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* Views expressed are those of the author and do not necessarily reflect official positions of De Nederlandsche Bank.

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**The measurement of international pension obligations –
Have we harmonised enough?**

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Abstract

In the domain of pension statistics comparability of pension entitlements across countries improved substantially due to new SNA/ESA recommendations. In the near future, inclusion of unfunded employment related pension schemes in the core accounts or in the supplementary table on pensions will become the standard. This paper analyses pension entitlements for twelve OECD-countries according to the new compilation standards. In spite of constructive European harmonisation efforts, the paper identifies a number of measurement differences that may hamper a fair comparison of pension liabilities.

Keywords: pensions, pension entitlements, discount rate, national accounts, defined benefit, funding, fair value, public sector pensions, actuarial evaluation

JEL classification: G23: Non-bank Financial Institutions
 H55: Social Security and Public Pensions
 H75: Public Pensions

1 Introduction

Nowadays, many countries are confronted with an aging population. These changing demographic conditions raise challenges to ensure long-term adequacy of retirement benefits. It also raises questions on the sustainability of future public expenditures on pensions. These issues do not only concern future pension obligations of governments but may also be valid for private or personal pension schemes. In this respect it should be pointed out that pension systems can differ significantly across OECD countries.

This paper investigates how pension liabilities in the OECD area are reflected in published data on the OECD's website. The analysis is limited to international datasets as sent by the countries to the OECD. In comparing countries a number of differences come to the surface in relation to the statistical recording of pension liabilities. Divergences may be related to different national recording practices when interpreting and implementing the prescriptions laid down in the statistical handbooks. In addition, diverging recording practices may be the result of variations between national pension systems and internal accounting rules. The impact of these variations are investigated.

The current international standards for the compilation of national accounts, the System of National Accounts (SNA) 1993, and its European equivalent, the European System of Accounts (ESA) 1995 only recognise pension liabilities to beneficiaries for private schemes that are funded, i.e. schemes that have accumulated funds for the payment of future pension benefits.¹ Only pension provisions that accumulate such *funds* or *reserves* represent holdings belonging to households. All other contingent or future liabilities in social security schemes, even when funded, or in private unfunded schemes are neither treated as household assets nor as liabilities of those schemes. To correct this incomplete coverage of employment related pensions, the recently revised standards, the 2008 SNA and the ESA2010, now recognise pension liabilities in core national accounts from all employment-related pension schemes to households, whether funded or not. Although social security pensions are not recognised as pension entitlements of households in the core accounts, they have to be included in a supplementary table. This table would then show a comprehensive picture of all social insurance pensions, and could be of great help to identify the total amount of pension liabilities. It will also improve the international comparability of national statistics on pensions. On the other hand, also the new standards still have a number of shortcomings which will be further elaborated upon.

¹ The term private here may cause some confusion as it means not only funded and unfunded pension arrangements by private sector companies (including pension funds and insurers) but also schemes operated by the government as an employer.

The next section focuses on current datasets on pension liabilities in some OECD countries. Section 3 compares pension obligations across OECD countries. Section 4 discusses the role of the supplementary table on pensions in harmonising pension liabilities. Finally, section 5 concludes.

2 Current datasets on pension liabilities

The OECD maintains three international databases in the pension domain, as follows:

i. National Accounts: Data on pension liabilities can be found on the liabilities side (LI) of the (financial) Balance Sheets of institutional sectors that recognise pension obligations, such as pension funds and insurance companies (S.125).² Alternatively, one can find data representing entitlements to future pension benefits on the assets side (AS) of the sector households. For our purpose we are interested in the category AF.612, i.e. Net equity of households in pension funds.

ii. Household Assets & liabilities (HAL): This database presents a detailed picture of financial and non-financial assets and liabilities of households. As such, it includes a more detailed classification of financial instruments, including investment funds shares, net equity in life insurance and in pensions, several types of loans, consumer credit. Net equity of households in pension funds, as included in the National Accounts dataset, is also represented (AF.612).

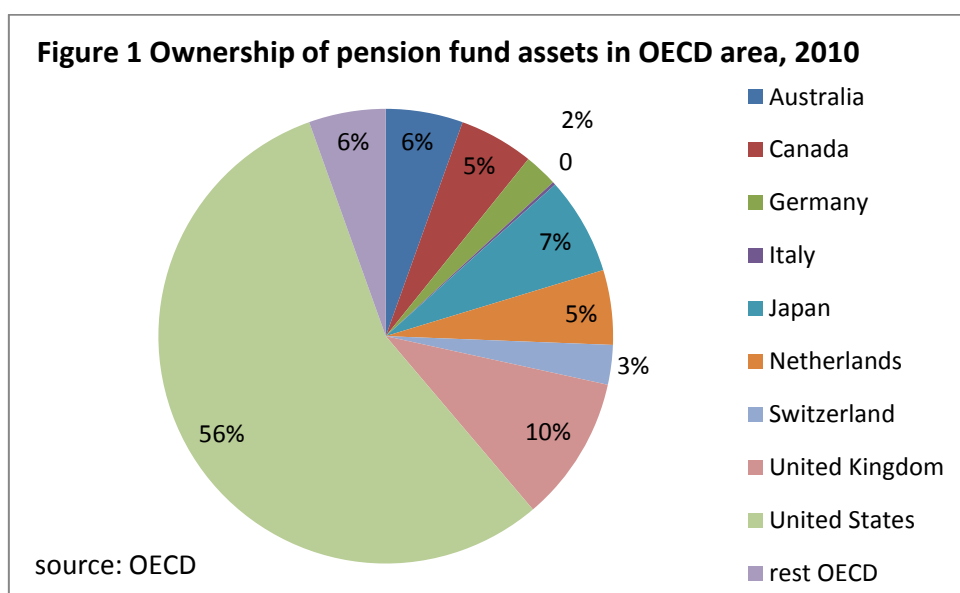
iii. Funded Pension Statistics: This dataset includes pension funds statistics, classified by type of pension plan (occupational and personal, mandatory and voluntary) and by type of pension fund (funded pensions, book reserved pension plans, pension insurance contracts, investment companies and bank managed funds). The pension plans are also classified into defined benefit (DB) and defined contribution (DC). The dataset contains information on “Net technical provisions of pension funds”.

All databases are available on <http://stats.oecd.org>. All three databases contain annual data, while i. and iii. also provide quarterly data.

2.1 Data availability

This paper focuses on pension systems in some member states of the OECD (Australia, Canada, France, Germany, Italy, Japan, the Netherlands, Portugal, Spain, the United Kingdom, the United States and Switzerland). These countries make up 79% of GDP and 68% of population in the OECD area. In addition, six of these economies have funded pension schemes which together make up not less than 89% of all pension funds’ assets in the OECD area (see figure 1).

² In principle all sectors may have pension obligations; in the cases of funded non-autonomous schemes, see Annex 1.



In table 1 the availability of data in the OECD datasets on pensions is presented in qualitative terms.

Table 1 Availability of 2011 data on pension liabilities/entitlements

	NA/FBS; AF612 LI	FPS; Net technical provisions	NA/FBS; AF612 AS	HH A&L; AF612
Australia	x	x	x	x
Canada 2)				
France 2)	x	x	x	
Germany				x
Italy 1)	x	x	x	
Japan	x		x	x
Netherlands	x	x	x	x
Portugal	x		x	x
Spain	x		x	x
Switzerland		x	x	x
UK 3)	(x)		(x)	
US	x		x	x

1) HAL: 2009 data.

2) HAL: 2010 data

3) Relevant data have been merged within AF.61.

In order to choose one indicator of pension liabilities as a starting point for international comparison, the table shows that most countries publish household pension assets in the NA-dataset (third column).

However, Canada and Germany do not have data here, while they do include estimates in HAL (although

Canada only for 2010, just as France). Furthermore, the UK does not publish data on AF.612, but merges this within AF.61. Taking HAL as a basis makes that pension obligations of eleven of twelve countries can be analysed.

2.2 Pension entitlements: a static view

As far as the *liabilities* are concerned, there is no database where all pension liabilities are published for all countries. Not all countries report estimates for AF.612 on the liabilities side. For instance, Canada does not publish net equity on pension funds separately but includes this in a broader aggregate AF.6 (Insurance, pension and standardized guarantee schemes). This concept includes also net equity in (individual) life insurance and prepayment of premiums. Australia on the other hand reports its data to the OECD but the Australian Bureau of Statistics publishes on its own website AF.6 (insurance technical reserves). The United Kingdom does not yet report any separate data on pension obligations, but merges them with net equity of households in life insurance reserves within AF.61.

On the *assets* side most countries provide data to the OECD on AF.612; Italy's data for the database HAL over 2010 and 2011 still have to be published. As noted above, the United Kingdom does not report any data on pension entitlements of households. Figure 2 brings together pension entitlements of households according to the indicator HAL for which most countries publish data.

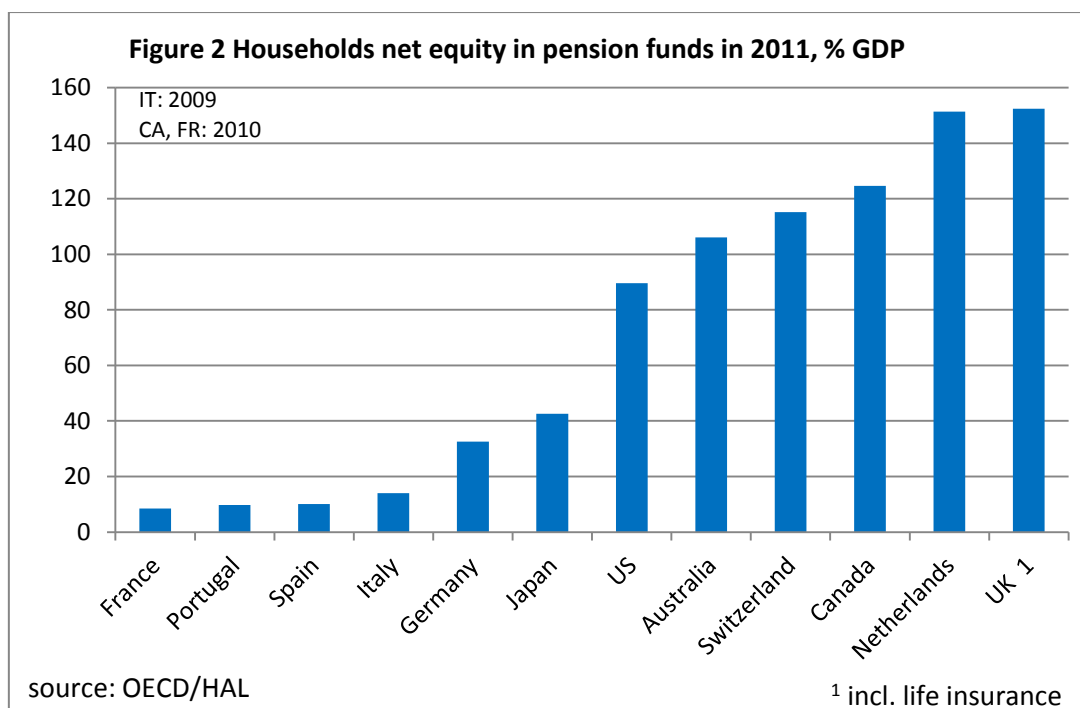
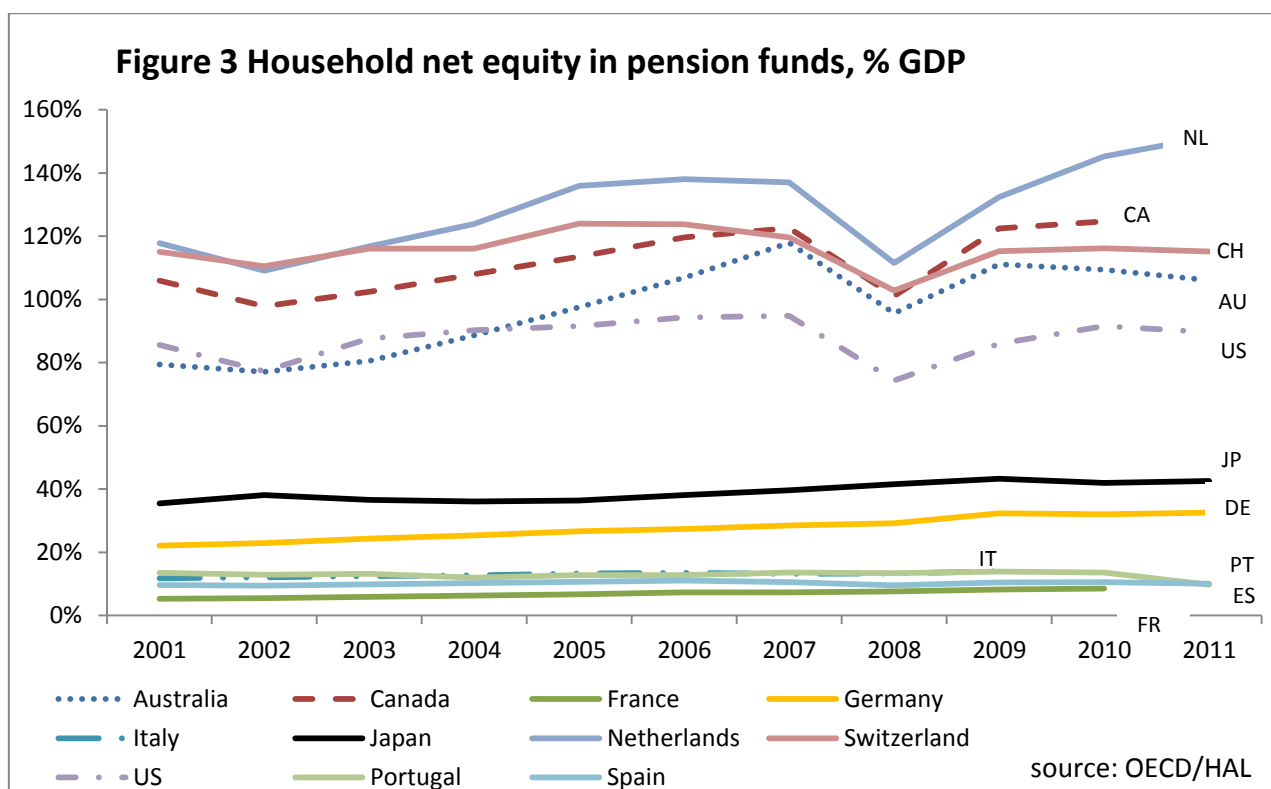


Figure 2 shows that there are considerable differences across countries. A distinction can be made between two groups of countries, one with relatively low shares of net equity holdings, and another one with relatively high shares. In the first group (France, Portugal, Spain, Italy, Germany, Japan) the net equity to

GDP ratio ranges from 9% in France to 43% in Japan. The second group of countries includes the US households owning pension equity in the range of 90% of GDP. It also includes Australia, Switzerland, the Netherlands, Canada and the United Kingdom (where the ratio of pension entitlements to GDP is as large as 152%). Section 3 will clarify the data of the United Kingdom on pension liabilities.

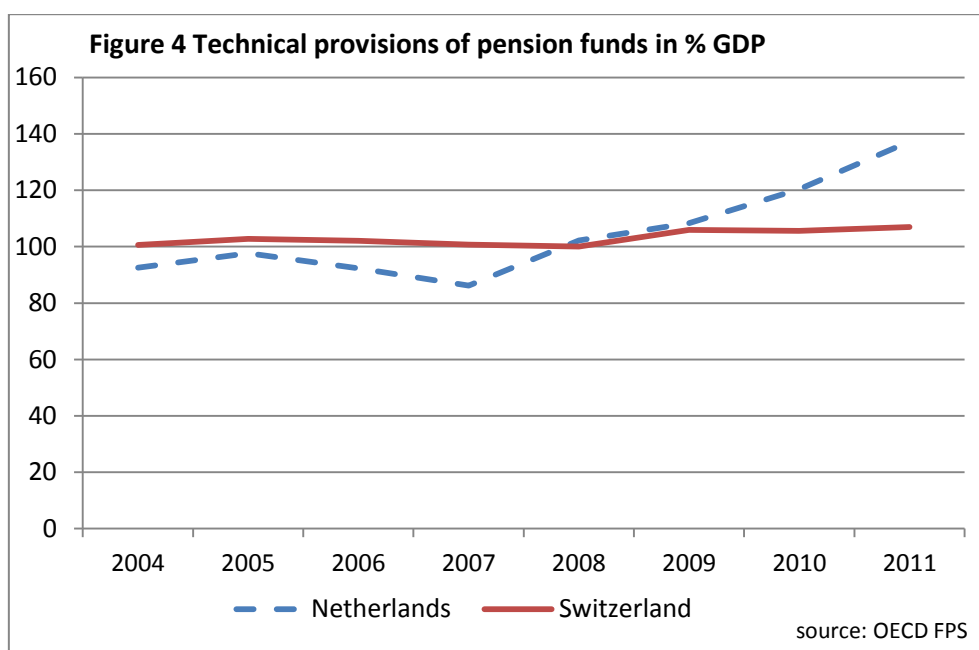
2.3 Pension entitlements in a dynamic perspective

Also in a dynamic perspective pension entitlements in the two groups of countries are different (figure 3). Most of the countries in the second group show an upward trend until 2008. In that year, however, there is a sharp decline in the value of pension liabilities to households. For countries that rely (partly) on defined contribution (DC) pension systems (UK, US, Australia) this could be due to the stock market decline as a result of the economic and financial crisis that started with the collapse of Lehmann Brothers. As is well known, DC systems do not guarantee the amounts they will pay out in future. Instead, the results depend on the contributions made and the market returns on the invested funds.



For other countries that predominantly have defined benefit (DB) schemes (Canada, Netherlands, Switzerland), the sharp dip is slightly puzzling, at least at first sight. DB schemes more or less guarantee pension entitlements to participants, largely irrespective of financial market returns; the relevant pension entitlements mainly depend on the (average) compensation of employees and the number of years that one

is participating in the scheme. Therefore, this may create some doubts whether the aforementioned countries really calculated and disseminated an independent estimate of the liabilities of the pension funds. In this respect, the contrasting development of net technical provisions according to actuarial based data stemming from supervisors in e.g. the Netherlands and in Switzerland may underpin these doubts: both indicators for liabilities are not showing any dip during the stock market decline in 2008 (figure 4). Further inquiries for the Netherlands indeed showed that the data on liabilities, as derived from Household Assets and Liabilities have been equalized to the amount of invested funds.³ For Switzerland the same applies, as the pension funds' balance sheet total has been used.⁴



3 Comparing pension obligations across OECD countries

This section will highlight at least four reasons for differences in the ratio of pension entitlements and GDP. These will explain to some extent the variation shown in figure 2.

³ With the data 2010 revision due to ESA 2010 Dutch pension liabilities will be derived from reported obligations of pension funds to households instead of financial assets of the funds.

⁴ From 2014 Switzerland will use actuarial valuation of pension fund liabilities as this is required by ESA2010.

3.1 Funded versus unfunded systems

The distinction between two groups of countries reflects a very important institutional difference, i.e. whether or not the pension schemes are funded. This has a substantial statistical impact. The countries in the first group have a large first-pillar-state pension in common. They have PAYG schemes without accumulated assets, and the contingent liabilities of these PAYG schemes are not recorded. The countries in the second group have to a large extent funded pension systems; past contributions in excess of past benefit payments have been saved and accumulated into asset portfolios of pension funds. Together with property income and holding gains arising from these investments, a large stock of earmarked financial assets has been created. The second pillar is very important in the pension provisions of these countries.⁵ As only the funded liabilities are to be recorded according to the 1993 SNA, only these entitlements show up in statistics.

3.2 Discrepancy in national recording practices

Secondly, there may also be quite divergent recording practices across countries. The *United Kingdom* statistical authorities do not publish separate data on pension obligations as we have seen before (table 1). In fact, the data in figure 2 reflect not only net equity in pension funds but also net equity in (individual) life insurance. Only for this broader aggregate (SNA93: AF.61) official data are also available. Up to now, the United Kingdom has not made a split between the two items. Traditionally, the British private sector is very large and insurance companies are playing a major role in pension provision. Insurance companies not only manage investments for their own risk, but also manage (individual) life insurance contracts. In addition, they take care of assets (and the relevant liabilities) of employment related pensions and of so-called self-administrated workplace pensions and trustee funds. Although an official estimate of separate pension liabilities is not possible now, the Office of National Statistics (ONS) assumes that the majority of the liabilities falling under AF.61 are in the field of (collective) pension arrangements.⁶ As a consequence, one can argue that the United Kingdom pension entitlements are substantial. However, it should be noted that the estimates for the pension entitlements to GDP ratio is overestimated due to inclusion of entitlements related to (individual) life insurance.

Germany includes reserves related to health insurance. These are non-pension social insurance benefits. They amount to about 7% of GDP. Such reserves are an institutional feature of the German pension system and they rarely occur in other countries. SNA suggests including them only for pragmatic reasons in pension entitlements.⁷

⁵ Although Canada's first pillar is funded as well, these funds are owned by the government and are therefore not included in the data on net equity of households.

⁶ Levy (2011).

⁷ SNA 2008, par. 17.114.

Within the group of countries with funded pension systems, the relevant data cover more differences in national practices.

In *Australia* government employees are covered by DB schemes. For a major part, these schemes are unfunded. According to SNA 1993, unfunded employer pension liabilities should not be recorded. However, Australia has estimated these liabilities and they amount to 18% of GDP (end 2010). They are published under obligations of the sector general government S.13, and are also included in the net equity of households in pension funds (AF.612). On its website, the Australian Bureau of Statistics notes that since January 2011 the financial accounts are based on SNA 2008 (where unfunded government employer pension liabilities indeed should be recognised in the core national accounts).⁸

Canada presents another example of divergent recording practice. The Canadian government sector operates DB pension plans that may be partially funded or unfunded. But since 2000 Canadian national accounts include a full actuarial treatment of those liabilities. The value of the government unfunded obligations amounts to 14% of GDP (end 2010), and has been recorded in the Canadian national accounts as liabilities of the general government sector, and as financial assets of households. This recording practice is not required by SNA 1993 where only funded liabilities have to be recorded. For a number of reasons, however, Canada prefers to express the recognition of the unfunded part of government liabilities.⁹

Moreover, Statistics Canada has included some other items in household financial assets in HAL (AF.612). One component of this is ‘other pension plans’ (see AF.6124). Canada records here ‘deposits accepting financial intermediaries’ liabilities to the household sector’, ‘investment funds liabilities to the household sector’ and ‘other individual registered savings plans’ (all of which are tax-sheltered). These three components – part of pillar three personal pension plans - of household financial assets are included in the Canadian ratio of pension entitlements to GDP in figure 2. It’s not entirely clear how these assets/liabilities should be recorded according to SNA 1993. However, as these instruments do not seem to involve an insurance aspect, one could argue that they are to be recorded under the relevant financial instruments (e.g. savings deposits).

In summary, recording practices across countries differ, as some countries (Australia, Canada) include unfunded or partially funded government employment related liabilities, while other countries (France, United Kingdom¹⁰) do not. In addition, British households have substantial net equity in pension schemes. They are statistically mixed with net equity in (individual) life insurance schemes. Further, Canada takes some pillar three personal pension plans on board, while other countries (The Netherlands, United States,

⁸ As some of these entitlements may be arranged via social security, flexibility in recording is allowed.

⁹ Tomas (2010).

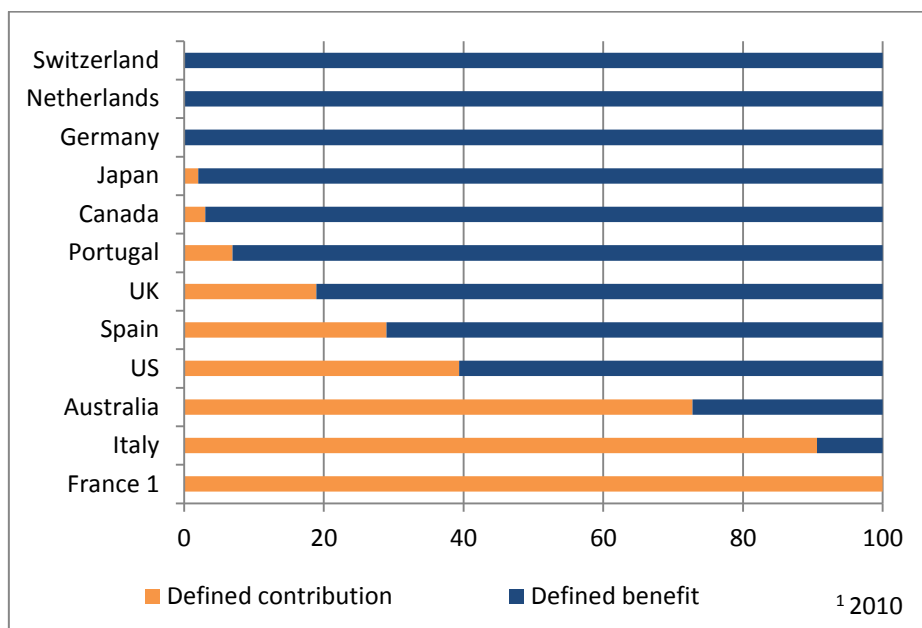
¹⁰ Most public sector pension liabilities in the United Kingdom are unfunded.

Switzerland) do not. Moreover, The Netherlands and Switzerland disseminate pension funds' balance sheet totals instead of liabilities (par. 2.3). Finally, Germany includes some non-pension related reserves in the pension entitlements of households.

3.3 Varying pension formulas: DB versus DC

Another difference in the measurement of pension liabilities is that funded employment related pension schemes in various countries differ in their definition of pension benefits. Countries with accumulated assets for retirement do not use the same pension formula. Some rely mainly on DB types (The Netherlands), others have both DB and DC systems in place (Unites States). Also, some economies only rely on DC occupational schemes (France).¹¹ Figure 5 presents an overview of the various schemes, as derived from the OECD Global pension statistics.

Figure 5 Relative shares of DB and DC pension funds' assets (occupational plans), 2011, %



Source: OECD Global pension statistics (2011); national statistics

The shares of DC and DB pension assets may have far-reaching implications. First, the measurement of pension liabilities in DC schemes is quite straightforward. DC plans follow the market value of the underlying invested assets. And because in most countries pension providers apply fair value pricing, there will be less variation in valuation methods across DC pension schemes, and DC pension liabilities can be

¹¹ Of course, the high DC share in e.g. Italy (91%) represents still a very small percentage of its GDP.

compared across countries. Such schemes play an important role, for example, in Australia and to some extent in the United States.

Other countries without a tradition of DC schemes rely heavily on DB pension arrangements (Canada, Netherlands, Portugal, Switzerland, United Kingdom). More than 80% of employment related pension funds' assets in these countries are of the DB type. Pension liabilities in DB schemes are measured quite differently: benefits do not depend on investment returns but are set according to a formula that depends among others on earnings, age and career length. Because in DB schemes under- or overfunding is the rule rather than the exception, pension entitlements will not coincide with market value of funds' assets. This implies that within the group of countries with funded pension schemes, disparity in the composition of DB and DC elements might lead to sizable differences in measuring liabilities. In general, different pension formulas will generate divergent measurements of pension plans. Therefore, international comparison of these pension obligations needs to be considered with special care.

3.4 Discounting DB pension liabilities: variation in discount rates

The fourth source of variation in measuring pension obligations stems from the fact that DB schemes in OECD-countries do not use the same type of discount rate to arrive at the current value of future retirement benefits. Basically, two methods are used in practice when setting discount rates:

- (1) actuarial method
- (2) fair value method

The first method fixes a pre-set expected rate of return on assets. This is motivated by the long-term orientation of pension funds.¹² Funds face a very long investment horizon, e.g. 60 years. In this period they could earn above-average returns in good times which would compensate for meagre years with low or even negative returns. This view has traditionally been taken by the actuarial profession. The method usually takes into account the rates of return that have been realised in the past.¹³ For a long time pension liabilities had been valued using a fixed discount rate, based on an assessment of the long-term earning capacity of the assets held.¹⁴ For instance, in the Netherlands a constant actuarial rate of 4% had been used until 2007.

However, this view has recently been criticised by economists.¹⁵ They hold the view that an actuarial rate will only fully fund the scheme's liabilities if the assets indeed generate the expected yield in the next ten

¹² Ponds et al. (2011).

¹³ The US stock market e.g. had an average rate of return of 4.4% from 1927-2008, Novy-Marx & Rauh (2009).

¹⁴ Ponds et al. (2011).

¹⁵ Novy-Marx & Rauh (2009), Biggs (2012a), Bodie (2012).

or twenty years. The actuarial view ignores that the funds' chosen asset allocation might result in different outcomes, including very bad outcomes. Bad outcomes may not be consistent with the highly certain nature of DB pension benefits. Therefore, in this view, which is founded in standard finance theory, future streams of payments should be discounted at a rate that reflects their risk.¹⁶ A case can be made that DB pension promises appear almost risk-free; this may be true in case the public sector is providing these schemes (like in the United States, the United Kingdom or in Canada) which refer to accrued pension rights that workers have already earned. Consequently, if pension payments are quite certain to be made in the future, then the discount rate used should be a risk-free interest rate reflecting current market rates, like Treasury bills or interest rate swap rates. In this way one enjoys the comfort that investments prevailing today will yield at least the same return, so as to guarantee the payment of future pension obligations. Even if the pension promise is less certain, it is argued that the use of current market-determined interest rates is still the preferred option, as current rates *can* be earned which is not necessarily the case with assumed rates. For this reason, the second method is also called the fair value method. It reflects the emergence of fair value accounting and mark-to-market valuation principles in the nineties of the last century.¹⁷ The fair value method has been founded in US GAAP and IFRS accounting rules for private sector companies.

Table 2 shows the variation in the use of discount rates across countries. It relates to countries that provide DB funded schemes. PAYG-schemes are not included, because at present they often do not disclose liabilities nor do they apply a discount rate. The sources for this table are mainly based on detailed reports available on the internet. It should be pointed out that public sector schemes do not always make clear which actuarial assumptions on discount rates are applied. Most certainly, it is less clear than in the case of *private sector* DB pension schemes, which typically use standardised fair value accounting assumptions. Table 2 also shows that when the government sector is ultimately responsible for the operation of the pension schemes the actuarial method is typically applied. In all countries, this method is based on the expected return on assets that investment managers of these funds hope to achieve in the long run.

¹⁶ Novy-Marx & Rauh (2009).

¹⁷ Ponds et al. (2011).

Table 2 Discount rates used to calculate funded DB pension plans' liabilities

	Public sector scheme		Private sector scheme	
	Reference rate	Rate 2012	Reference rate	Rate 2012
Australia	<i>Actuarial method:</i> expected return on government bonds over the long term; different public entities however may use different rates	6%	<i>Fair-value method:</i> current, market-determined, risk-adjusted discount rates (in practice long term government bond rate at 30 June each year)	3.38
Canada	<i>Actuarial method:</i> expected return on government bonds over the long term plus mark-up	5–6½ % ²	<i>Fair-value method:</i> Federal high-quality debt instruments with cash flows that match both timing and amount expected of benefit payments (usually AA corporate bond yields)	4.78% ²
Switzerland	<i>Actuarial method:</i> average of expected return on stocks (2/3) and return on government bonds (1/3) minus 0.5% (technische Referenzzinssatz) ³	3.5%	<i>Actuarial method:</i> average of expected return on stocks (2/3) and return on government bonds (1/3) minus 0.5% (technische Referenzzinssatz) ³	3.5%
Netherlands	No public pension schemes ⁴	-	<i>Fair-value method:</i> interbank swap rates as proxy for risk free rate. Since September 2012 on the basis of 3 months average whereby for maturities > 20 years the Ultimate Forward Rate (4.2%) increasingly is taken into account.	2.38%
United Kingdom	<i>Actuarial method:</i> expected return on investments calculated as inflation rate (RPI) + approx. 3% on average	6.44% ⁵	<i>Fair-value method:</i> variable market discount rate based on high-quality corporate bond yields	4.8% ⁵
United States	<i>Actuarial method:</i> expected rate of return ¹	8%	<i>Fair-value method:</i> average of high-quality corporate bonds over past 25 years	6.5%

¹ US state and local governments DB pension plans. ² 2011 data. ³ The outcome must lie between 3.5 - 4.5%.

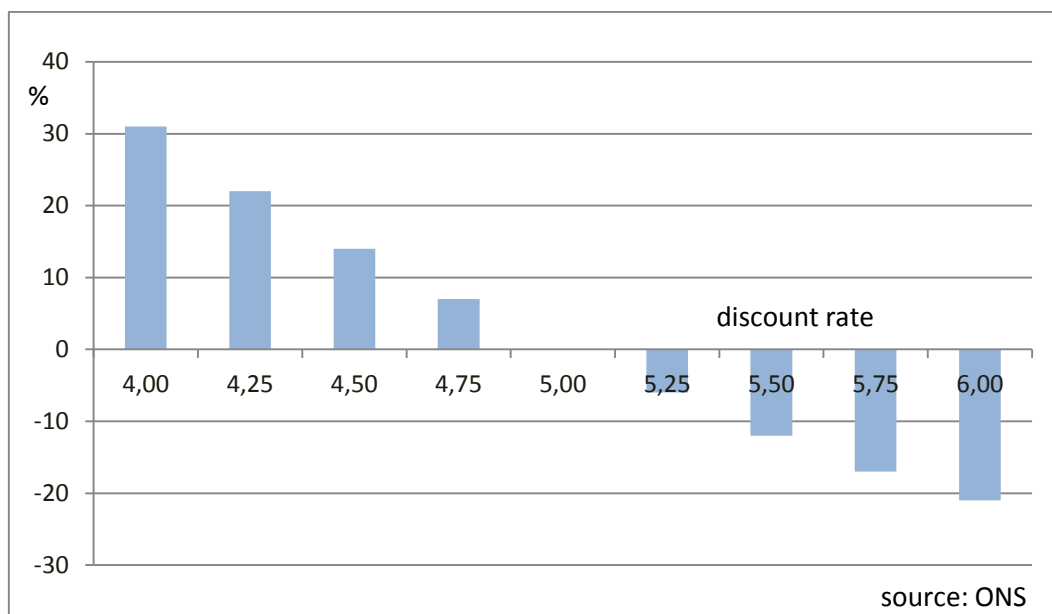
⁴ Due to privatisation of public sector employees' pension schemes in the 1990s funds' liabilities are now classified under private sector (financial institutions S.125). ⁵ Data refer to 2010. Public sector rates are based on scheme valuations of 34 London Local Government Pension Schemes. The average RPI-inflation in 2003-2012 was 3.3%.

Sources table 2: AUS: International accounting standard, AASB 119; Bateman & Piggott (2011); Deloitte (2010); Fong, Piggott & Sherris (2012); Australian Government, the Department of Finance and Deregulation (2012); OECD/DAF information. CAN: Biggs (2012); Ontario Teachers' Pension Plan; Pension plan for the public service of Canada (Aon Hewitt); C.D. Howe Institute; Canadian Institute of Actuaries. CHE: Bundesrates (2011). NLD: De Nederlandsche Bank. UK: London local Government Pension Scheme (data 2011); Independent Public Service Pensions Commission (Hutton report (2010)). USA: Novy-Marx & Rauh (2009); Biggs (2012). National regulators on pension funds.

It is clear from table 2 that discount rates differ across countries. In this respect, it should also be noted that discount rates do not need to be the same for all economies. National inflation rates will vary across countries. Moreover, variations in discount rates may reflect different investment strategies and market views. Pension schemes have varying asset allocations which may affect the discount rates as a proxy for expected returns. In addition, member age profiles (does the scheme has younger or older members?) and life expectancy differ between countries.

What catches the eye in table 2 is that *private sector* plans' discount rates are systematically lower than those in the *public sector* plans. This difference in accounting practise clearly has significant consequences. Lower discount rates used in DB pension plans typically increase the net present value of the future pension obligations. Even small changes in underlying assumptions as regards the discount rate will have a significant impact. To illustrate this, figure 6 shows the impact of varying discount rates on unfunded pension entitlements in British social security pension schemes.¹⁸

Figure 6 Relative change in UK state pension entitlements due to changes in discount rate



Starting from a discount rate of 5%, a 1%-point increase will lead to a 21% decline in pension entitlements. And a 1%-point decrease in the discount rate even adds 31% to pension entitlements. For some public sector retirement plans in Canada, the United Kingdom, the United States and Australia it has been found that liabilities seem to be understated because they use too high (assumed) discount rates.¹⁹

¹⁸ Levy (2012).

¹⁹ Ponds et al. (2011).

Especially for Canada and the United States the extent of underfunding has been well documented.²⁰ More generally, it is clear that, to some extent, *public sector* pension funds operate under national laws and a special regulatory framework. They do not have to comply with agreed accounting rules for private business like the International Accounting Standards (IAS) 19. In some countries individual public funds are quite autonomous in their pension accounting practice.²¹

In summary, one can conclude that in OECD-countries a large variety in discount rates exists between funded *public sector* DB schemes and funded *private sector* DB schemes. Public sector schemes tend to use higher rates and consequently underestimate liabilities. International statistics currently simply combines them, thereby masking underlying valuation differences, making it harder to compare pension liabilities internationally.

4. The role of the supplementary table to harmonise pension liabilities

According to Eurostat, the supplementary table on pensions (SToP) “aims to give an overview of pension obligations vis-à-vis households covering all pension schemes in social insurance”.²² It tries to correct the incomplete coverage of pension entitlements in SNA 1993. This table supplements employment related pension claims (private, public, funded and non-funded) with future pension obligations in social security. SNA 2008 permits some flexibility in recording unfunded government employer pension schemes that are difficult to distinguish from social security retirement schemes. Some of these entitlements will be recorded in the core national accounts (and will flow from there in the supplementary table), other obligations will only be visible in SToP.²³ In this way, the SToP provides a comprehensive analysis of all social insurance pensions.²⁴

4.1 SToP included in transmission programme ESA 2010

The supplementary table in SNA 2008 (table 17.10, annex 2)²⁵ is also part of the ESA 2010 transmission programme (table 29) and is compulsory for EU-countries. Every 3 years it has to be compiled, for the first time at the end of 2017, for data related to 2015. To arrive at estimates of future liabilities of (un)funded

²⁰ Novy-Marx & Rauh (2009), Laurin & Robson (2009), Biggs (2012a).

²¹ Vanderwal (2013).

²² Eurostat/ECB (2011), p. 15.

²³ SNA provides some criteria on whether to record such schemes only in SToP or in both. Also countries have to motivate their recording decisions (SNA 2008, p. 369).

²⁴ Pillar 3 personal pension plans and social assistance by government are excluded.

²⁵ <http://unstats.un.org/unsd/nationalaccount/docs/SNA2008.pdf> , p. 370.

government employer DB pension plans and of social security PAYG-schemes, an actuarial model based on a net present value approach is needed. This model measures pension entitlements that are accrued by current workers and contains also the remaining pension entitlements of current pensioners.²⁶ This model needs assumptions on, among others, life expectancy projections, future wage growth and the discount rate. ESA 2010 prescribes an expected risk-free rate of return on assets to be applied as discount rate. It should be based on an average over several years to smooth the time series. The reference rate should relate to high quality government and corporate bonds (AAA-rating).²⁷ In 2011, Eurostat and the ECB developed a Technical Compilation Guide (TCG).²⁸ This guide provides further clarifications to ESA 2010 and aims to support EU countries in compiling data for the SToP. To promote international comparison in pension schemes' liabilities, the TCG recommends some harmonised assumptions for all EU-countries:

1. Wage-growth: because the future level of pensions in a DB scheme will be affected by, among others, members' salaries, assumptions on future wages are needed. The TCG recommends a wage growth (promotions or general wage increase) where pensions/entitlements are indexed according to current indexation rules. This approach is known as Projected Benefit Obligations (PBO).²⁹

2. Discount rate: for government managed DB pension schemes the discount rate should be based on central government debt securities with the following features:

- high quality government bonds of a basket of several European countries to obtain a proxy for a risk-free rate;
- long maturities, i.e. at least 10 years;
- to be used for all government managed pension plans (including social security schemes);
- stable rate to avoid 'noise' from frequent changes;
- should be reviewed regularly because of uncertainty about future rate developments.

Surprisingly, the TCG goes even further and recommends that the same discount rate should be applied to all EU-countries. Preferably the Guide advises a rate of 3% in real terms and 5% in nominal terms, the difference being in line with the ECB's medium-term inflation objective of a stable inflation rate of 2%. This specific discount rate is based on an historical average of 10 years government bonds in the eurozone and in Germany in 1999-2009.³⁰

3. Life expectancy: demographic assumptions based on the latest projections of Eurostat.

²⁶ Eurostat/ECB (2009), p. 16. This measurement concept is known as accrued-to-date liabilities (it reflects the accrued pension rights) and is applied in national accounts.

²⁷ ESA 2010 p. 420.

²⁸ http://www.ecb.europa.eu/pub/pdf/other/techn_comp_gd_pens_dt_nat_accts_201201en.pdf

²⁹ The other approach, Accumulated Benefit Obligations (ABO), rules out real wage increases.

³⁰ The TCG realises that the choice of the wage rate and the discount rate are related to each other.

As stated before, the choice of the discount rate is a key assumption because estimates of pension entitlements are very sensitive to even small changes. The recommendation of the TCG to use one, invariable, discount rate for all EU-countries' *public sector* pension schemes generates some problems. Firstly, one rate for all can be misleading if national inflation rates differ (as they do within the EU). Secondly, one constant rate seems to suggest that the actuarial method with expected (but perhaps not attainable) returns for discounting future pension obligations is applied, instead of the fair value method that uses current market prices. Thirdly, applying one rate for all assumes that the degree of certainty of future pensions in *public sector* DB pension plans across the EU is the same. In reality, however, DB pension schemes between EU-countries differ in the 'strength' of the pension promise. Some schemes specify strong promises, others contain soft entitlements. As a result, for countries with low inflation and strong nominal pension promises a discount rate of 5% will be too high, and for other economies it will be too low. This will result in underestimating pension liabilities in the first group and overestimating them in the second group of countries.³¹

4.2 Country supplementary table data already published

A number of countries have already compiled complete estimates and have published their pension entitlements in the context of the supplementary table. These data are not published in the regular OECD statistics. A Eurostat/ECB task force on pensions also produced first preliminary data for several European countries.³² The task force was assisted by experts from the Research Center for Generational Contracts of the Freiburg University. Using the 'Freiburg model', estimates for selected government sponsored pension schemes (including social security pension schemes) have been compiled, using harmonised assumptions for the measurement of pension entitlements. After the task force finished its empirical work in 2008, a number of countries continued this line of research (table 3). In compiling these estimates countries applied the accrued-to-date liability concept. The results are only indicative as in many cases they need to be further developed. In the upper section A pension entitlements for government employees' unfunded schemes are estimated. In the lower section B obligations for social security pension schemes are calculated.

As can be seen, entitlements using PBO are larger, as under this approach real wage growth is assumed. In the ABO approach pension entitlements only increase in accordance with future inflation. Diverging assumptions on the developments of real wages between countries can also be a source which may create problems for the international comparability of data.

³¹ It should be added that one discount rate serves a baseline scenario. Countries are invited to run a sensitivity test with several interest rates.

³² Eurostat/ECB (2008).

Table 3 Pension entitlements calculated by the Freiburg model

A

Pension entitlements for government employees unfunded schemes ¹

country	year	model	wage growth	pension entitlements in % GDP
Germany		2006 Freiburg ABO		41
		PBO		49
France	2006 Freiburg	ABO		50
		PBO		61
		National PBO		53
Netherlands ²	2006 Freiburg	ABO		4
		PBO		5
United Kingdom	2004-05 National	PBO		45
	2010 National	PBO ³		58
Australia	2010 National	?		18

¹ Standard scenario: real discount rate 3%; real wage growth 1.5%, inflation 2%.

² Pension entitlements of the military pension scheme.

³ Key assumptions along the lines of ESA 2010/TCG 2011.

Source: Eurostat/ECB (2008); Levy (2012); Khurmi et al. (2010).

Pension entitlements for other government employees unfunded schemes ¹

country	year	model	wage growth	pension entitlements in % GDP
Spain		2009 National	PBO	24
Portugal		2009 Freiburg	PBO	102
Poland		2006 Freiburg	ABO PBO	25 29

¹ Standard scenario: real discount rate 3%; real wage growth 1.5%, inflation 2%. Source: Eurostat/ECB (2008); Cristobal (2011); de Almeida (2011)

B

Pension entitlements for social security pension schemes ¹

country	year	model	wage growth	pension entitlements in % GDP
Germany		2006 Freiburg ABO		232
		PBO		278
France	2006 Freiburg	ABO		247
		PBO		293
		2005 National PBO		327
Netherlands ²	2006 Freiburg	ABO		129
		PBO		163
United Kingdom	2010 National	PBO ³		263

¹ Standard scenario: real discount rate 3%; real wage growth 1.5%, inflation 2%.

² Pension entitlements of the military pension scheme.

³ Key assumptions along the lines of ESA 2010/TCG 2011.

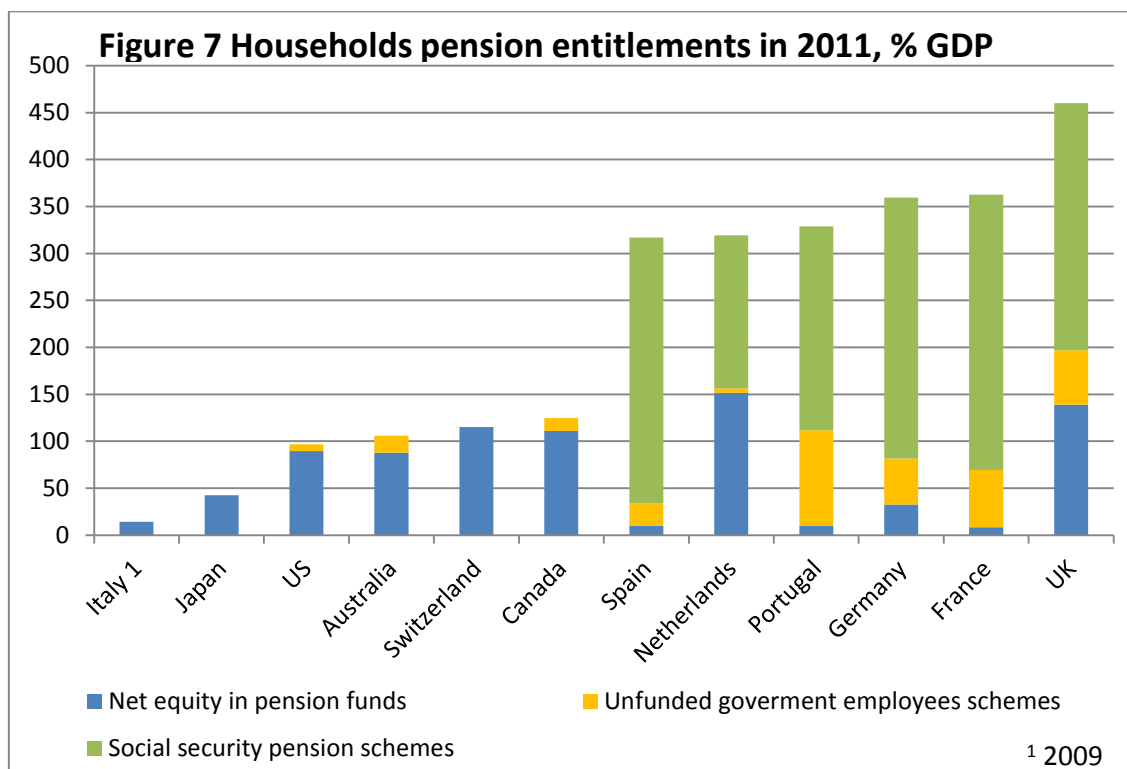
Source: Eurostat/ECB (2008); Levy (2012);

Pension entitlements for other social security pension schemes ¹

country	year	model	wage growth	pension entitlements in % GDP
Spain		2009 National	PBO	283
Portugal		2009 Freiburg	PBO	217
Poland		2006 Freiburg ABO		255
		PBO		287
Sweden		2006 Freiburg ABO		168
		PBO		198
Hungary		2006 Freiburg ABO		228
		PBO		275
Czech Republic		2006 Freiburg ABO		162
		PBO		200

¹ Standard scenario: real discount rate 3%; real wage growth 1.5%, inflation 2%. Source: Eurostat/ECB (2008); Cristobal (2011); de Almeida (2011)

Further, the entitlements for unfunded government employees' schemes (panel A) produce obligations which are on average about 50% of GDP. They are much smaller than those for social security PAYG schemes (panel B) where entitlements are more than four times as large on average (233%). In this respect it is important to note that the relevant data and these averages are approximations which serve as an illustration of the possible magnitudes of the relevant stocks of obligations.



Source: OECD/HAL, national calculations

Having data for this supplementary table allow us to make a more accurate comparison of all pension liabilities for some countries. In figure 7, we have assumed that the 2008-2009 estimates for the relevant economies are still valid today. For Canada, Italy, Japan, Switzerland and the United States³³, we are not aware of additional estimates of pension entitlements for unfunded employment related and social security pension schemes. For these countries a reasonable comparison cannot be made. Australia has published data for the supplementary table, but the liabilities of pension funds are not split into sponsorship. In addition, Australia does not operate a social security system, as a consequence of which no future pension obligations exist in this context.³⁴ In this respect, Australia already provides a fair comparison. Figure 7 shows that for the six economies to the right of Canada social security obligations are especially large for countries with a PAYG-system where the government takes care of pensions. In most countries (Germany, France, Portugal, Spain, United Kingdom), private sector workers' entitlements are included in state pension obligations. For the Netherlands social security pension entitlements are smaller, because the

³³ The US presented very recently new calculations of pension entitlements (BEA 2013).

³⁴ Khurmi et al. (2010). Australia operates social assistance for aged people, which is available to the general public, on a means tested basis and where beneficiary contributions are not a criterion for eligibility.

employment related, above minimum level, pensions are provided by second pillar private pension funds' schemes (blue bar 'Net equity in pension funds').

More in general, figure 7 clearly shows that including unfunded liabilities results in a totally different picture than the one presented in figure 2. France, Germany, Portugal and Spain have made large (unfunded) government pension promises to its population. In terms of net pension equity to GDP they surpass the Netherlands. The already high ratio of pension entitlements to GDP in the United Kingdom increases even more.

5 Conclusions

The goal of introducing the supplementary table on pensions in SNA 2008 was to generate comparable estimates for pension entitlements across countries. Doing so, the European Union (EU) also tries to harmonise some of the accounting assumptions to be applied. This effort to foster international comparison can only be applauded.

Completion of the supplementary table will solve the problem of the differences in the treatment of funded and unfunded pension systems, as a consequence of which more transparency of pillar one and pillar two accrued pension liabilities can be achieved. Furthermore, the idea of harmonising accounting assumptions in public sector pension schemes in the EU is a step forward too. As a result, public sector schemes inside countries, but also across countries, can be better compared. However, applying one and the same discount rate for all EU-countries seems to be an over-harmonisation, as it will lead to under- and overestimation of social insurance pension liabilities. A final advantage of the supplementary table will be the provision of a comprehensive picture of all social insurance pension schemes.

On the other hand however, some national reporting practises that deviate from statistical handbooks and questionnaire guidelines will of course continue to show up in the supplementary table. This will hamper international comparability. Furthermore, the supplementary table will not settle the issue that countries have varying compositions of DB and DC pension formula elements. As both schemes use very different assumptions to arrive at the measurement of liabilities, economies with large DC pension schemes and small DB schemes will end up with quite different outcomes than countries with large DB and small DC schemes. It is of course important that users of statistics should be aware of these institutional differences underlying international data.

Finally, in OECD-countries a large variety in discount rates exists between funded public sector DB schemes and funded private sector DB schemes. Because public sector plans apply systematically higher discount rates their liabilities can be underestimated. As a result, variety in discounting practice may also hamper a fair comparison of national schemes. Furthermore, ESA 2010 suggests the application of harmonised accounting assumptions in *public sector* schemes. Doing so, ESA guidelines suggest the use of rates based on expected returns, instead of fair value discount rates that private *sector* pension schemes apply. As a consequence, public and private sector pension schemes' liabilities are calculated in different ways.

It should be added that, because we only covered pension schemes in large OECD countries, there are also *public sector* DB pension plans in other countries that apply market-based discount rates.³⁵ More generally, because of the national character of discount rates in public pension plans an international standardised method for reporting *public sector* pension liabilities is momentarily lacking.³⁶

In summary, inclusion of the supplementary table facilitates to a great extent the comparison of government pension plans in social insurance, whether funded or not. Provisional calculations for the Netherlands, Germany, France, Portugal, Spain and the United Kingdom show that international comparisons of pension arrangements can be enhanced significantly. As such, the implementation and completion of this supplementary table has to be promoted to the extent possible. In doing so, some measurement issues still need to be resolved. Solving these shortcomings may further improve the comparability of pension obligations inside and across countries.

One important recommendation relates to the improvement of the available metadata on the actuarial assumptions used for each and every public and private pension scheme (e.g. discount rate, ABO versus PBO, projected wage and/or inflation rate). Too many schemes are silent about this in their financial reports. In addition, international organisations could provide more and better clarification notes to the tables, especially regarding the underlying specificities of the relevant countries. This could help users to better understand the possibilities and limits of international comparison.

³⁵ See Ponds et al. (2011), p. 23.

³⁶ Ibidem.

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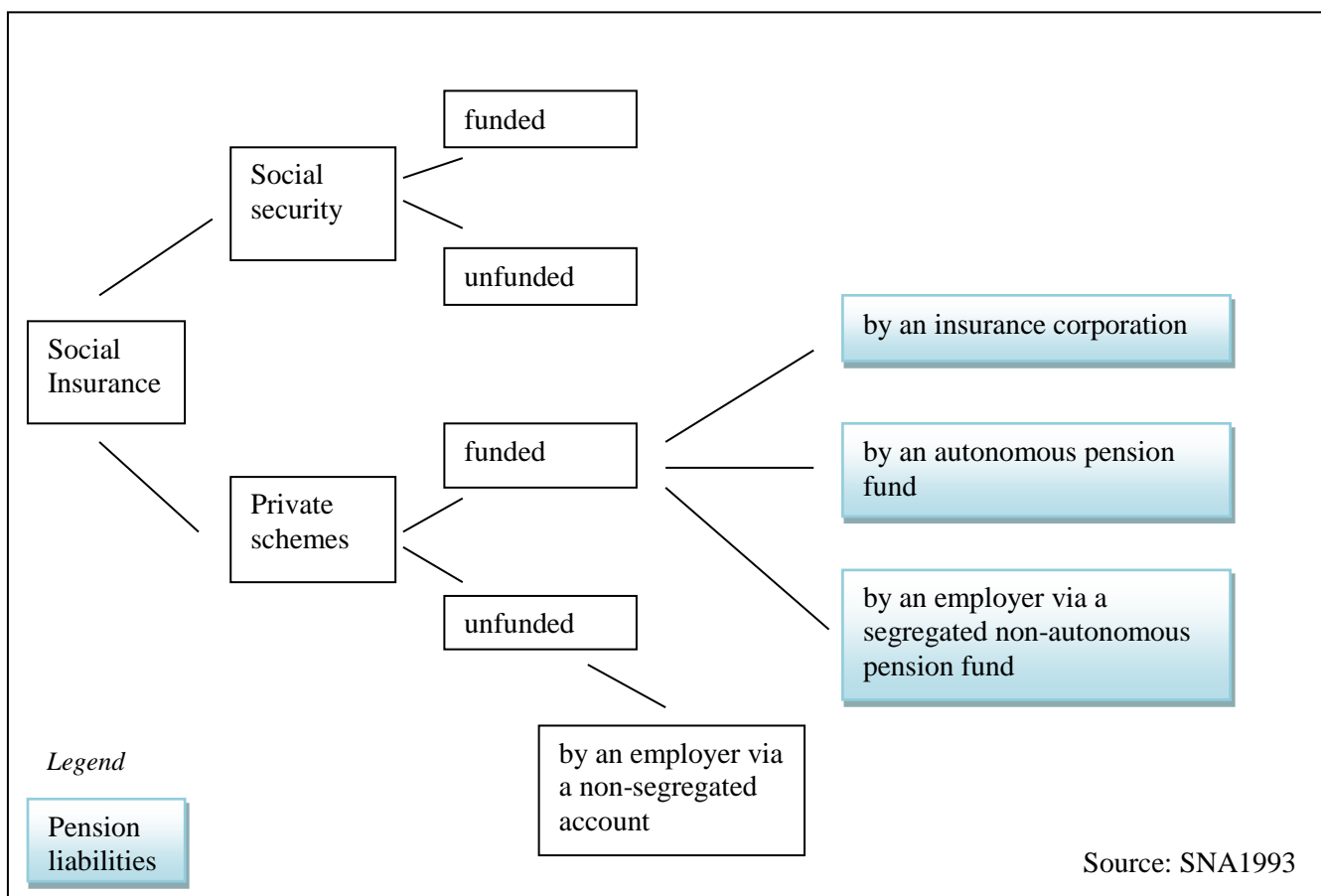
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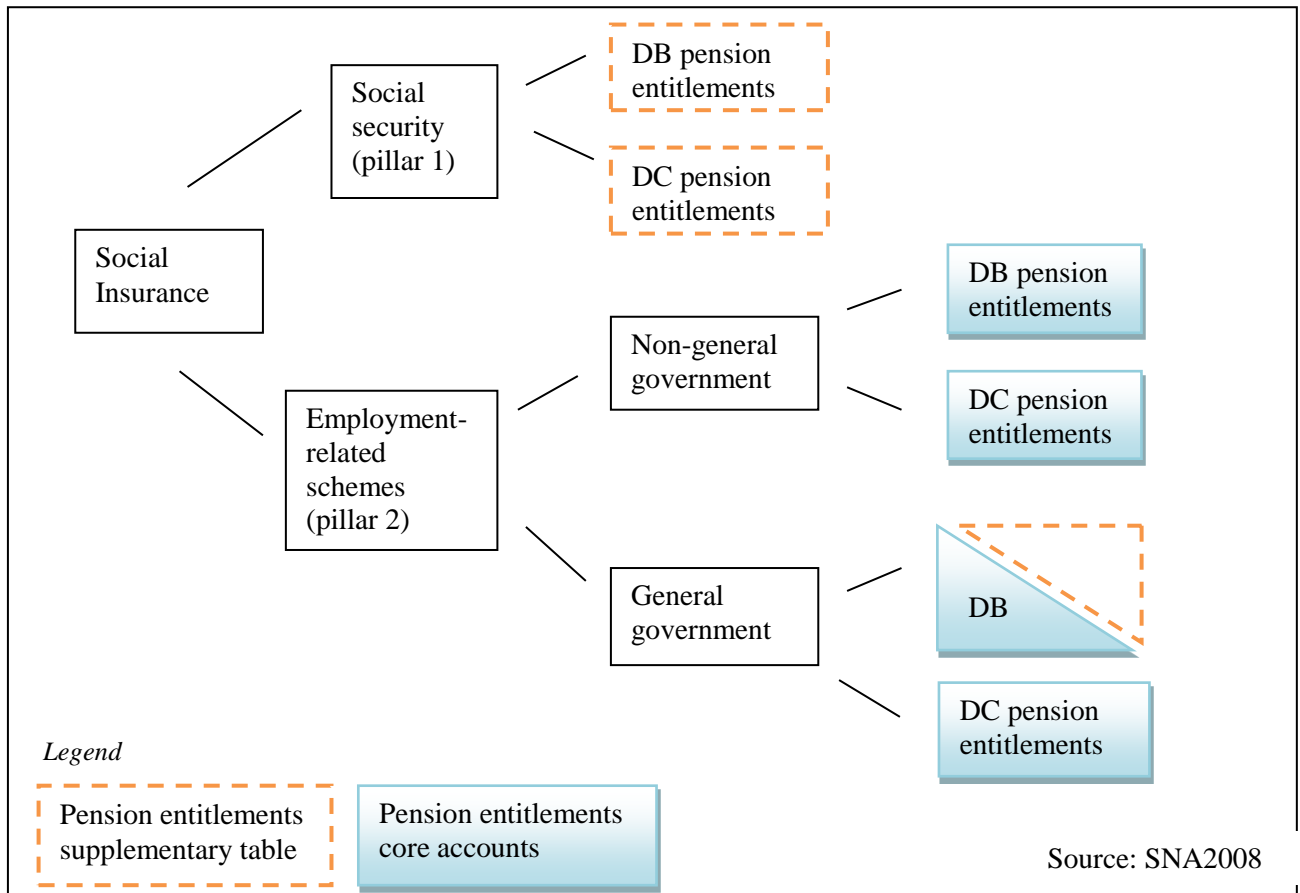
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Annex 1 Recording of pension liabilities in SNA 1993 and SNA 2008

Units involved in SNA 1993 social insurance



Pension providing units involved in SNA 2008 social insurance



Annex 2 Supplementary Table on Pensions

Table 17.10: A supplementary table showing the extent of pension schemes included and excluded from the SNA sequence of accounts

Row number	Position / transaction / other flow	Liabilities appear in the core national accounts							Liabilities do not appear in the core national accounts	
		Non-general government			General government				Total pension schemes	Pension entitlements of resident households
		Defined contribution schemes	Defined benefit schemes	Total	Defined contribution schemes	General government employee defined benefit schemes				
						In the financial corporations sector	In the general government sector	In the general government sector		
Column number	A	B	C	D	E	F	G	H	I	J
	Opening balance sheet									
1	Pension entitlements									
	Transactions									
2	Social contributions relating to pension schemes									
2,1	Employer actual social contributions									
2,2	Employer imputed social contributions									
2,3	Household actual social contributions									
2,4	Household social contribution supplements									
3	Other (actuarial) accumulation of pension entitlements in social security funds									
4	Pension benefits									
5	Adjustment to the change in pension entitlements									
6	Change in pension entitlements due to transfers of entitlements									
7	Changes in entitlements due to negotiated changes in scheme structure									
	Other economic flows									
8	Revaluations									
9	Other changes in volume									
	Closing balance sheet									
10	Pension entitlements									
	Related indicators									
	<i>Output</i>									
	<i>Assets held by pension schemes at end-year</i>									

Empty cells show where entries appear in the main ("core") accounts. Black cells show where no entry is appropriate. Grey cells show where information is provided in the supplementary table only.

Row 2 is the sum of rows 2.1 to 2.4

Row 3 is the analogue of employer's imputed contributions in the case where government has assumed the ultimate responsibility for any shortfall in pension provision

Row 5 is the sum of rows 2 and 3 less 4

More information on the components underlying rows 8 and 9 to be shown in a further supplementary table to allow an assessment of the degree of uncertainty in these estimates.

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