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# Implicit debt in public-sector pension plans: An international comparison

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**Abstract** Most countries have separate pension plans for public-sector employees. The future fiscal burden of these plans can be substantial as the government usually is the largest employer, pension promises in the public sector tend to be relatively generous, and future payments have to be paid out directly from government revenues (pay-as-you-go) or by funded plans (pension funds) which tend to be underfunded. The valuation and disclosure of these promises in some countries lacks transparency, which may hide potentially huge fiscal liabilities to be passed on to future generations of workers. In order to arrive at a fair comparison between countries regarding the fiscal burden of their public-sector pension plans, this article recommends that unfunded pension liabilities should be measured and reported according to a standard approach for reasons of fiscal transparency and better policy-making. From a sample of Member countries of the Organisation for Economic Co-operation and Development, the size of the net unfunded liabilities as of the end of 2008 is estimated in fair value terms. This fiscal burden can also be interpreted as the implicit pension debt in fair value terms.

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**Keywords** pension scheme, public sector, pay as you go system, pension fund, defined benefit plan, defined contribution plan, method of financing, actuarial valuation, governance, OECD countries

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## Introduction

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In many countries the sustainability of fiscal policies is being questioned. A major driving force of this growing concern is age-related expenditure, such as health care and social security spending (public pensions). A sometimes overlooked reason for sustainability problems, however, involves the pension schemes for government employees. In most countries there are separate pension plans for public-sector employees. Traditionally, these specific arrangements are justified because they guarantee the security, integrity and independence of employees and because they contribute to the attractiveness of a career in the civil service.<sup>1</sup> General findings from research indicate that compared to pensions in the private sector, public-sector pensions tend to offer more generous terms and feature lower funding levels (Palacios and Whitehouse, 2006).

Reforms have been undertaken in many countries. These reforms have been oriented at bringing remuneration practices in the public sector more in line with those found in the private sector. Such reforms have generally involved lowering the generosity of public-sector pension schemes (e.g. Finland, France, Germany, Italy, Portugal, and Sweden). In some countries, public-sector workers have been transferred to the main public pension system (e.g. Austria, Chile, Czech Republic, Greece, Hungary, Mexico, Poland, Spain, and the United States), which in some cases includes a fully-funded, defined contribution component (e.g. Chile, Denmark, Hungary, Mexico, and Poland).<sup>2</sup>

In addition, initiatives have been taken in a number of countries to introduce some degree of pre-funding of public-sector pensions via the establishment of reserve funds (e.g. Australia, Belgium, Finland, Germany, Ireland, and Sweden). Sometimes, however, fiscal pressures have overwhelmed the drive to pre-funding, as in 2003 when the Belgian government transferred the assets and liabilities of

1. Pensions are an important component of total remuneration. Pensions may therefore help to explain that, generally, gross wage pay in the public sector is lower than in the private sector because higher pension entitlements in the public sector compensate for gross wages differences (Disney, Emmerson and Tetlow, 2009).

2. There have been some important pension policy reversals in recent years. At the end of 2010, the Hungarian government decided to stop contributions to the mandatory funded pillar, initially for 14 months, and then introduced coercive measures to switch people back into the public, pay-as-you-go system. At the beginning of 2011, the Polish government announced that it would reduce the mandatory contribution rate to the funded pillar from 7.3 per cent to 2.3 per cent of salaries.

Belgacom, the former state-owned telephone monopoly, to the state system. The Portuguese government recently announced a similar planned assumption of the assets and liabilities of Portugal Telecom. Such moves, though worrisome if they lead to a depletion of the pension reserves, have also been justified as a way to unify pension arrangements between public- and private-sector workers.

Pre-funding implies that, in principle, the costs of pension promises are borne when those pension promises are accrued. In some countries, public-sector defined benefit (DB) schemes are pre-funded, but in other countries they are financed on a pay-as-you-go basis (PAYG) or deeply underfunded. On the liability side, sometimes benefits are not provisioned for at all in public-sector balance sheets. Those benefits that are accounted for in public-sector balance sheets are not necessarily comparable to those provisioned for in the private sector, as the assumptions employed may not use market-level discount rates, comparable longevity estimates or do not take into account the effect of future salary increases on benefits that have already been accrued. On the asset side, contribution levels are not necessarily sufficient. Finally, underfunding may persist for a long time in view of lax solvency regulations.

The funding practice of public-sector plans has received increased attention in the United States where state governments offer their employees DB pension plans. These pensions are generally pre-funded to a high extent. A recent study (Novy-Marx and Rauh, 2009), however, reports that the market-valued underfunding of the pension liabilities of the state pension funds amounted on average to 24 per cent of gross state product at the end of 2008. While these numbers have been disputed (see, for example, Angelo et al., 2010; and Lav and McNichol, 2011), they reflect a high level of concern regarding the growing cost of public-sector pension liabilities.

This article presents a survey of public-sector pension plans using a sample of Member countries of the Organisation for Economic Co-operation and Development (OECD). In particular, we are interested in public-sector pension funds and their funding status. The calculations show that public-sector funded DB plans tend to be underfunded; a finding that mirrors those presented by Novy-Marx and Rauh (2009) for the United States.

The article is structured as follows: the following section gives a broad overview of the pre-funding debate, and is followed by an overview of public-sector pension plans in OECD countries. We then deal with the funding position of a number of specific public-sector pension funds; the valuation method for liabilities is a key issue for this topic. We compare the funding positions of a number of different plans as disclosed by the plan sponsors, as well as based on market discount rates in each country and using a common fixed discount rate. The plans generally tend to be underfunded. In order to put the challenge of underfunding in perspective, we then compare the size of underfunding with the present value of future payments of unfunded plans. Concluding remarks are then offered.

## A broad overview of the funding debate for public-sector pensions

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There has been much debate as to what extent pension plans for public-sector workers should be funded. This section describes some of the arguments made for and against pre-funding, but it does not attempt to develop further this issue.

Pre-funding can be justified on various grounds. First, it facilitates intergenerational tax smoothing (see, for example, D'Arcy, Dulebohn and Oh, 1999), ensuring that each generation pays a more or less constant percentage of taxable income. Second, it can reap the benefits of the diversification of pension fund investments, in particular into foreign markets. Third, it can protect beneficiaries from the possibility of the bankruptcy of the sponsoring governmental entity.

At the same time, there are various possible justifications for underfunding such pension commitments. First, to the extent that funding risks can be smoothed over time as they can be shared with future generations of taxpayers, underfunding in market value terms may be an optimal strategy (see, for example, Cui, de Jong and Ponds, 2011; and Munnell et al., 2010). Second, a funding surplus might also mobilize pressure to increase benefits which, in turn, leads to higher funding costs in the longer term and so to underfunding. So, for taxpayers it is rational to aim at underfunding rather than full funding or overfunding. Moreover, a funding surplus will enforce contribution cuts and once contributions are reduced it is difficult to increase them. The accountability horizon of pension fund managers and politicians is much shorter than the horizon over which pension promises have to be met by adequate funding. This horizon gap may lead to pressure to underestimate costs and risks and to overestimate the earning capacity of assets. Third, to the extent that pre-funding leads to investment in domestic government bonds, circularity in government funding may be created, with little added value relative to a PAYG system. In the United States, with regard to the system of pension funds that operate at state level, Bohn (2011) relates optimal funding to the comparison of taxpayers' costs of funds with the return on pension assets. He finds zero funding is optimal, as taxpayers' borrowing costs (typically, credit card costs) are larger than the pension funds' return on their assets. The presence of legal ambiguities and default-risks may warrant some funding.

Ultimately, therefore, there is no single answer as regards defining the optimal level of funding for such special DB arrangements. Each plan should target a level of funding that is appropriate given its circumstances. One critical element of this evaluation is the relationship between the growth rates of pension costs and the contribution or tax base. A related question is how pension cost should be divided between the government and employees. To the extent that the government is at

least partly responsible for financing pension benefits, increases in life expectancy will lead to a growing transfer of wealth from private-sector taxpayers towards public-sector pensioners. The government's contribution rate to the special DB arrangements of public-sector workers has to grow in line with life expectancy.

One key policy message is that better disclosure and transparency is needed as regards the pension commitments made by governments to their employees, as information on public-sector arrangements is often only partially or not readily available. A debate should also be opened on how to compare governments' commitments, not only on a domestic level but on an international basis.

### **Experience with pension plans for government workers in OECD countries**

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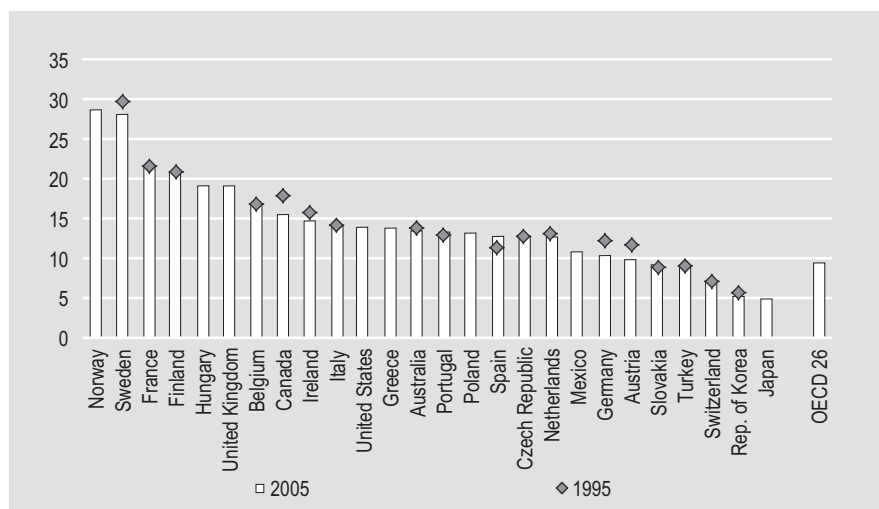
Pension promises for government workers are a major policy challenge for four main reasons. First, the state is often a country's largest employer and, as such, has large pension commitments to its public-sector employees. Second, public-sector pension promises are often of a DB nature and tend to be relatively generous compared to private-sector arrangements. In some countries, generous pension promises appear to have been made to compensate for relatively lower cash pay in the public sector as compared to the private sector. Third, these pension promises are in some countries underfunded or not funded at all (that is, financed on a PAYG basis). Fourth, there is as yet no international standardized method of reporting public-sector pension liabilities in contrast to the significant disclosure requirements that exist for exchange-listed private-sector companies — requirements that are relatively standardized across many countries. Practice varies widely by country, as does the extent to which the liabilities associated with these promises are disclosed and valued. Such lack of transparency could mean that huge fiscal liabilities are potentially hidden, to be passed on to future generations of workers. This section and the next discuss in turn each of these issues.

#### *Share of government workers in total labour force*

As can be seen in Figure 1, government workers make up a substantial section of the labour force of many OECD countries, with the OECD average at close to 15 per cent of the total. In Norway and Sweden, government employees account for nearly 30 per cent of the labour force. In contrast, in both the Republic of Korea and Japan employees in the state sector account for about 5 per cent of the total.

If employees of state-owned enterprises are included, the level of labour force coverage increases by a few percentage points in most countries. Figure 1 also shows the relative stability in the level of employment in general government and public corporations as a percentage of the labour force between 1995 and 2005.

**Figure 1.** Employment in general government as a percentage of the labour force (1995 and 2005)



*Notes:*

Data revised for Germany (2005 instead of 2004).

Greece: Data refers to 2006 — Staff under private law have been taken into account.

Last data available for Republic of Korea: 2004.

Portugal: Data refers to 1996 instead of 1995. Data in 1996 not including Madeira Autonomous Region in subcentral Government.

Source: OECD (2009a).

*Types of pension plans for government workers in OECD countries*

Government workers' pension plans can be classified according to three key criteria. Financially speaking, the main distinction in the administration of government workers' pension arrangements is between funded and unfunded arrangements, but partially funded and book-reserved arrangements should also be considered.

- **Funded arrangements** are those where an independent legal entity is established to hold pension plan assets on behalf of plan members. Typically, assets are held in a (legally separate) pension fund, although some countries allow public-sector plan sponsors to purchase insurance to cover their pension obligations.

- **Unfunded (or PAYG) arrangements** are financed directly out of the government's coffers, though reserves may be set up which are the legal property of the employer (government).

- **Book-reserved arrangements** are where the sponsoring government recognizes a liability (debt) on its balance sheet that reflects the accrued pensions of its members, but there are no legally-separated pension assets.

• **Partially funded plans** are where the plan sponsor specifically targets a funding level that is less than 100 per cent. The remainder could be unfunded (PAYG) or it could be book-reserved.

A second classification is whether the pension plan is specific to government workers' or part of a broader arrangement, such as a national pension system. In the former case, it is also important to know whether the plan substitutes for, or complements, the national pension system.

Finally, pension plans may be classified into defined benefit (DB), defined contribution (DC) and hybrid pension arrangements. DB plans provide benefits that ultimately are guaranteed by the state as sponsor. In DC plans, by contrast, the government's cost is limited to a pre-specified contribution rate and hence does not create any future fiscal liabilities.<sup>3</sup> In some countries, DC plans can be considered as "protected" (Pugh and Yermo, 2008), where the pension entity or provider guarantees or targets a specific rate of return or benefit, but there is no automatic claim to the sponsoring employer in case of underfunding. In collective DC plans, risks are shared across the plan membership. Hybrid pension arrangements are those that offer a minimum return or benefit guarantee (e.g. cash balance plans) and may offer a variable (DC-like) benefit on top.

### *Main features of pension arrangements for public-sector workers in OECD countries*

Following Pinheiro (2004), Palacios and Whitehouse (2006) and further research, we describe in Table 1 the main features of pension arrangements for public-sector workers in OECD countries. The table states whether such workers are covered by the general national social security arrangement and whether they have a special arrangement (a substitute for, or complementary to, the general social security system). It also describes the main features of these special pension arrangements. In particular, it describes the financing mechanisms (funded, with legal entities set up to hold the assets on behalf of beneficiaries; unfunded schemes, though reserves may be built up; and book-reserved plans) and the pension formula (DB or DC).

Most OECD governments, with few exceptions, offer special DB arrangements for public-sector workers, which in most instances are complementary to the general social security system. These special DB plans create a pension liability for governments beyond that already reported in social security arrangements. Table 1 also shows that at the federal level, unfunded (PAYG) schemes are the most common, followed closely by funded schemes. At the local government level, funded schemes are more popular than unfunded (PAYG) ones. Some schemes at the

3. Some DC systems, however, have DB elements and may involve contingent liabilities for governments if, for example, the state provides or underwrites a minimum return or pension guarantees.



**Table 1. Main features of pension arrangements for public-sector workers in OECD countries**

Country	Are public-sector workers covered by the general social security system?	Is the substitute or complementary plan for public-sector workers DB or DC? Is it funded, unfunded or book-reserved?
Australia	No, they are excluded from the mandatory DC system.	The Australian Public Sector Superannuation Scheme (PSS), a partially funded (with assets at about 30% of liabilities), partially book-reserved DB plan for employees of the central government, was closed in 2005 and replaced with a DC plan (PSSap) for new workers. Each state has its own plan for its employees, most of which are funded and based on either DB or hybrid pension formulas.
Austria	Yes	DB, unfunded.
Belgium	No	DB, unfunded.
Canada	Yes	There is a funded, DB pension plan for federal government workers for service after 2000 (book-reserved before then). Provincial governments tend to offer specific, DB plans to their personnel. These plans are usually funded, though some are book-reserved.
Chile	Yes, except military personnel. The mandatory pension system includes a fully-funded DC pillar.	There is no specific arrangement for public-sector workers, except military personnel (unfunded, DB).
Denmark	Yes	Collective DC, funded.
Finland	No, but the rules are the same as for private sector workers.	There is an unfunded DB pension plan for central government workers (VaEL). However, a buffer fund has been established and the target funding level is 25% of the VaEL plan's liabilities. There is an unfunded DB plan for local government workers (KuEL). A fund has been established to cover the KuEL plan's annual costs on a short-term basis.
France	No	DB, unfunded, plus a complementary (voluntary) fully-funded DC plan (Prefon) and a complementary funded DB scheme.
Germany	Employees are covered by the general system and supplementary pension arrangements. Civil servants appointed for life are covered by a special pension system.	All plans are DB arrangements. The supplementary pension arrangements are partially funded. For civil servants appointed for life of almost all federal states as well as at federal level, reserve funds have been set up.
Greece	Yes	DB, unfunded.
Hungary	Yes. The mandatory pension system includes a fully-funded DC pillar (see footnote 2).	There is no specific arrangement for public-sector workers.
Iceland	Yes	Collective DC, funded.

**Table 1. Continued**

Italy	Yes	Some public-sector employees (e.g. teachers) have a complementary DC plan.
Japan	Yes	DB, unfunded.
Republic of Korea	No, there are separate arrangements for public-sector workers.	The military, civil servants and university and school teachers have each their own unfunded, DB arrangement.
Netherlands	Yes	There is a funded DB pension plan for government workers at all levels and the education sector (ABP) and a funded DB plan for the health care sector (PIZW).
Norway	Yes	DB, funded arrangements for local government workers. DB, partially funded, partially book-reserved arrangement for federal government workers.
Poland	Yes. The mandatory pension system includes a fully-funded DC pillar.	There is no specific arrangement for public-sector workers.
Slovakia	Yes	There is no specific arrangement for public-sector workers.
Spain	Yes	Central government workers have both an unfunded DB and a funded, DC plan. Some regional governments (e.g. Basque Country and Catalonia) sponsor funded DB plans for their personnel.
Sweden	Yes	Arrangements for local and federal employees include both DB and DC elements. Arrangements are funded for federal government workers. For local government workers arrangements are partially funded or book-reserved and partially PAYG. (For local-government workers, pre-1997 obligations are PAYG, whereas post-1997 obligations are funded or book-reserved.)
Switzerland	Yes	DB, funded arrangements for central and local government workers.
Turkey	Yes, except military personnel, coal miners and school teachers.	There is no specific arrangement for public-sector workers, except military personnel who are covered by a DB, funded plan (Oyak). Coal miners and primary school teachers also have their own DB plan.
United Kingdom	Yes, although some are contracted out of the state pension system.	There is a book-reserved DB plan for civil servants of the central government and funded, DB plans for employees of local authorities. There are also separate book-reserved DB plans for employees of the National Health Service, for teachers, fire department, armed forces and police.
United States	Yes, for most states and central government workers hired after 1983. Some states maintain arrangements that substitute for social security.	New federal civilian employees, first hired after 1983, are automatically covered by FERS, a three-tiered system that consists of social security, a specific, unfunded DB plan and the Thrift Savings Plan which is a funded DC plan. States and local governments offer mainly DB plans, which are often funded.

federal and local government level are book-reserved, whereas a small number of schemes target partial funding.

Table 1 also reveals some countries where government workers have been fully or largely integrated into both the PAYG and the funded part of the mandatory pension system. Such countries include Chile, Denmark, Hungary, Iceland, Mexico, Poland, and Slovakia. With the exceptions of Denmark and Iceland, these are all countries that reformed their public pension system structurally, replacing part of the public pension with “carve-out” individual accounts.<sup>4</sup> Chile led such reform in 1981, including public-sector workers in the new system (except the military, who maintained a special DB system financed directly from the government’s budget). The inclusion of government workers in the mandatory private pension system in Denmark and Iceland can be traced back to a long history of collective bargaining at industry level. The mandatory private pension system in Iceland dates from 1974.

### *Pension expenditure and pension liabilities*

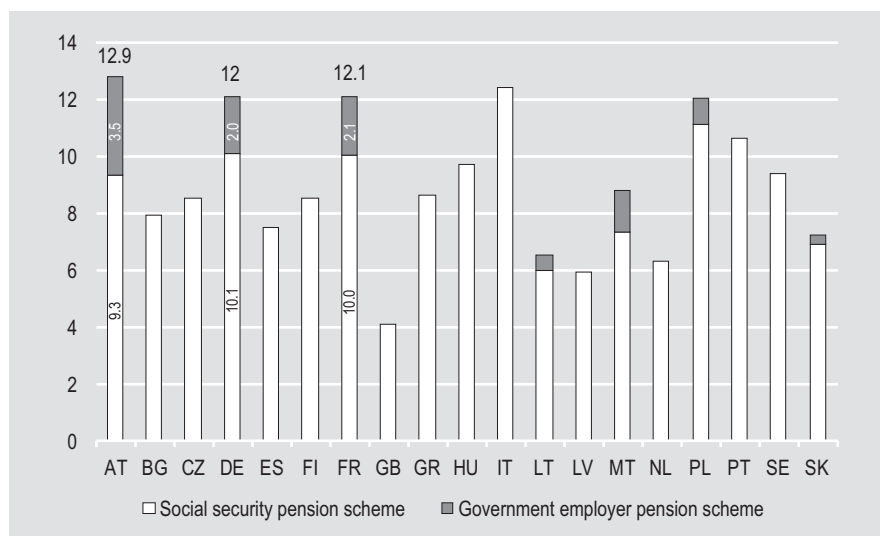
Information regarding public expenditure on government workers’ pensions is readily available for most OECD countries. However, international comparability is problematic because of the way the information is reported. The OECD’s SOCC database, for example, reports pensions paid to former civil servants through autonomous funds as a private spending item (Australia [partially], Canada, Denmark, the Netherlands, Sweden, and the United Kingdom). All social benefits not provided by general government are considered “private”.<sup>5</sup>

A recent study by Müller, Raffelhüschen and Weddige (2009) has collected information for selected European countries. In France and Germany, spending on pensions for public-sector workers represents 17 per cent of total public spending on pensions, while in Austria it is 27 per cent. The highest ratio of government workers’ pension expenditure to GDP is also found in these countries, as plans provide benefits that replace those of the general social security system (Figure 2).

4. In all these cases, at least part of the social security contribution was transferred to the new fully-funded DC system (see footnote 2).

5. This is in line with the System of National Accounts 1993, which states: “. . . Social insurance schemes organized by government units for their own employees, as opposed to the working population at large, are classified as private funded schemes or unfunded schemes as appropriate and are not classified as social security schemes . . .” (ISWGNA, 1993, para 8.63). In practical terms, for pension payments to former civil servants to be classified as private, these payments have to go through autonomous private funds (e.g. separate pension and/or insurance companies), for which the government does not make up the deficit on a regular basis (e.g. in practice, benefit schemes that are DC plans). Non-autonomous pension schemes (including pension benefits paid directly from the government budget) remain institutionally in the government sector.

**Figure 2.** Pension expenditure for government workers and social security compared (as percentage of GDP, 2006)



Source: Müller, Raffelhüschen and Weddige (2009).

Unlike that for private-sector pension schemes (if sponsored by publicly-traded corporations), the reporting of government workers’ pension liabilities is not yet standardized internationally, although there is an ongoing initiative to do so that involves the OECD and the International Monetary Fund (IMF) via the so-called System of National Accounts (SNA). Some countries, like Australia and Canada, already require their governments (at all levels) to report their pension liabilities for their employees as a liability on the government’s balance sheet (if there are no associated plan assets, then these pension arrangements would in effect be transformed into book reserves). By making these debts explicit, these governments formally quantify and acknowledge the future commitments that they are responsible for.

Some of the more contentious issues regarding the valuation of public-sector liabilities are the extent to which benefits should incorporate future salary growth and the discount rate to be used. In the private sector, such issues have been largely solved through the application of the International Accounting Standard Board’s IAS19 standard for pension benefits in the European Union and other countries, and through similar standards applied in Japan and the United States. The choice of discount rate for calculating public-sector liabilities is particularly controversial because of the huge impact small changes in discount rates can have on the size of the liability.

Much of the recent financial economics literature proposes that public- and private-sector pension liabilities should be computed using some reasonable government paper rate (Bader and Gold, 2003; Gold and Latter, 2009; Novy-Marx and Rauh, 2009; Exley, Mehta and Smith, 1997; Kortleve, Nijman and Ponds, 2006; Waring, 2009). However, there is an ongoing debate regarding the application of market-based discount rates, given that pensions are long-term liabilities, that there is no market for such liabilities and that there is no expectation a priori that such liabilities will be sold by governments or otherwise transferred to insurance companies. Hence, to the extent that a government bond yield is to be used to calculate public pension liabilities, it may be preferable to use a long-term average measure or an expectation of its future value, based on long-term trends in economic growth and inflation. Actuaries have also traditionally adjusted such discount rates upwards to reflect the higher long-term return that may be expected from pension fund investments in equity and other instruments.

### Funded public-sector pension plans

This section examines specific public-sector pension plans in several countries in an attempt to highlight in more detail some of the broad concerns identified above. Specifically, we present evidence of the financial aspects of a selection of public-sector funded DB plans. We find that funded plans generally tend to be underfunded and we discuss a number of arguments as to why this may be so. To put underfunding in perspective, we compare the size of underfunding in funded plans with the financial obligations captured in unfunded plans of a number of countries.

#### *Funding and methods of valuation of liabilities*

Participants in a traditional DB plan typically accrue pension rights based on years of service, the annual accrual rate and wage income over the career. The accrued rights offer a prospective stream of annual pension payments as of retirement age. These payments may be indexed for some reference variable, for example price inflation or wage growth. A pension fund accounts for future pension payments by reporting the size of the pension liabilities. In essence, the liability of a pension plan is the discounted value of this stream of future pension cash flows to the present.

There has been debate about which method of discounting is appropriate in valuing pension liabilities (Exley, Mehta and Smith, 1997; Bader and Gold, 2003; Kortleve, Nijman and Ponds, 2006; Waring, 2009; Novy-Marx and Rauh, 2009). For a long time, liabilities were valued using a fixed discount rate that may reflect the expected return on assets, but since the 1990s the economic approach based on fair valuation principles and a market discount rate has increasingly substituted for the

**Table 2.** *Reported evidence by plans in consideration (in euros, end 2008)*

Country	Plan	Assets	Liabilities	Funding residue	Funding ratio	Discount rate
		(in euros, end of 2008)			(%)	(%)
Canada	Public Service (31 March 2008)	70.0	66.8	3.2	104.9	6.00
	OTTPF (2008)	62.1	68.6	-6.5	90.5	4.00
France	Public Service Additional Pension Scheme	6.1	5.4	0.7	112.5	1.80
Netherlands	ABP (2008)	175.6	195.7	-20.1	89.8	3.57
	PfZW (2008)	71.3	78.7	-7.3	90.7	3.55
Sweden	Federal 7(2008)	20.0	19.0	-0.9	104.8	1.90
Norway <sup>1</sup>	Federal (2008)	18.9	28.2	-9.3	67.0	5.80
United Kingdom <sup>2</sup>	West Yorkshire	4.4	5.5	-1.1	79.6	6.00
	Approx. all local government plans	317.8	542.1	-224.2	58.6	6.00
United States <sup>3</sup>	All state and local plans	1,374.3	2,110.8	-736.5	65.1	8.00
Australia	CSS Super (31 June 2008)	3.0	32.0	-29.0	9.3	7.54
	ESS Super (31 Dec. 2008)	8.5	13.8	-5.3	61.5	8.00

<sup>1</sup> Annual report states at value assets: "fictitious fund".

<sup>2</sup> United Kingdom has 99 local plans and approximation is based on the three biggest plans.

<sup>3</sup> Data derived from Novy-Marx and Rauh (2009).

actuarial method.<sup>6</sup> The private sector, for the most part, no longer utilizes the actuarial method for disclosure purposes, seeing that internationally-recognized accounting standards prescribe that companies have to report their pension obligations in fair value terms based on economic principles.

For public-sector pension plans, there is great variety in discounting practice: both the fixed discount rate method and the economic method are in use. The liabilities that the examined plans report, the discount rates used and whether the discount rates are fixed or market-related are discussed in the following section.

### *Reported evidence on funding positions*

Table 2 informs about the financial position of a number of countries' funded pension plans as of the end of 2008, as reported by the plan sponsors of the schemes. All monetary terms are in euros. Assets are reported at their disclosed value. The

6. The fair value approach aims at market-consistent valuation. Applied to pensions, the fair valuation method implies that a pension promise has to be seen as a bond and therefore has to be valued as a bond. The discounting method to value future pension payments therefore should be the same as used in the market to value government bonds.

value of the liabilities is determined by the discounting method. The information about the discounting method used in the table shows a large variety in this respect.

The Netherlands has two public-sector plans: the ABP for the government and education sectors, and the PZV for the health care sector. The supervision prescribes that the discount rates for the various terms have to be derived from the nominal swap rates curve.<sup>7</sup> At the end of 2008, the swap rates corresponding with the duration of the liabilities for the two plans were 3.57 per cent and 3.55 per cent, respectively.

The United States is presented in the table using aggregate information on the value of assets and liabilities of all public-sector plans (derived from Novy-Marx and Rauh, 2009). The plans in the United States use the actuarial method as prescribed by the Governmental Accounting Standards Board (GASB).<sup>8</sup> GASB 25 states that the discount rate should be based on “an estimated long-term yield for the plan, with consideration given to the nature and mix of current and planned investments . . .” (citation adapted from Munnell et al., 2010). For most plans, this expected yield turns out to be equal or close to 8 per cent (Novy-Marx and Rauh, 2008).

The Australian plan also employs the actuarial method and applies a discount rate of 8 per cent. The Australian PSS scheme for federal employees is partly funded/partly book-reserved, with assets at about 30 per cent of liabilities.

The Norwegian SPK plan for federal employees is accounted for using the Norwegian accounting standard NRS 6, which is similar to the pension accounting standard required by United States GAAP for corporate plan sponsors. The SPK plan is partly funded/partly book-reserved, with assets at about 60 per cent of liabilities. At the end of 2009, the market-based discount rate was 5.80 per cent

The pension plan for Swedish federal employees uses a market-based discount rate that is net of future indexation. At the end of 2008, this discount rate was 1.90 per cent.

The United Kingdom public-sector pension plans are partly unfunded/partly funded in nature. Unfunded plans cover civil servants, National Health Service (NHS) employees, and teachers. The 99 local government plans all are based on funding. The reported evidence in the table concerns these local government funded plans only. However, the table addresses two examples. The first row presents information for one specific plan, the West Yorkshire. The second row is an approximation of the size of assets and liabilities for all 99 local government plans. The reported value of liabilities is based on a discount rate of around 3 per cent

7. The reason for the use of the swap curve instead of the yield curve of Dutch government bonds as a proxy for the risk-free interest rate is that the swap market is more developed (more trade terms and many more participants) and therefore much less sensitive to incidental market disturbances.

8. For more information on accounting standard GASB 25, see <[http://gasb.org/cs/ContentServer?c=Pronouncement\\_C&pagename=GASB%2FPronouncement\\_C%2FGASBSummaryPage&cid=1176156677465](http://gasb.org/cs/ContentServer?c=Pronouncement_C&pagename=GASB%2FPronouncement_C%2FGASBSummaryPage&cid=1176156677465)>.

(= 6 per cent denominator discount rate minus 3 per cent inflation rate). Cash flows are projected with an expected rate of inflation/indexation of 3 per cent (approached by taking the difference between the yield on long-term gilts and the yield on inflation-linked bonds). The denominator discount rate is around 6 per cent, determined as the sum of the long-term gilt return plus assumed outperformance of assets over the gilt return, this being 2 per cent for assets relating to pre-retirement service and 1 per cent for post-retirement.

The French public service additional pension scheme (RAFP) manages the additional retirement benefit rights of French government and local authority civil servants, and the staff of French public hospitals, through a fully-funded scheme. With almost 4.6 million beneficiaries, 51,000 employers and contributions of more than EUR 1.5 billion per annum, RAFP is one of the world's largest public pension funds in terms of members. The size of the plan's assets and liabilities were relatively small at the end of 2008, at EUR 6.1 billion and EUR 5.4 billion, respectively, after four years of operation (the plan was implemented on 1 January 2005). The plan's assets and liabilities are expected to grow rapidly. The discount rate is 1.80 per cent.

### *Funding positions for different methods of valuation*

The previous section has clarified that funded public-sector plans use different methods and assumptions for valuing future pension benefit cash flows. Differences could include discount rates, mortality tables, actuarial methods and disclosure practices. Such differences may be historical or stem from regulatory practices. Regrettably, the existence of these differences in valuation and disclosure hinder an assessment of the funding positions of public-sector pension plans on comparable terms. In order to make these liabilities truly comparable, they would need to be recalculated using the same methods and assumptions.

Here, we do not attempt to fully recalculate the liabilities using the same methods and assumptions. However, in order to make the liabilities at least somewhat more comparable, they have been approximately adjusted as if they were calculated using comparable discount rates across countries. This is done by employing i) market-based discount rates based on the long-term nominal swap rates in each country, and ii) a fixed discount rate related to the expected return on assets held by the pension funds. Please note that we have made no adjustment for differences in other assumptions, including mortality tables, whether or not future salary increases are included in the liabilities, and potential differences in asset valuation. Accordingly, our revaluation can be considered only as a very rough approximation of a more "comparable" set of funding levels.



*Discounting methods*

There are different ways to arrive at a discount rate for pension fund liabilities. The choice of the discount rate can be related to the expected return on assets in the portfolio. The discount rate can be based also on the characteristics of the pension liabilities. The former approach typically has been advocated by actuaries and plan sponsors, whereas the latter approach in general is supported by finance theory and financial economists (Bader and Gold, 2003; Gold and Latter, 2009). We make use of both approaches in comparing the funding positions of public-sector pension funds.

***Liability-based discount rate.*** Finance theory states that the appropriate discount rate should reflect the riskiness of the pension liabilities (Novy-Marx and Rauh, 2009). When it is highly likely that pension promises to public-sector employees will be incurred, then the appropriate discount rate would be the risk-free interest rate, which can be derived from government bonds or from the inter-bank market for interest-rate swap contracts. Pension funds in the Netherlands, for example, have to value their liabilities using this inter-bank swap curve. An assumed advantage of using the swap curve above the government bond markets is that inter-bank swap markets are well-developed and free from credit risk pricing.

A main drawback of fair value accounting is that the volatility of interest markets results in very volatile values of pension fund liabilities, even though the underlying benefit cash flows may not change. An alternative to the fair value approach might be the use of a fixed discount rate related either to some long-term average of the rate of interest on long-term government bonds or perhaps to some assumed value acting as a good proxy for the interest rate on government bonds. Such a rate should also be consistent with long-term trends in economic growth, which ultimately determines the government's capacity to finance pensions.

***Asset-based discount rate.*** The asset-based discount rate approach typically relates the discount rate to the assumed rate of return on the assets held in the pension fund. The motivation for using this approach may be found in the long-term orientation in funding pension promises. Given that pension funds invest for the long term, periods with below-average returns can be averaged out by periods with higher returns. Private-sector pension funds are hindered in following this practice as their sponsors are exposed to market competition and the related risk of discontinuity because of a bankruptcy, a takeover, a merger and so on. This justifies market-based accounting to inform the fund's stakeholders about the funding position, rather than using an asset-based approach. The government, as the

sponsor of government pension funds, is much less constrained in following a long-term funding approach because of its power to tax and its ability to survive the ups and downs of the business cycle and stock market volatility. A fixed discount rate, based on an assessment of the long-term earning capacity of assets held, adds to intergenerational equity as annual contributions are determined on an equal base. Such an approach can also be justified if one considers that benefit payouts are also volatile, as they depend on parameters — such as wage growth, job turnover, and longevity — whose future evolution is uncertain.

What would be an appropriate level for an asset-based fixed discount rate? To seek guidance for expected future rates of return, one may fall back on historical performance. Looking back over a long period justifies the use of a relatively high discount rate (around 8 per cent or more), but restricting the period implies much lower average returns.<sup>9</sup> State pension funds in the United States are allowed to use a rate of 8 per cent. We base our calculation on a fixed discount rate of 6 per cent, assuming that pension funds hold 50 per cent in equity and 50 per cent in fixed income positions, yielding respectively 7.5 per cent and 4.5 per cent.

### *Funding positions*

The revaluation of the liabilities makes use of the following formula (compare Biggs (2010) and Novy-Marx and Rauh (2008), who also employ this revaluation rule):

$$L_{\text{alternative}} = L_{\text{reported}} \left( \frac{1 + r_{\text{reported}}}{1 + r_{\text{alternative}}} \right)^{\text{duration}}$$

where  $r_{\text{reported}}$  stands for the discount rate as reported by the plans and  $r_{\text{alternative}}$  reflects the discount rate of the alternative valuation method.

The term “duration” measures the money-weighted average maturity of the benefit cash flows. The duration also corresponds roughly to the elasticity of the value of liabilities with respect to the rate of interest.<sup>10</sup> The term duration is sometimes also explained as the percentage increase or decrease in a plan’s liabilities owing to a 100 basis point decrease or increase in the discount rate.

The actual duration of the liabilities of a specific plan is determined by the composition of the terms of plan liabilities, however we assume for all plans that the duration of the liabilities is 15 years. Generally speaking, this assumed duration of

9. Over the period 1989-2009, the state pension funds in the United States earned on average 8.1 per cent, but average returns were just 3.9 per cent for the period 1999-2009 (Lav and McNichol, 2011). The Canadian Ontario Teachers’ pension fund reports an average return of 9.7 per cent for the period 1990-2009, and for the period 2000-2009, 6.2 per cent (see <<http://www.otpp.com>>). The Dutch government ABP pension fund earned an average return of 7.1 per cent for 1993-2010, much lower than North America pension funds because of a more conservative asset mix (OECD, 2009b).

10. The change in the value of liabilities  $\Delta L$ , because of a change in the value or rate of interest  $\Delta r$ , can be approximated with the following expression, with D as duration:  $\Delta L \approx -D\Delta r$ .

15 years is assumed to be an appropriate approximation of the duration for most funded DB plans — even though the duration of 15 years would be too high for a very mature fund and too low for a very young plan.

Table 3 displays four panels (Panel A: Pension liabilities in billions of euros; Panel B: Pension liabilities as a percentage of GDP; Panel C: Funding ratios; Panel D: Pension fund residue as a percentage of GDP), where each panel is subdivided into the valuation as reported by the plans themselves plus three different methods of valuation:

- Reported: Liabilities as reported by the individual schemes, based on local regulatory practice.
- Liability-based discount rate based on the inter-bank swap rate curve: The “fair value” liabilities are our very rough approximation of the liabilities of the individual schemes, determined using a market-based discount rate. This valuation method is inspired by the Netherlands.<sup>11</sup> As the market for government bonds in the Netherlands is quite limited in terms of size and trading rates, the supervisor prescribes that fair valuation has to be based on the nominal swap curve. We use the 30-year nominal swap rate as the market discount rate for nominal liabilities as the duration of a 30-year swap rate is about 15 years. Table 3 informs on the 30-year nominal swap rates at the end of 2008 for the different countries.
- Liability-based discount rate equal to 4.5 per cent: This method bases the valuation on an assumed nominal interest rate on government bonds. This rate, indicated in the table as *R<sub>b</sub>* (rate of interest on government bonds), is assumed to be 4.5 per cent; this being the sum of a 2.5 per cent real interest rate and 2 per cent expected inflation. This rate is also consistent with long-term GDP growth rates in OECD countries, which reflects the growth in the government’s tax base which is the financing source for public pensions.
- Asset-based discount rate equal to 6 per cent: The valuing of the liabilities is based on an assumed discount rate of 6 per cent as a proxy for the assumed rate of return on assets equal to the expected rate (indicated in the table as *ER*). We base our calculation on a fixed discount rate of 6 per cent, assuming that pension funds hold 50 per cent in equity and 50 per cent in fixed income positions, yielding respectively 7.5 per cent and 4.5 per cent.

Panel A of Table 3 reports the absolute value of liabilities in billions of euros, which is strongly related to country size.

Panel B expresses the liabilities as a percentage of GDP. The highest values can be found in the Netherlands, with fair value liabilities around 54 per cent of GDP (sum

11. One may ask why the Netherlands do not use real discount rates as they aim at full indexation of accrued nominal benefits. The actual granting of indexation depends on whether there is overfunding above the nominal value of pension liabilities. As indexation is uncertain and dependent on the funding position, Dutch pension funds therefore need not account for the indexation ambition explicitly and can make use of nominal swap rates and not real rates.

Implicit debt in public-sector pension plans

**Table 3.** Funding position of funded public-sector pension plans as reported by plan sponsors, using a market-based discount rate, using an assumed long-term government interest rate of 4.5% and using an assumed rate of return on assets of 6%

<b>Panel A</b>		<b>Liabilities in billion euros</b>			
Country	Plan	Reported	Fair value	Rb 4.5%	ER 6%
Canada	Public Service	66.8	97.6	82.7	66.8
	OTTPF	68.6	75.4	63.8	51.5
Netherlands	ABP	195.7	195.7	171.1	138.2
	PfZW	78.7	78.4	68.6	55.4
Sweden	Federal	19.0	16.4	13.0	10.5
United Kingdom	West Yorkshire	5.5	8.1	6.9	5.5
	Approx. all local government plans	542.1	795.9	671.3	542.1
United States	All plans	2,110.8	4,444.3	3,459.8	2,793.9
Australia	CSS Super	32.0	60.7	49.2	39.7
	ESS Super	13.8	27.9	22.6	18.2
Norway	Federal	28.2	34.0	33.9	27.4
France	Additional	5.4	4.2	3.6	2.9
<b>Panel B</b>		<b>Liabilities as % GDP</b>			
Country	Plan	Reported	Fair value	Rb 4.5%	ER 6%
Canada	Public Service	7.2	10.5	8.9	7.2
	OTTPF	7.4	8.1	6.8	5.5
Netherlands	ABP	38.6	38.6	33.8	27.3
	PfZW	15.5	15.5	13.5	10.9
Sweden	Federal	7.3	6.3	5.0	4.0
United Kingdom	West Yorkshire	0.3	0.5	0.4	0.3
	Approx. all local government plans	33.4	49.0	41.3	33.4
United States	All plans	20.7	43.5	33.9	27.4
Australia	CSS Super	5.2	9.9	8.1	6.5
	ESS Super	2.3	4.6	3.7	3.0
Norway	Federal	13.6	16.4	16.4	13.2
France	Additional	0.3	0.3	0.2	0.2

Table 3. Continued

Panel C		Funding ratios (%)			
Country	Plan	Reported	Fair value	Rb 4.5%	ER 6%
Canada	Public Service OTTPF	104.9	71.7	84.7	104.9
		90.5	82.4	97.3	120.5
Netherlands	ABP PfZW	89.8	89.8	102.6	127.1
		90.7	91.0	104.0	128.8
Sweden	Federal	104.8	121.8	153.3	189.8
United Kingdom	West Yorkshire Approx. all local government plans	79.6	54.2	64.3	79.6
		58.6	39.9	47.3	58.6
United States	All plans	65.1	30.9	39.7	49.2
Australia	CSS Super ESS Super	9.3	4.9	6.1	7.5
		61.5	30.4	37.5	46.4
Norway	Federal	67.0	55.6	55.7	68.9
France	Additional	113.0	146.3	167.3	207.2
Panel D		(Residue) as % GDP			
Country	Plan	Reported	Fair value	Rb 4.5%	ER 6%
Canada	Public Service OTTPF	0.3	-3.0	-1.4	0.3
		-0.7	-1.4	-0.2	1.1
Netherlands	ABP PfZW	-4.0	-4.0	0.9	7.4
		-1.4	-1.4	0.5	3.1
Sweden	Federal	0.4	1.4	2.7	3.6
United Kingdom	West Yorkshire Approx. all local government plans	-0.1	-0.2	-0.2	-0.1
		-13.8	-29.4	-21.8	-13.8
United States	All plans	-7.2	-30.1	-20.4	-13.9
Australia	CSS Super ESS Super	-4.8	-9.5	-7.6	-6.0
		-0.9	-3.2	-2.3	-1.6
Norway	Federal	-4.5	-7.3	-7.3	-4.1
France	Additional	0.0	0.1	0.2	0.2

Source: Ponds, Severinson and Yermo (2011).

of ABP and PfZW); the United States, with 44 per cent; and the United Kingdom, with 49 per cent.

Panel C informs on the funding ratios as reported and for the three different valuation models.<sup>12</sup> For the valuation method based on an expected rate of return

12. "Funding ratio" is defined as assets over liabilities: funding ratio = assets/liabilities. "Funding residue" is the balance between assets and liabilities: funding residue = assets minus liabilities.

(ER) of 6 per cent, the plans in Canada, the Netherlands, Sweden and France show high funding ratios far above 100 per cent. Even with this favourable discounting method, plans in the United Kingdom and the United States are severely underfunded. The level of funding is much lower for the alternative, fair value valuation method. Most plans are in a position of severe underfunding. The best funded plan is in Sweden with a funding ratio of 122 per cent, whereas Australia and the United States have funding ratios with indexed liabilities around 30 per cent.

Panel D expresses the pension fund residue (the difference between assets and liabilities) as a percentage of GDP. These results can be interpreted as the implicit government debt, which is comparable with the implicit debt position of unfunded plans. Underfunding implies that accrued pension rights are not matched in full by adequate funding so that future taxpayers may have to make additional tax payments to fund the part of pension promises that are as yet unfunded.

Panels C and D would suggest that underfunding in public-sector pension funds is common. This is the case irrespective of the method used to value the pension liabilities, although the underfunding situation is clearly aggravated when the fair value approach is used. However, it has to be recognized that these funding ratios are derived from values during or just after the financial crisis. It might be possible that public-sector pension funds are financially sound and healthy in less extreme periods; for example, those funds in the Netherlands, Canada, and Sweden.

### **Public-sector pension plans not backed by pension plan assets**

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The liabilities of public-sector plans not backed by pension plan assets (either PAYG or book-reserved) can be perceived as a kind of implicit government debt (Holzmann, Palacios and Zviniene, 2004). The costs of pension promises are not borne by the generation that has granted them, but have to be paid by later generations of taxpayers when they lead to actual pension payments. This section provides an estimation of the size of this implicit debt position for the plans in consideration in this article. It is important to note, however, that government sponsorship of these plans, and the relative guarantee that this may imply compared to the private sector, may also be considered an implicit asset.

#### *Pay-as-you-go plans*

Some public-sector pension schemes are financed on a PAYG basis. For these plans, no provision is made in the plan sponsor's financial statements for any liability and benefits due are payable out of the plan sponsor's general budget.

The implicit debt position in PAYG plans is equal to the present value of plan participants' future benefits, based on the pension rights acquired in the past service

**Table 4.** *Liabilities in PAYG and book-reserved plans*

Panel A	PAYG plans	Benefits 2008	Reported value liabilities	Discount rate	Fair value liabilities	
					In billion euros	As % GDP
France	Civil servants, magistrates and the military	45.5	n.a.	n.a.	1,456	72
	Local governments	12.4	n.a.	n.a.	397	19
	Total	57.9			1,853	91
Germany	Civil servants	28.7	n.a.	n.a.	918	35
	Other	18.3	n.a.	n.a.	586	23
	Total	47.0			1,504	58
Sweden	Local governments	n.a.	31	n.a.	27	7
Finland	Local (KuEL) and federal (VaEL) net of funded part	6.2	n.a.	n.a.	148	77
Norway	All	3.0	n.a.	n.a.	103	50
Panel B	Book-reserved plans	Benefits 2008	Reported value liabilities	Discount rate (%)	Fair value liabilities	
					In billion euros	As % GDP
United Kingdom	Civil servants	3.9	119	5.25	157	8
	National Health Services	5.0	218	4.60	262	14
	Teachers	4.4	172	6.50	270	14
	Total	13.3	509		689	36

years. Accordingly, the debt position may be perceived as the Accrued Benefit Obligation (ABO) of a PAYG-financed plan, when such a plan is treated as a fictitious funded DB plan. In Table 4, Panel A, we have very roughly estimated the fictitious ABO of the PAYG-financed plans on a fair value basis (swap rate).<sup>13</sup>

### *Book-reserved public-sector pension plans*

Some public-sector pension schemes finance their obligations using the book reserve method. This means that the plan sponsor holds a provision in their balance sheet for the liabilities of the plan, but there are no assets set aside in a pension fund

13. This estimation has been made using the annual benefit payments of the plans in recent years as reported by the plans themselves. For an accurate determination of the ABO, we also need to have knowledge of the future cash flows based on accrued rights from past years of service, and knowledge of the actuarial principles (e.g. mortality tables, career parameters) and the current composition of the scheme members regarding age and gender, as these aspects determine the present value factors needed to translate benefit cash flows into the benefit obligations. As we have no knowledge of future benefit cash flows nor of present value factors, we have to fall back on rules of thumb that can be derived from the practice of real-life public-sector pension funds offering benefits of the same kind.

to cover these obligations. Rather, as benefits become due, payments are made out of the plan sponsors' general budget. Of the plans that we examined, the United Kingdom schemes for civil servants, the NHS and teachers are financed via the book reserve method.<sup>14</sup>

As was done for the plans with pension fund assets in the previous section, Table 4, Panel B presents the liabilities of the book-reserved plans on the reported basis and on the fair value basis (using a market discount rate).

### **Net unfunded liabilities across countries**

Funded pension schemes, in principle, accumulate assets to cover the future payments of promises when those promises become payable. However, underfunding in funded plans could also be interpreted as implicit debt for future generations of taxpayers. Underfunding implies that accrued pension rights are not matched in full by adequate funding now, so future taxpayers may have to step in to cover future financial shortfalls. The residue position as a percentage of GDP as reported in Table 3, Panel D, can be interpreted as the implicit debt of future taxpayers in funded plans. Table 4, Panel B, in principle, is the implicit debt position of the book-reserved plan.

The reported evidence reflects the actual size of the net unfunded liabilities, which are best for France, Finland, the United States, Norway, Sweden and the Netherlands, as the examined plans in these countries cover around 90 to 100 per cent of active public-sector employees (see Table 5). For the United Kingdom, there is underreporting of the total net unfunded liabilities position as the considered plans cover less than 60 per cent of the active workers in the public sector. This is also the case for Germany and even more so for Canada, as the reported Canadian plans represent about 10 per cent of the total public-sector workforce.

Figure 3 attempts to tie all the information together for all of the examined plans per country so as to get some perspective on the net unfunded liabilities on a fair value basis. Now we can compare the different examined plans, grouped by country, as to the fiscal burden for future taxpayers in one dimension. In principle, this fiscal burden, the implicit pension debt, can be replaced by explicit government debt, if the governments were to turn to the capital market and borrow the money necessary to back all unfunded pension promises made to public-sector workers to date. However, as stated previously, to the extent that pre-funding of government pension promises leads to investment in domestic government bonds, this may lead to circularity in government funding.

14. The Australian PSS scheme is partially funded, partially book-reserved, with assets at about 30 per cent of liabilities. The Norwegian SPK plan is partially funded, partially book-reserved with assets at about 60 per cent of liabilities. These partially-funded schemes have been discussed in the section on funded public-sector pension plans.

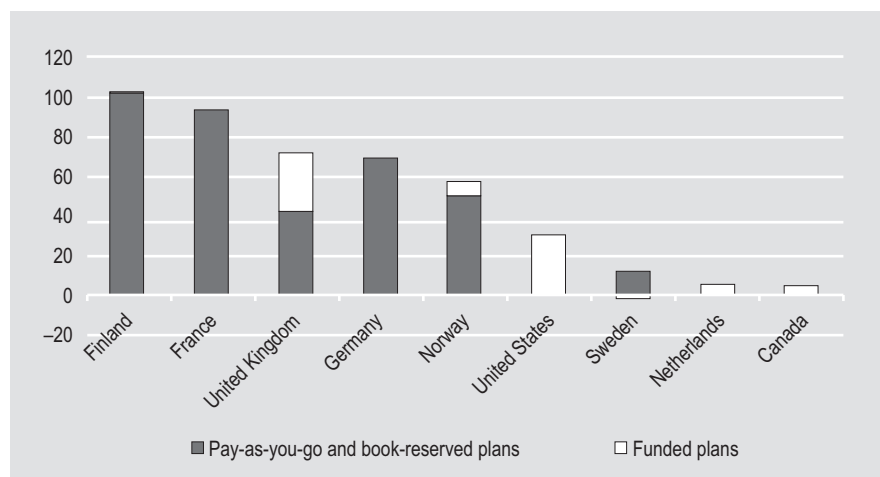


**Table 5.** *Relative size of examined pension plans*

Country	Relative size of pension plans* (percentage)
France	86
Finland	95
United Kingdom	56
Germany	50
United States	<100
Norway	88
Sweden	100
Netherlands	100
Canada	10

Note: \* = number of active members in examined plans / number of public-sector employees  
 Source: Ponds, Severinson and Yermo (2011).

**Figure 3.** *Net unfunded liabilities of the examined public-sector plans on a fair value basis, as percentage of GDP (end of 2008)*



Source: Ponds, Severinson and Yermo (2011).

The examined plans in Finland, France, the United Kingdom and Germany rank the highest in terms of their net unfunded liability, with the Finnish level reaching 102 per cent of GDP and the French one 93 per cent of GDP. The net unfunded liabilities in Sweden, the Netherlands (ABP and PfZW together), and Canada (only public servants) are low due to the relatively high funding levels in the examined

funded plans. The examined plans in the United States (all state and local plans) and Norway fall between these two positions.

### Concluding remarks

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Pension promises for government workers are a major policy challenge for four main reasons. First, the state is usually the largest employer in the country and hence it usually faces large commitments to provide pensions for its employees. Second, these pension promises, often in the form of DB plans, tend to be relatively generous, especially when compared to private-sector arrangements. In some cases, higher pension promises may compensate for lower cash pay in the public sector relative to the private sector. Third, in some countries these pension plans are underfunded, or paid for directly from government revenues (the PAYG financing mechanism). Fourth, there is as yet no international standardized method of reporting public-sector pension liabilities, as there is now for exchange-listed private sector companies in most countries. The valuation and disclosure of these promises is, all too often, less than transparent, which may hide potentially huge fiscal liabilities to be passed on to future generations of workers.

A fair comparison between countries regarding the fiscal burden of their DB public-sector pension plans is hindered by the country-specific use of valuation and reporting methods. To arrive at a fair comparison, we have estimated for a number of plans the size of the net unfunded liabilities using a market discount rate (“fair value” approach) and a common fixed discount rate, both as of the end of 2008.

The fiscal burden as a result of underfunding can also be interpreted as the implicit pension debt for government, as future generations of taxpayers may have to pay for these underfunded accrued pension promises. It should be noted, however, that the government sponsorship of public-sector DB plans might also be considered an implicit pension asset, because of the relatively longer time horizon of the government as plan sponsor and the potentially stronger level of credit worthiness of government as compared to plan sponsors in the private sector.

The limitations of this study should be considered. Not all pension plans for public-sector workers were examined in each country. In France, Finland, the Netherlands, Norway, and Sweden, the plans analysed cover most (over 85 per cent) of public-sector employees, so the plans can be considered representative of the public sector. However, for Canada, the implicit liabilities calculated only refer to plans covering 10 per cent of the public sector, while the equivalent figure for Germany and the United Kingdom is around 50 per cent.

Furthermore, in estimating the liabilities on a fair value basis, we made a series of assumptions (such as their duration), seeing as detailed actuarial information on the plans surveyed is not available. Irrespective of the valuation method used (actuarial or fair value), calculations of funding ratios and net unfunded liabilities

may be subject to potential criticism in that they are based on a given set of assumptions that may not represent accurately the long-term financial challenge faced by governments in meeting their pension commitments on an ongoing basis. For instance, the use of market discount rates, as in the fair value approach, incorporates the erratic and not always rational behaviour of capital markets in the calculation of long-term pension commitments.

One key policy message from this study is that better disclosure and transparency is needed as regards the commitments made by governments to public-sector employees. While general social security systems are under increased scrutiny, information on public-sector arrangements is often only partially or not readily available. Also, an international debate should be instigated on how to compare these commitments internationally, in order to assist the understanding of their fiscal impact. This article has sought to offer a first attempt at providing such internationally comparable data.

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