicity the value of entitlements is therefore calculated as the yearly benefit times a capitalization factor 10.

DC schemes sponsored by the government are not found in the Netherlands, so column D is left blank. The defined benefit schemes sponsored by the government and classified as a financial corporation (recorded in column E), are the previously mentioned ABP and FVP, and a fund, not under supervision, that pays pensions to civil servants in former parts of the Dutch Kingdom in Indonesia and Suriname (SAIP). The valuation method is the same as described for column B, except for SAIP where the financial accounts are used. The entitlements of SAIP amount to less than 1 million euros.

Column F is not filled for the Netherlands. If the government organizes a funded pension scheme this is characterized as a pension fund by law, and because pension funds are financial institutions, they are recorded in column E.

Columns G reports on the government sponsored early retirement scheme. This scheme is accounted for in the same manner as for the early retirement schemes in column B. The benefits paid directly to the military personnel by the government is also reported in column G and treated in the same way as the direct payments of private employers in column B (capitalization factor 10).

The total in column I is broken down into two complementary columns, J and K. In order to estimate the columns J and K, a distribution key is used. This key is based upon the part of foreign premiums in the total premiums for every column. For the state pensions the key is based upon the share of the foreign benefits in the total benefits. It is assumed that these keys do not change over time, implying that the same people stay abroad and that the proportion of their entitlements will also be the same.

Pension scheme type	Foreign	National	Total
Funded pensions schemes (executed by pension funds)	1.6%	98.4%	100%
Funded pensions schemes (executed by insurance companies)	2.8%	97.2%	100%
Early retirement schemes	0%	100%	100%
Direct payments	0%	100%	100%
State pensions	3.6%	96.4%	100%

Table 4: Foreign and national share in total pension schemes

4.2 Rows

The employment related pension schemes in the Netherlands, whether DB or DC, can be specified in industry-wide pension funds, company pension funds, professional pension funds, and collective pension insurance with an insurance company[6]. This distinction (that is not visible in the supplementary pension table) is relevant, because they deal with possible surpluses and shortages of funds differently, and therefore, for each of these types the ESA 2010 guidelines need to be interpreted on a case-by-case basis. This is needed to complete the rows 2,2 and 8 in the supplementary table, in order to know where these surpluses and shortages should be booked.

Type of pension fund	number of funds / contracts	
Industry-wide pension funds	84	Funds
Company pension funds	327	Funds
Professional pension funds	12	Funds
Collective pension insurance	41,855	Contracts

Table 5: summary of funds at the end of 2012

Industry-wide pension funds are obligatory for employees in a particular industry. This means that all employers, or sponsors, in the industry are united in one pension fund, and, together with the employees, are accountable for possible shortages in funding to meet future obligations. In this case the pension fund has two options to keep the pension fund balanced: increasing the pension contributions or decreasing the benefits. In case of a surplus the opposite situation holds. Both measures will be the outcome of negotiations between employer and employee organizations. Any surpluses in funding the actuarial requirements are saved as buffers. These buffers are part of the net worth of the pension fund, although one may argue that the pension holders are the ultimate owners of entitlements and surpluses. The net worth of the pension funds is negative when the sum of their assets is below the technical reserves.

Company pension funds are most often related to a single company. Employer and employees have a direct relationship, and the employer can be hold responsible for any shortage of the

[6] The discussion in this subsection only concerns funded pension arrangements

pension fund, or can be seen as the claimant of surpluses of the pension fund. A growing part of the pension schemes in these company pension funds has a DC character. Because of this direct relationship between the sponsor, the pension fund and the participant, an exception with regard to the ESA 2010 treatment of technical reserves is made. Sponsors can be held accountable for shortages of their pension fund and this debt from the sponsor to the pension fund must be reported explicitly in ESA 2010 (as claims of pension funds on pension managers). In case of surpluses, these are recorded as debts from the pension fund to the sponsor, which is a new transaction in ESA 2010 compared to its predecessor ESA 1995.

Professional pension funds are set up by individuals, usually in unincorporated businesses and in specific professions. By Dutch law they have an obligatory character for all professionals in a specific profession. A share of around 20%-25% of these professional funds represents DC-schemes. In terms of technical reserves the professional pension funds represent about 2.5% of total pension reserves in the Netherlands at the end of 2012. Professional pension funds are quite similar to company pension funds in terms of their close relationship between the fund and the sponsor. The resulting value of the claims of pension funds on pension managers should be very small, because DC schemes will hardly have a surplus or deficit. In case the return on investments is insufficient for a DC scheme, the pension benefits will be lowered, and vice versa. Therefore the claim of pension funds on pension managers is set to zero.

Sponsors may assign the management of their pension scheme to an insurance company. Such pension schemes are classified under company pension schemes, but the percentage of DC-schemes under such arrangements is much higher (about 25%, end 2012) than for other company pension schemes. Pension schemes managed by insurance companies are guaranteed schemes: the insurance company is responsible for any deficit (or surplus). Following the same reasoning as for the professional pension funds, the resulting value of the claims of pension funds on pension managers should be very small and therefore is set to zero.

Box: the funding ratio of pension funds

Pension funds have to calculate their funding ratio on a regular basis. This is a highly sensitive policy issue as it influences possible adjustments in pension premiums and benefits. A critical term in the funding ratio formula is assessing the technical reserves. According to supervisory rules the level of technical reserves is calculated as the discounted value of the future pension entitlements at balance sheet date. Survival probability tables derived from demographic projections of Statistics Netherlands are used for assessing these future entitlements. DNB prescribes the discount rate needed to determine the net present value of future pension obligations as an interest term structure based on zero coupon rates, which converges ultimately to an ultimate forward rate (UFR) of 4,2%. The technical reserves equal the net present value of the entitlements to future benefits (ESA 2010, § 5.180).

Because the different types of pension schemes have a different accountability for the surpluses and deficits within the scheme, the recording thereof in the supplementary table differs as well. For all columns, except for column H, the employer imputed social contributions (row 2,2) are interpreted somewhat differently from ESA 2010. ESA 2010 identifies these imputed contributions as a balancing item to complete the reconciliation from row 1 to row 10. However ESA 2010 also prescribes that the employers contributions (actual and imputed) as part of the

earnings of employees must equal the contributions[7] received from employers by insurers and pension funds (ESA 2010, § 4.92 and § 4.97). The employer imputed social contribution is interpreted in a way that fits the Dutch situation best: the net social contributions reflect the premiums and premium supplements that actually flow into the pension fund, and the imputed social contributions show how the surplus or deficit of the fund is treated (not as a financial transaction (row 2,2) but through other changes (row 8) it flows in or out the buffer/net worth). The actual premiums are set by negotiations between employer and employee organizations. When they agree to set the actual premiums higher than the actuarial premiums, this means that the surplus is used to strengthen the buffer or net worth of the pension fund or to make indexation possible. In the opposite case, the deficit is taken from the buffer to make up the actual premiums to the actuarial premiums.

Only for company pension funds a financial transaction linked to the surplus/deficit is reported as imputed employer social contributions, because of the direct relation of the sponsor with the pension fund, meaning that the employer can be held accountable for any surplus or deficit. The pension funds reports a debt to, or a claim on, the employer in the ESA2010 transaction *Claims of pension funds on pension managers* (coded F.64 in the national accounts). The employer reports the counterpart of this transaction. Only the company pension funds are balanced in row 2,2, because of the direct relation of the sponsor with the pension fund. The other pension schemes use row 8 (changes due to revaluations) to record the surplus or deficit. Apart from these amounts paid by employers and employees that exceeds the actuarial needed payments, row 8 consists of some differences raised by imperfect details, and changes resulting from changes in the interest rate term structure for DB-schemes and unrealized increase of wealth in DC-schemes.

The social security schemes in column H are not allowed to record flows in row 2,2 (employer imputed social contribution) and this row cannot be used as a balancing item either. The government just pays out the benefits of these PAYGO schemes, and there is no relation between the contributions received by the government and the benefits they pay. To emphasize this distinctive character of social security schemes, ESA2010 introduces a separate balancing item in row 3. This balancing item consists mostly of the difference caused by an internal rate of return deviating from the actuarial discount rate.

4.3 Results

The supplementary table for 2012 is shown in the next figure. Total pension entitlements over all schemes are estimated at 2.5 trillion euros, or 384% of GDP. Only the unfunded state pension scheme (1.4 trillion euros) adds to 221% of GDP (closing balance sheet). The difference with the estimates mentioned by Müller, Raffelhüschen and Weddige (2009) is mainly made by the discount rate, but also by the scope of the government schemes that are taken into account. In 2012, the pension entitlements increased for all pension schemes except the DB-schemes classified in general government. This is because these early retirement schemes are terminated. The increase due to social contributions was larger than the decrease due to received benefits, partly because the social contributions supplement is quite high (row 2,4). This is due to the large outstanding entitlements that generate income.

[7] These contributions may also include extra payments for reinforcing the buffers.

Table 6: Supplementary pension table (black cells are not possible to occur, grey cells are not part of the standard national accounts)

			Recording	Standard national accounts						Not in the standard accounts		Total Pension Schemes	Counter-parts:	Counter-parts:
			Pension manager	Non-general government			General government						Pension entitlements of resident house-holds [4]	Pension entitlements of non-resident households [4]
				Defined contri-bution schemes	Defined benefit schemes and other[1] non-defined contribution schemes	Total	Defined contribution schemes	Defined benefit schemes for general government employees[2]						
								Classified in financial corporations	Classified in general government 3)	Classified in general government	Social security pension schemes			
		Row	*Code*	XPC1W	XPB1W	XPCB1W	XPCG	XPBG12	XPBG13	XPBOUT13	XP1314	XPTOT	XPTOTRH	XPTOTNRH
Relations	Code	*No.*	*Column number*	A	B	C	D	E	F	G	H	I	J	K
			Opening balance sheet											
	XAF63LS	1	Pension entitlements (incl contingent pension en	44.699	656.748	701.448		263.217		10.111	1.331.902	2.306.677	2.256.835	49.842
			Changes in pension entitlements due to transactions											
Σ 2.1 to 2.4 – 2.5	XD61p	2	Increase in pension entitlements due to social co	4.186	42.865	47.052		14.861		2.080	33.105	97.098	94.780	2.318
	XD6111	2,1	Employer actual social contributions	1.466	18.236	19.702		6.258		1.294	0	27.255	26.792	463
	XD6121	2,2	Employer imputed social contributions		-729	-729		0		0		-729	-718	-11
	XD6131	2,3	Household actual social contributions	791	10.275	11.066		2.876		786	33.218	47.946	46.508	1.438
	XD6141	2,4	Household social contribution supplements[5]	1.396	16.196	17.592		6.263		0	0	23.855	23.434	421
	XD6151	2,5	Less: Pension scheme service charges	-533	1.112	579		537		0	113	1.229	1.236	-8
	XD619	3	Other (actuarial) change of pension entitlements								-28.162	-28.162	-27.150	-1.012
	XD62p	4	Reduction in pension entitlements due to paymen	2.918	24.983	27.901		8.563		2.417	31.415	70.296	68.477	1.818
2 + 3 - 4	XD8	5	Changes in pension entitlements due to social co	1.268	17.883	19.151		0		0	-26.472	-7.321	-7.321	0
	XD81	6	Transfers of pension entitlements between schen	-411	411	0		0		0	0	0	21	-21
	XD82	7	Change in entitlements due to negotiated change	112	4.351	4.463		5.597		0	0	10.060	9.904	156
			Changes in pension entitlements due to other flows											
	XK7	8	Changes in entitlements due to revaluations[6]	3.556	31.634	35.191		17.004		166	228	52.589	51.587	1.002
	XK5	9	Changes in entitlements due to other changes in	75	7.632	7.708		434		0	0	8.142	8.011	131
1+ Σ 5 to 9	XAF63LE	10	Pension entitlements (incl. contingent pension en	49.301	718.659	767.960		292.549		9.941	1.428.537	2.498.987	2.448.389	50.598

Figure 13 lists the importance of the different pension options as the relative share in the total, based upon the outcomes of the supplementary table. In the Netherlands the DC-schemes are far less common than the DB-schemes. There is a difference in the calculation of these schemes, where the value of the former is the result of the invested assets (at market value), the latter depends on a formula, of, among other variables, earnings, age, and a discount rate to determine the value. The resulting net present value of the DB-schemes is not easily compared with the market value of the DC-schemes (Van der Wal, 2014). This holds for the Netherlands, but also for the comparison with other countries.

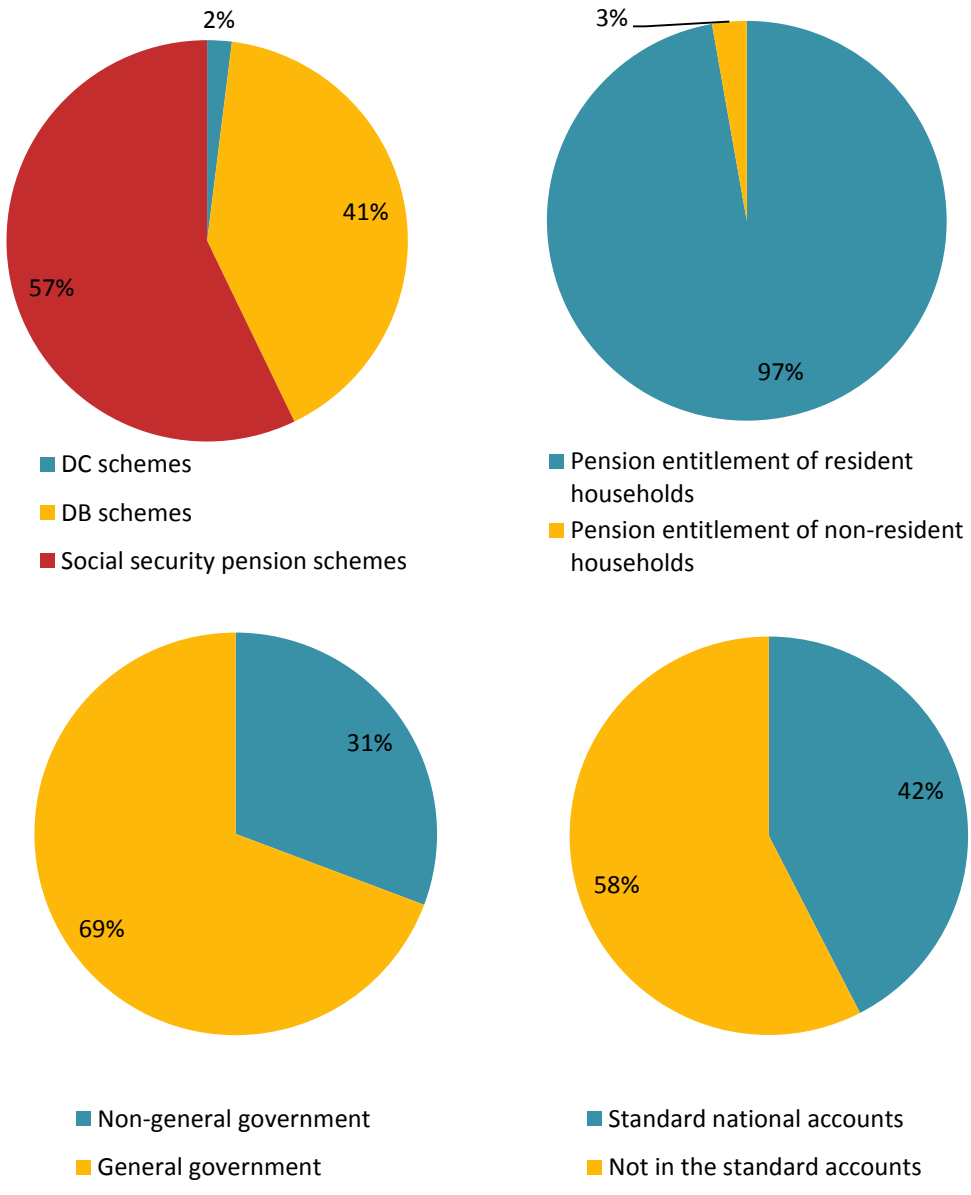

Figure 13: Relative shares of pension schemes

The addition of the unfunded pension entitlements in the pension table aims to increase comparability across countries. The results presented here show that more than half of the total pension entitlements are not yet recorded in the national accounts. This is estimated using the country- and year-specific discount rate for the Netherlands.

The general government is the sponsor of more than two thirds of the total pension schemes. Of this, 83% is in the social security pension schemes, and 17% in the DB-schemes for general government employees.

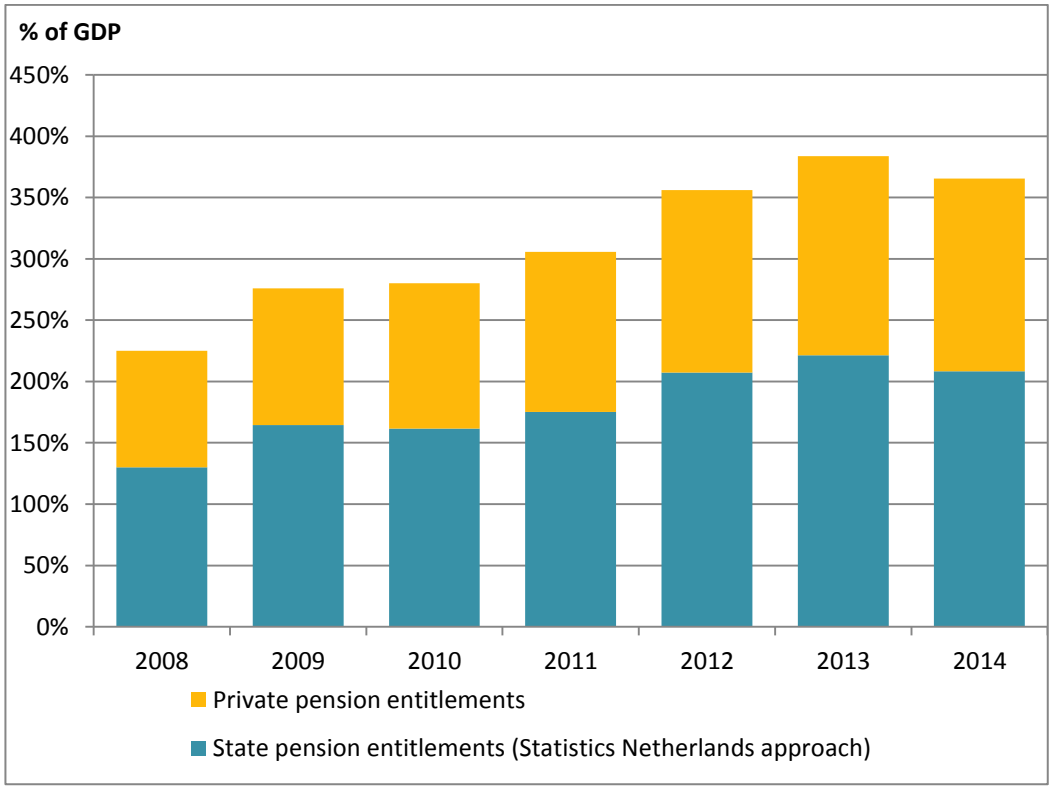

Figure 14: Pension entitlements as a percentage of GDP

Figure 14 shows that the relative importance of the private and public schemes remains rather stable over time. This is due to the approach taken by Statistics Netherlands to estimate the unfunded government pension entitlements, more specifically, due to the discount rates used. The Eurostat approach leads to a less fluctuating estimate for the pension entitlements, but a more fluctuating relative importance to the private pension entitlements.

5. Summary and conclusions

The supplementary pension table is developed to increase comparability of pension schemes between countries. These differences are rather large as Van der Wal (2014) shows. Pension funds in the Netherlands mainly consist of DB schemes, but this is different for other countries, France being the other end of the spectrum with almost only DC pension schemes. Also, the inclusion of the unfunded public pension schemes helps to improve this comparability. Müller, Raffelhüschen and Weddige (2009) show that there are large differences between EU-countries, and the supplementary pension table highlights these differences.

The specific Dutch situation with industry-wide pension funds managed by organisations for employers and employees forced us to interpret ESA 2010 for the Dutch situation. The balancing item (positive or negative) is interpreted as a supplement of the actual premiums to the actuarial premiums at the expense of the pension fund buffers.

The estimated liabilities of the government are of great importance to the wealth of households, using our method the importance is even larger than that of the funded pension schemes. The concept "liability" does not represent debt in the strict sense, since it does not come out a previous borrowing which has to be repaid. It is merely regarded as outstanding obligation implied by current pension rules and legislation. When one considers the case of unfunded pensions which are the responsibility of government, these obligations have to be met out of future governmental income. It goes without saying that pension legislation can be changed. The resulting net present value of the public pension scheme should be considered as the costs for the government of terminating this unfunded scheme, without defaulting on any of the accrued entitlements.

The results should be considered with care however; as shown throughout this paper, the size of these pension liabilities greatly depends on the choice of the discount rate. The proposed discount rate by Eurostat aims to smooth the fluctuations of the estimates over time, and to harmonize the construction of the table between the countries. Both arguments for the proposed discount rate are debated in this paper, and an alternative is offered. For the funded pension entitlements (which are already part of the core national accounts) the dependence of the discount rate was already known. For the unfunded pension entitlements we take a similar approach, different from the one proposed by Eurostat. This deviation results in large differences when the alternative discount rate starts deviating from the proposed fixed real discount rate of Eurostat. In 2008 both discount rates are similar, but since then they grew apart, resulting in estimates for the AOW entitlements in 2012 that are more than 400 billion euros apart. The approach taken by Statistics Netherlands leads to fluctuating estimates over the years, but comparable to those of the private pension entitlements; the relative importance of these two schemes is stable because of this approach, which strengthens our preference. Apart from the discount rate, the model will also be sensitive to the other parameters used. In our current model we use the life expectancy as published by Statistics Netherlands. This can differ from the life expectancy published, and suggested, by Eurostat. For the moment only the life expectancy of Statistics Netherlands is considered, but these differences are probably less influential for the resulting pension entitlements than the different discount rates.

Despite these considerations, taking this estimate into account in economic analysis improves the overview of the liabilities of the government, and the pension wealth held by household. As

depicted in the pension table and the figure in the introduction, the unfunded pensions account for 54% of the total pension wealth of households, the second pillar accounts for another 40%, and the third pillar, that is not further discussed in this paper, for the remaining 6%.

Households do not only hold their wealth in cash or in non-financial assets (dwellings), which is currently the scope of the SNA, but also in social contracts. This issue relates closely to the debate of wealth in the national accounts, when the inclusion of other forms of wealth is discussed. Human capital is one form of wealth currently outside the scope of the SNA, but, in the respect of this paper, foremost the notion of transfer wealth by, among others, Lee (1994) is fairly similar to the estimates produced here for the unfunded pension entitlements. All social insurance schemes depend on a PAYGO system, not only the state pension scheme, but, for example, also the unemployment and disability benefits. When a complete picture of the government liabilities is desired, not only because of previous borrowing, but also as a results of existing social contracts, all these social security schemes should be recorded in a similar way as the pension obligations presented in this paper.

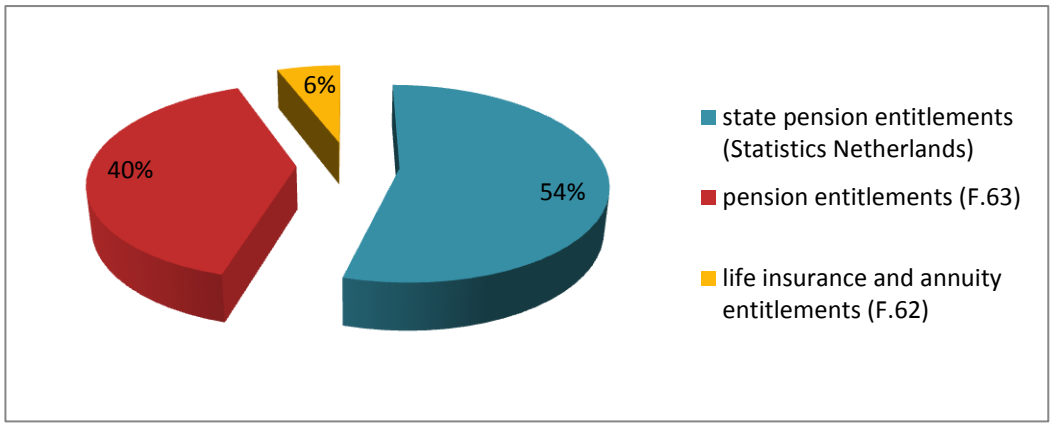

Figure 15: share of the three pillars of pension wealth in the national accounts (opening balance sheet of 2013)

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7. Appendix A: Glossary

ESA – European System of Accounts. ESA was revised in 2010 and is based on SNA 2008, the system of national accounts set up by the United Nations. The previous ESA revision was in 1995. Statistics Netherlands follows the accounting rules of ESA 2010 to compile national accounts for the Netherlands.

Not in the standard accounts: Table 29 The supplementary table on pensions is divided in two main parts: pensions reported in the standard national accounts and those not reported for the standard national accounts. Pensions already reported in the standard national accounts can be found in the pension reserves in the financial balance sheets (**funded schemes**) and in all the related transactions in the current accounts. The second part of T29 concerns the pension schemes not yet (fully) reported in the national accounts. No pension entitlements are reported in the balance sheets and usually only the benefits are reported in standard current accounts. The pension schemes concerned are social insurance schemes and pay-as-you-go schemes (PAYGO).

The pillar system is used to categorize the whole system of pension arrangements in a country. Usually the pension building is divided in three pillars. The first pillar is for social security pension arrangements; the second pillar is reserved for employment related pension arrangements and the third pillar concerns the voluntary personal pension arrangements. This building is sometimes extended with pillars for saving accounts, own housing and the like.

A **pension** is interpreted as a benefit (mostly a periodic payment, sometimes a single payment with the obligation to buy a periodic payment) based upon an employment-related arrangement in this article. In a broader sense the pension concept could be extended to other income supplement arrangements, like for disability or for unemployment. Employment related pension arrangements can be divided in three broad categories with many variations inside these categories: defined benefit, defined contribution and pay-as-you-go schemes.
Defined benefit (DB) is a category of pension arrangements where the pension benefits are calculated using an actuarial formula. Various risks (investment risks, actuarial risks) are shared with all other participants. The pension reserves comprise the discounted value of future benefits.
Defined contribution (DC) pension arrangements are pension schemes where the contribution is known but where the benefits depends solely on the individually paid contributions and the investments return earned with the invested contributions. In a pure DC arrangement no risks are shared with other participants. The scheme has characteristics of a personal investment/savings account and so has the pension reserve.
In this paper the term pension is also used for state funded pension benefits.

Pay-as-you-go schemes (**PAYGO**) are schemes where the benefits are paid directly by the employer to the employee as employee costs. No contributions are paid by the employee. Early retirement schemes where the benefits are paid with the contributions received are also PAYG-schemes.

Social insurance schemes are schemes where the benefits are paid with the contributions received in that year. No relation exists between the contributions paid by an employee and the benefits received by another employee.

Pension schemes involve many parties, with different roles in the economic process. In the Netherlands, the roles as defined by ESA2010 cannot be uniquely assigned to the parties, because there can be an overlap in the roles.
The **pension manager** is the party that determines the settings of the pension schemes. The pension manager determines how much premiums are to be paid, how high the benefits will be, and the investment policy. The pension manager also decides how certain parts of the arrangement will be executed (for instance outsourcing or not). Usually the pension manager in the Netherlands is responsible for any shortage of the scheme.
The **sponsor/employer** is the party that took the initiative to settle a pension scheme and that is responsible for paying contributions. In some situations in the Netherlands the employer is also responsible for supplementing shortages of the scheme.
The **pension administrator** just executes the arrangements made by employers, employees and pension manager. The pension administrator can be seen as the counterpart in an outsourcing process.
The **participant** is the person (employee) that is entitled to a pension benefit in the future.

The **discount rate** is used to convert amounts to be paid in future in today's euros. The discount rate pension funds have to use is an interest rate term structure that tends more and more to the UFR for durations longer than 20 years.
The **interest rate term structure** is a series risk-free interest rates for a series of different durations.
Ultimate Forward Rate (UFR) is the interest rate for very long durations, which is set at 4,2% for the Euro Area. This is ultimately the upper bound of the interest rate term structure.

Explanation of symbols

.	Data not available
*	Provisional figure
**	Revised provisional figure (but not definite)
x	Publication prohibited (confidential figure)
–	Nil
–	(Between two figures) inclusive
0 (0.0)	Less than half of unit concerned
empty cell	Not applicable
2014–2015	2014 to 2015 inclusive
2014/2015	Average for 2014 to 2015 inclusive
2014/'15	Crop year, financial year, school year, etc., beginning in 2014 and ending in 2015
2012/'13–2014/'15	Crop year, financial year, etc., 2012/'13 to 2014/'15 inclusive

Due to rounding, some totals may not correspond to the sum of the separate figures.

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