

# ENTITLEMENTS OF HOUSEHOLDS UNDER GOVERNMENT PENSION SCHEMES IN THE EURO AREA – RESULTS ON THE BASIS OF THE NEW SYSTEM OF NATIONAL ACCOUNTS

## ARTICLES

Entitlements of households  
under government pension  
schemes in the euro area –  
results on the basis of  
the new System  
of National Accounts

*This article presents the results obtained when household entitlements under government pension schemes in the euro area are recorded on the basis of the System of National Accounts, 2008 (2008 SNA). While the treatment of government pension schemes in the core accounts has hardly changed, the 2008 SNA provides an international statistical standard for compiling supplementary data on pension entitlements under unfunded defined-benefit schemes managed by the general government and also social security schemes. The rough magnitude of unfunded entitlements vis-à-vis general government is known owing to various studies undertaken by international organisations such as the IMF, the OECD and the World Bank. However, the 2008 SNA makes provision for more detailed information in terms of pension entitlements as outstanding amounts, their accumulation and the impact of pension reforms. It increases the transparency of household and general government finance, allows a better comparison across countries and economic areas and is particularly relevant in view of the far-reaching implications of population ageing in the euro area and many industrial economies.*

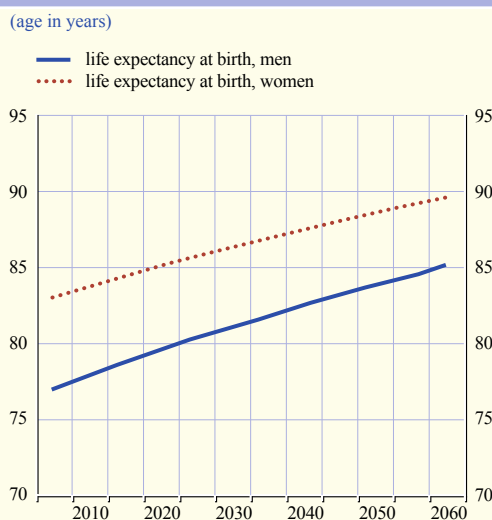
*Household entitlements under government pension schemes as presented in this article cannot be used as an indicator to assess the fiscal sustainability of unfunded pension schemes. For that purpose the concept of pension entitlements needs to be extended to include entitlements that will be accrued in the future, while at the same time comparing these “claims” with future social contributions and tax payments.*

## I INTRODUCTION AND POLICY CHALLENGES

Owing to increasing life expectancy and low birth rates, the population in the euro area is ageing and is expected to decline. According to the central scenario prepared by Eurostat, life expectancy at birth in the euro area is projected to increase in the period from 2008 to 2060 by 7.5 years for men (from 77.5 years in 2008 to 85.0 years in 2060) and by 6.1 years for women (from 83.4 years in 2008 to 89.5 years in 2060). As shown in Chart 1, this implies a continuation of the gradual convergence of the life expectancy of men and women. As regards the birth rate in the euro area, although it is expected to rise slightly, from 1.55 births per woman in 2008 to 1.67 births per woman in 2060, this is still substantially below the rate of 2.1 births per woman that would be needed for each generation to replace itself.<sup>1</sup>

To assess the policy challenges arising from the above demographic projections for the financing of pay-as-you-go government pension schemes, it is useful to analyse the implications by taking stock of pension entitlements already accrued to date, from both a national accounts perspective and a forward-looking economic perspective.

Chart 1 Projected life expectancy at birth in the euro area



Source: European Commission and the Economic Policy Committee (2009), 2009 Ageing Report: economic and budgetary projections for the EU-27 Member States (2008-2060), European Economy No 2, 2009.

<sup>1</sup> See also European Commission and the Economic Policy Committee, “2009 Ageing Report: economic and budgetary projections for the EU-27 Member States (2008-2060)”, European Economy, No 2, 2009.

From a forward-looking economic perspective, according to the 2009 Ageing Report by the European Commission and Economic Policy Committee, government expenditure on pensions in the euro area is projected to rise from the level of 11.1% of GDP in 2007 to 13.9% of GDP in 2060, with significant differences across the euro area countries. In conjunction with the euro area's weak structural fiscal position, this overall rise in ageing-related costs in an environment in which potential GDP growth is declining to some extent would contribute to significant risks to the long-term sustainability of public finances identified in the Sustainability Report 2009.<sup>2</sup> Reducing these risks requires the implementation of the so-called three-pronged strategy agreed upon by the Stockholm European Council in 2001 which consists of (i) fostering fiscal consolidation, (ii) increasing productivity and employment and (iii) reforming social security systems including pensions.

The above-mentioned stocktaking approach is based on the recording of pension entitlements which pensioners and employees have accrued through their past social contributions. These household pension entitlements are obligations of general government. Even though they are not recorded as government debt, governments are expected to fulfil their commitments to (current and future) pensioners. In the light of the projected demographic developments, it is of interest to record the size of these obligations and monitor their development over time.

It must be stressed that gauging general government accrued-to-date pension obligations does not suffice in itself to allow an assessment of the sustainability of public finances. This is because the evolution of future contributions to pay-as-you-go government pension schemes is not taken into account. Notwithstanding, if recorded systematically and over a long time horizon, data on accrued obligations may contribute usefully to assessing, inter alia, to what extent the size of pension obligations changes in response to reforms of government pension schemes, e.g. increases in the statutory retirement age. According to the literature, the size of these accrued-to-date pension

entitlements of households or obligations of general governments is very significant, although differing widely across countries.<sup>3</sup>

The recently adopted 2008 SNA recommends that the accrued-to-date pension entitlements of households be recorded under unfunded defined-benefit schemes managed by government and social security schemes in a supplementary table on pensions.<sup>4</sup> Moreover, the European System of Accounts, which is currently being revised, will be amended in line with this approach. These amendments aim to allow pension data of countries with different types of pension scheme to be compared, especially in the case of major economic areas, such as the euro area, the United States and Japan. Against this background, the aim of this article is to survey the changes in the 2008 SNA with respect to accrued-to-date pension entitlements and to present estimates for the euro area prepared by the European Commission (Eurostat)/ECB Task Force on Pensions established by the Committee for Monetary, Financial and Balance of Payments Statistics.<sup>5</sup>

The article is structured as follows. Section 2 provides an overview of how pension

2 See European Commission, "Sustainability Report 2009", *European Economy*, No 9, 2009.

3 For a survey of estimates, including those of the OECD and IMF, see R. Holzmann, P. Palacios and A. Zviniene, "On the economics and scope of implicit pension debt: an international perspective", *Empirica*, No 28, 2001, pp. 97-129. The studies surveyed date back to the mid-1990s and find implicit pension liabilities of between 200% and 350% of GDP for individual euro area countries.

4 The 2008 SNA, the most important international statistical standard, is an updated version of the System of National Accounts, 1993 (1993 SNA). It is the fifth version of the SNA, the first of which was published over fifty years ago, and it was adopted by the United Nations Statistical Commission in 2008 and 2009. The 2008 SNA was prepared under the auspices of the Inter-Secretariat Working Group on National Accounts (ISWGNA), which consists of five organisations: Eurostat, the IMF, the OECD, the United Nations Statistics Division and regional commissions of the United Nations Secretariat and the World Bank. The 2008 SNA is published jointly by the five organisations. It is available at the website of the United Nations Statistics Division (<http://unstats.un.org/unsd/sna1993/snarev1.asp>).

5 The estimates refer to accrued-to-date pension entitlements of households vis-à-vis unfunded employment-related government pension schemes, including social security schemes. See also R. Mink, M. Rodriguez, E. Barredo and J. Verrinder, "Reflecting pensions in National Accounts – Work of the Eurostat/ECB Task Force", a paper prepared for the 30th General Conference of the International Association for Research in Income and Wealth (IARIW), August 2008.

entitlements of households are currently recorded in national accounts and introduces the new way of recording pension data recommended in the 2008 SNA. Section 3 presents estimates of pension entitlements under government pension schemes in the euro area in comparison with data provided for the United States. It describes these data from the perspective of households and also from a general government perspective. Section 4 briefly considers the projections published in the 2009 Ageing Report for all EU Member States. Their methodological basis is also compared with the concept of accrued-to-date pension entitlements. Section 5 concludes.

## 2 PENSION ENTITLEMENTS OF HOUSEHOLDS UNDER GOVERNMENT SCHEMES, AS COMPARED WITH HOUSEHOLD ASSETS

Pension entitlements of households can be recorded either as financial assets in the national accounts or as contingent assets.<sup>6</sup> Those treated as financial assets constitute financial claims that beneficiaries have vis-à-vis either their employer or a pension manager designated by the employer to pay pension benefits earned as part of a compensation agreement concluded between the employer and the employee. Those treated as contingent assets usually represent “conditional claims” on unfunded pension schemes managed by general government, including social security schemes. As counterparts, they are recorded as contingent liabilities of the government, the obligations of which cover these contingencies together with government debt.

### SOCIAL INSURANCE PENSION SCHEMES

Under social insurance pension schemes, beneficiaries are obliged or encouraged to take out insurance to cover their risks and needs in old age. The most important pension benefit covered by social insurance pension schemes is income in retirement, but other contingencies may also be covered. For example, pensions may be payable to widows and widowers, or to people who have suffered an injury at work and are no longer able to work. Social assistance

benefits may be provided independently of participation in a social insurance scheme. A third form of pension is that provided under individual insurance policies.

As shown in Box 1, there are different types of social insurance pension scheme in the euro area: they may be managed by general government, as is predominantly the case, or by non-government entities; they may be designed as employment-related pension schemes, such as defined-contribution, defined-benefit or hybrid schemes, or as social security schemes. Employment-related schemes may be funded or unfunded, while social security schemes tend to be financed on a pay-as-you-go basis, through social contributions or government transfers.

In the System of National Accounts, 1993 (1993 SNA), obligations to provide pension benefits were recognised as liabilities for employment-related defined-contribution and funded defined-benefit schemes, but not for unfunded defined-benefit and social security schemes. The recently adopted 2008 SNA recommends that pension entitlements under unfunded defined-benefit schemes managed by general government and social security schemes be recorded as supplementary data.<sup>7</sup> This will allow pension data of countries with different types of pension scheme to be compared, especially in the case of major economic areas, such as the euro area, the United States and Japan.

Social security pension schemes and unfunded defined-benefit schemes managed by general government are particularly important for the euro area. Accordingly, there is an interest in comprehensive information on accrued-to-date government obligations that will need to be financed in future, in view of demographic developments and the foreseeable fiscal burden owing to ageing populations.

6 As contingent assets and liabilities do not give rise to unconditional obligations either to make payments or to provide other objects of value, they are not recorded as financial assets and liabilities in the national accounts. For details, see paragraph 2.29 of the 2008 SNA.

7 For details, see Chapter 17 of the 2008 SNA.

## Box 1

**SOCIAL INSURANCE, SOCIAL ASSISTANCE AND INDIVIDUAL INSURANCE POLICIES**

Social insurance is the predominant form of pension scheme in the euro area, covering social security pension schemes (classified as belonging to the general government sector) which, in many cases, are organised for major parts of the population, and employment-related pension schemes established by employers, including government, for their own employees.<sup>1</sup> The distinction between social security schemes and employment-related schemes varies considerably from country to country, with the consequence that the coverage and, therefore, the national perception of what the term “social security” means also vary considerably, especially between European and non-European countries.

In contrast to social insurance benefits, social assistance benefits are payable without qualifying contributions having been made to a social insurance scheme.

Individual insurance policies are policies that beneficiaries take out in their own names without being members of a scheme organised collectively for groups of employees, as in the case of social insurance.

Employment-related social insurance pension schemes may be managed by general government or by non-government entities, and they may be funded or unfunded. Funded schemes finance pension benefits by drawing down segregated and earmarked assets. Their design calls for them to hold assets equal to their liabilities. These schemes can be exactly funded, under-funded or over-funded, depending on the size of the accumulated assets in relation to the pension entitlements. Unfunded schemes finance current pension payments with the ongoing contributions paid by future pensioners and/or other ongoing revenue, such as taxes or transfers; unfunded schemes may nevertheless hold assets (for liquidity reasons, for example, or as buffer funds).

<sup>1</sup> Chapter 17 of the 2008 SNA describes the recording of pension schemes in the form of social insurance, social assistance and individual insurance schemes. A new chapter on pensions will also be part of the revised European System of Accounts.

**Social insurance pension schemes**

Characteristics	Social insurance			
	Social security		Employment-related social insurance	
	The beneficiary is obliged or encouraged to take out insurance against contingencies (old age, unemployment, illness, long-term care) by intervention of a third party.			
Form of organisation	Organised by general government via social security schemes		Organised by employers on behalf of their employees and their dependants or by others on behalf of a specified group	
Type of social insurance	Social security pension schemes	Other social security	Employment-related pension schemes	Other employment-related social insurance
Sector	Social security funds		Sector or sub-sector of employer or pension funds	

Employment-related pension schemes are broken down further into defined-contribution pension schemes and defined-benefit pension schemes. In a defined-contribution scheme, the benefits are defined exclusively in terms of the level of the fund built up from the contributions made over the employee's working life and the increases in value that result from the investment of these funds. These schemes are organised like accounts owned by the scheme participants, as the level of benefits on retirement depends on the balance in the defined-contribution scheme account. The entire risk of the scheme to provide an adequate income in retirement is thus borne by the employee. In a defined-benefit scheme, the benefits payable to the employee on retirement are determined through the use of a formula, either alone or in combination with a guaranteed minimum amount payable. This formula typically considers the length of service and some measure of final or average pay. The risk of a defined-benefit scheme to provide an adequate income in retirement is borne by the employer. Hybrid schemes with both a defined-benefit and a defined-contribution element are usually classified as defined-benefit schemes.

#### DIFFERENT RECORDING OF DEFINED-CONTRIBUTION AND DEFINED-BENEFIT SCHEMES

Institutional differences across countries with respect to pension schemes (e.g. a relatively large proportion of defined-contribution schemes in the United States, the Netherlands and the United Kingdom, as opposed to relatively large social security and government-managed unfunded defined-benefit schemes in most euro area countries) result in significant differences across the national accounts, making international comparisons difficult. In particular, household pension entitlements in countries with mainly defined-contribution schemes are recorded as household assets, while rather small amounts of pension entitlements are recorded in countries in which pension schemes are predominantly organised as government-managed unfunded schemes, as in Germany, France and Italy.

Looking at the data currently reported in household balance sheets on life insurance and pension assets, euro area countries with a large proportion of defined-contribution schemes show rather high ratios of household life insurance and pension assets as a percentage of household gross disposable income (GDI) (see Table 1). The opposite is the case for euro area countries with social security pension schemes for the majority of the population

and also unfunded defined-benefit schemes managed by general government.

In the euro area, defined-contribution pension entitlements (including life insurance products) totalled €4.8 trillion in 2008, covering 80% of household GDI (see also Table 5) or 11% of household assets, held predominantly with pension funds.<sup>8</sup> In the United States, life insurance and pension assets amounted to USD 10.4 trillion in 2008, which corresponds

<sup>8</sup> See Table 3.3 under the Euro area accounts sub-section of the Euro area statistics section in this issue of the Monthly Bulletin.

**Table 1 Household life insurance and pension assets**

(percentages of household GDI at the end of the year)

Country/area	1999	2007	2008
Euro area	64.4	84.0	79.7
<i>of which: Germany</i>	64.2	82.8	84.8
<i>France</i>	69.6	96.7	94.5
<i>Italy</i>	33.6	54.1	51.3
<i>The Netherlands</i>	296.0	324.4	268.7
United Kingdom	261.5	247.9	201.8
United States	138.4	129.2	98.0
Japan	103.3	119.5	.

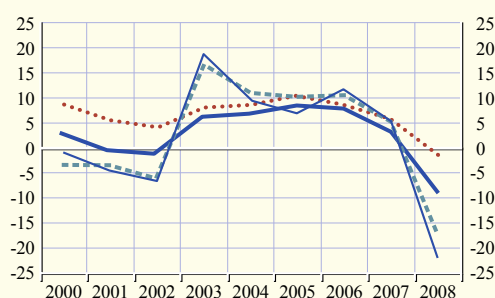
Sources: ECB, European Commission (Eurostat), UK Office for National Statistics, US Federal Reserve Board, US Bureau of Economic Analysis, Bank of Japan, Economic and Social Research Institute and the Cabinet Office of the Government of Japan.

Notes: End-of-year figures. Data include life insurance and pension assets; they refer predominantly to defined-contribution schemes.

**Chart 2 Household life insurance and pension assets, and financial assets**

(annual percentage changes)

- euro area financial assets
- ... euro area life insurance and pension assets
- - - US financial assets
- US life insurance and pension assets



Sources: ECB and US Federal Reserve Board.

to 98% of household GDI or some 16% of household assets.

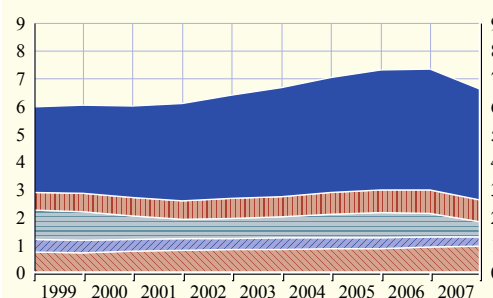
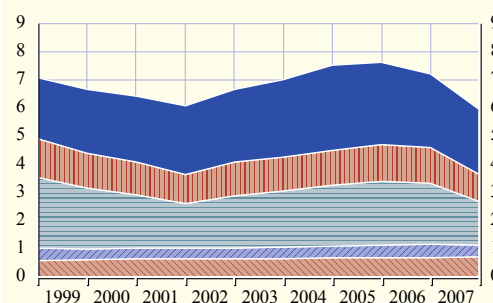
In the euro area, the annual growth rate of household life insurance and pension assets declined from 10% in 2005 to 6% in 2007, mainly on account of diminishing holding gains (see Chart 2). In 2008 the assets decreased by more than 1%. This was relatively moderate in comparison with the 8% drop in euro area household financial assets, mainly as a result of valuation losses in the course of the financial crisis.

By contrast, US household financial assets dropped by about 17% in 2008. Most of the loss in assets was accounted for by shares and other equity, which fell by 27% in 2008. Pension fund assets in the United States also declined sharply, falling by 22% in 2008. This relatively large negative impact on household life insurance and pension assets in the United States, as compared with the rather moderate decline in the euro area, is related to the fact that defined-contribution schemes in the United States are far more exposed to the financial crisis via their heavy financial investment in equity than schemes in the euro area, which hold mainly debt securities.

**Chart 3 Household assets in the euro area and in the United States**

(multiples of annual household GDI)

- non-financial assets
- life insurance and pension assets
- shares and other equity
- long-term deposits and debt securities
- short-term deposits and debt securities

**Euro area household assets****US household assets**

Sources: ECB, US Bureau of Economic Analysis and US Federal Reserve Board.

Note: Household non-financial assets in the euro area refer to residential real estate and in the United States to residential real estate and tangible assets.

In general, the growth rates of US household life insurance and pension assets have been more volatile than those of corresponding investments of euro area households since 2000 (see Chart 3).

### A BROADER VIEW OF HOUSEHOLD PENSION ENTITLEMENTS

In order to make it possible to provide a comprehensive view on social insurance pension entitlements, the 2008 SNA recommends that a supplementary table be compiled in which all pension entitlements are recorded in balance sheets on an accrued-to-date basis. Entitlements

under unfunded defined-benefit schemes managed by government are not recorded in the standard national accounts, but in this supplementary table. The same applies to social security pension entitlements.

The supplementary table on social insurance pension schemes provides a framework for compiling and presenting balance sheet, transaction and other flow data for all pension entitlements from the perspective of both debtors (pension funds) and creditors (households). The table shows stock and flow data for specific pension schemes, such as government-managed unfunded defined-benefit schemes and social security pension schemes, that are not fully recorded in the standard national accounts. In principle, the supplementary table covers the pension part of social insurance only. Social assistance, health or long-term care insurance and individual insurance policies (related to pensions) are not included. However, it contains elements of social assistance that are covered indistinguishably within pension schemes that are generally organised as social insurance. Entitlements for survivors (e.g. dependent spouses, children and orphans), as well as benefits for disability and invalidity are included in the supplementary table if they are an integral part of the pension scheme.

Table 2 presents the supplementary table as included in Chapter 17 of the 2008 SNA. The rows show the opening and closing balance sheet positions of the various social insurance pension schemes, and also the transactions and other flows during an accounting period. In essence, the table reconciles the opening and closing positions of pension entitlements (rows 1 and 10) for all social insurance pension schemes that exist in an economy. Transactions shown in the table are social contributions received (row 2), pension benefits paid (row 4), transfers of pension entitlements (row 6) and consequences of pension reforms (row 7). Other economic

flows cover revaluations and other changes in volume (rows 8 and 9) during an accounting period. The columns distinguish between different types of pension scheme according to various criteria – the principle of recording (in the standard national accounts, or not in the standard accounts), the pension manager and the sector of the scheme (government or non-government), and the type of the scheme (defined-contribution, defined-benefit or social security) – with separate columns (G and H) for the “non-standard account” schemes – unfunded government-managed defined-benefit and social security pension schemes. Column J shows all household pension entitlements.

Only the items in the table that are shaded in yellow add to the transaction data on social contributions and pension benefits that are already recorded. The additional flow data are essential to derive data on pension entitlements. They comprise data on imputed social contributions paid by employers (row 2.2) and household supplementary contributions (row 2.4), other actuarial changes in social security pension entitlements (row 3) and changes arising from revaluations and other changes in volume. Together with the transaction data on both employers’ and household actual social contributions (rows 2.1 and 2.3) and pension benefits (row 4), which are also recorded in the standard national accounts, they permit a full and consistent set of stock and flow data to be compiled for pension schemes, as shown in columns G and H.

In the absence of data from other sources or reporting agents, national statistical institutes, in cooperation with other national agencies, perform the actuarial calculations underlying columns G and H on pension schemes managed by government. This is a new task for statisticians, which requires extensive experience in handling financial models for pension annuities and life insurance.

Table 2 Supplementary table on pension schemes in social insurance

Row No	Recording	Standard national accounts			
	Pension manager	Non-general government			Defined-contribution schemes
Column number		Defined-contribution schemes	Defined-benefit schemes and other <sup>1)</sup> non-defined-contribution schemes	Total	Defined-contribution schemes
		A	B	C	D
<b>Opening balance sheet</b>					
1	Pension entitlements				
<b>Changes in pension entitlements due to transactions</b>					
2	Increase in pension entitlements due to social contributions				
2.1	Employer actual social contributions				
2.2	Employer imputed social contributions				
2.3	Household actual social contributions				
2.4	Household social contribution supplements <sup>5)</sup>				
3	Other (actuarial) changes in pension entitlements in social security pension schemes				
4	Reduction in pension entitlements due to payment of pension benefits				
5	Changes in pension entitlements due to social contributions and pension benefits				
6	Transfers of pension entitlements between schemes				
7	Changes in pension entitlements due to pension scheme reforms				
<b>Changes in pension entitlements due to other flows</b>					
8	Changes in pension entitlements due to revaluations <sup>6)</sup>				
9	Changes in pension entitlements due to other changes in volume <sup>6)</sup>				
<b>Closing balance sheet</b>					
10	Pension entitlements				

Notes:

- 1) Other non-defined-contribution schemes, often described as hybrid schemes, have both a defined-benefit and a defined-contribution element.
- 2) Schemes organised by general government for its current and former employees.
- 3) These are non-autonomous defined-benefit schemes the pension entitlements of which are recorded in the standard national accounts.
- 4) Counterpart data for non-resident households will only be shown separately when pension relationships with the rest of the world are significant.

### 3 ENTITLEMENTS TO GOVERNMENT PENSIONS IN THE EURO AREA

#### SUPPLEMENTARY DATA ON PENSION SCHEMES MANAGED BY GOVERNMENT

In order to obtain a complete picture of the pension entitlements of households in the euro area, data on transactions and other

economic flows in the course of 2007 as well as outstanding positions in pension entitlements at the end of 2006 (the opening amounts) and the end of 2007 were estimated with the assistance of the European Commission (Eurostat)/ECB Task Force on Pensions (see Box 2). These estimates were based on national pension models, and also on benchmark calculations provided by



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Standard national accounts		Not in the standard national accounts		Total pension schemes	Counterparts: pension entitlements of resident households <sup>4)</sup>
General government					
Defined-benefit schemes for general government employees <sup>2)</sup>			Social security pension schemes	I	J
Classified in financial corporations	Classified in general government <sup>3)</sup>	Classified in general government			
E	F	G	H		
Opening balance sheet					
Changes in pension entitlements due to transactions					
Changes in pension entitlements due to other flows					
Closing balance sheet					

5) These supplements represent the return on members' claims on pension schemes through investment income on defined-contribution schemes' assets and, for defined-benefit schemes, through the unwinding of the discount rate applied.

6) A more detailed split of these positions should be provided for columns G and H based on the model calculations carried out for these schemes. The cells shown as   are not applicable; the cells in   will contain different data from the standard national accounts.

the Forschungszentrum Generationenverträge (Research Centre for Generational Contracts at Freiburg University).

Table 3 provides an overview of these benchmark calculations, covering about 54% of the government-managed unfunded defined-benefit schemes and 73% of the social security schemes in 2007. According to these estimates,

pension entitlements under government-managed unfunded defined-benefit schemes accounted for about 79% and pension entitlements under social security schemes for 415% of household GDI at the end of 2007 (see also Table 5). These results are broadly in line with the findings in the literature on estimating the size of accrued-to-date pension entitlements. Differences relate mainly to the reference

**Table 3 Pension entitlements under government-managed pension schemes in the euro area**(percentages of annual household GDI in 2007; projected-benefit-obligation valuation<sup>1)</sup>)

Position	Column No	
	Government-managed unfunded defined-benefit schemes	Social security pension schemes
	G	H
Pension entitlements (opening balance sheet)	77.4	406.0
Increase in pension entitlements due to social contributions	4.1	29.7
Other (actuarial) change of pension entitlements		-2.3
Reduction in pension entitlements due to payment of pension benefits	3.0	14.4
Changes in pension entitlements due to social contributions and pension benefits	1.1	13.1
Changes in pension entitlements due to pension reforms	-0.0	-4.1
Pension entitlements (closing balance sheet)	78.5	415.0
<i>Memo: Pension entitlements (closing balance sheet) in EUR billions</i>	<i>2,270</i>	<i>17,404</i>

Sources: ECB and Research Centre for Generational Contracts, Freiburg University.

Notes: The row and column numbers refer to the corresponding row and column numbers in Table 2.

1) See Box 2 for details on the valuation methods.

year, the proportion of pension schemes included in the estimates, the denominator (household GDI in this case, but GDP in other studies), as well as methodological specifications that follow the new international standards, and macroeconomic assumptions. Moreover, the approach applied in this article provides a coherent set of stock and flow data, as outlined in Table 2. In 2007, the reference year of the estimates presented in this article, accrued pension entitlements in the euro area totalled about 490% of annual household GDI (330% of GDP), with government-managed unfunded defined-benefit schemes amounting to about 79% of household GDI (52% of GDP) and pension entitlements under social security schemes for 415% of household GDI (278% of GDP).

Estimates of accrued contingent pension entitlements have been provided for France and Germany in recent years. The estimates for France, which were carried out by INSEE, put implicit social security pension entitlements at 259% of GDP in 2003. The figure is broadly in line with the results published in a study by the Banque de France, in cooperation with the US Bureau of Economic Analysis. According to the calculations undertaken for Germany by DESTATIS, social security pension entitlements

amounted to about 230% of GDP in 2005. The entitlements derived for social security pension schemes in these country studies compare well with the estimates provided for the euro area (278% of GDP in 2007). Preliminary estimates for pension schemes established for civil servants have been carried out recently in some country studies. For the euro area, they amounted to 52% of GDP in 2007.<sup>9</sup>

These estimates should be considered from two perspectives, namely that of households and that of the government. From the household perspective, they provide additional information on household assets, including contingent pension entitlements. From the government's perspective, they add to the data on government liabilities, including contingent pension obligations. However, as set out in Box 3, these

<sup>9</sup> See R. Holzmann et al. 2001; D. Blanchet and S. Le Minez, "Assessing implicit pension liabilities for the French pension system: a micro-founded approach", a paper prepared for the 30th General Conference of the IARIW, August 2008; D. Durant and M. Reinsdorf, "Implicit social security and pension wealth in household assets in the US and France", a paper prepared for the 30th General Conference of the IARIW, August 2008; and A. Braakmann, J. Grütz and T. Haug, "Das Renten- und Pensionsvermögen in den Volkswirtschaftlichen Gesamtrechnungen", Statistisches Bundesamt, *Wirtschaft und Statistik* 12/2007, pp. 1167-79.

**Table 4 Sensitivity analysis of household entitlements under government pension schemes in the euro area**

(percentages of household GDI)

Real discount rate as a percentage	Real wage growth rate as a percentage					
	1		1.5		2	
Schemes	G	H	G	H	G	H
2.6	79.2	419.1	83.9	446.3	89.2	477.2
2.8	76.6	404.6	81.1	430.2	86.1	459.3
3.0	74.2	390.8	78.5	415.0	83.2	442.4
3.2	71.9	377.8	75.9	400.7	80.4	426.5
3.4	69.7	365.5	73.5	387.2	77.8	411.6

Sources: ECB and Research Centre for Generational Contracts, Freiburg University.

Notes: Pension entitlements as percentages of household GDI; end-2007; projected-benefit-obligation valuation; sensitivity analysis based on varying the real discount rate and real wage growth; baseline scenario: a real discount rate of 3% and real wage growth of 1.5%; G – government-managed unfunded defined-benefit schemes; H – social security pension schemes.

figures do not allow a direct assessment of fiscal sustainability, which would need to be based on a more comprehensive approach, including revenue projections.

Similar actuarial calculations have been carried out by the US Bureau of Economic Analysis for

private and government-managed defined-benefit schemes and for social security pension schemes in the United States.<sup>10</sup> Currently, both defined-benefit and defined-contribution schemes play important roles in financing retirement for households.<sup>11</sup> While government-managed unfunded defined-benefit schemes are virtually non-existent in the United States, pension entitlements from private defined-benefit pension schemes add the equivalent of about 80% of US household GDI to US household assets (see also Table 5, row 5). Moreover, US households have contingent social security pension entitlements of about 160% of household GDI (see also Table 5, row 10).<sup>12</sup>

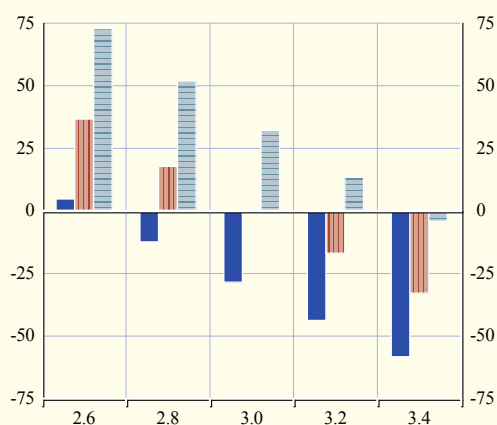
In order to account for the uncertainty surrounding the actuarial estimates of contingent pension entitlements of euro area households, sensitivity analyses were carried out. The calculations shown

**Chart 4 Sensitivity analysis by varying the real discount rate and the real wage growth rate**

(percentages of household GDI)

**Government-managed unfunded defined-benefit schemes and social security pension schemes**

- real wage growth rate at 1%
- real wage growth rate at 1.5%
- real wage growth rate at 2%



Sources: ECB and Research Centre for Generational Contracts, Freiburg University.

Notes: Pension entitlements as deviations from the baseline scenario as percentages of household GDI; end-2007; projected-benefit-obligation valuation; sensitivity analysis based on varying the percentage of the real discount rate (x-axis) and the real wage growth rate; baseline scenario: a real discount rate of 3% and a real wage growth rate of 1.5%.

10 See M. B. Reinsdorf and D. G. Lenz, "Defined benefit pensions and household income and wealth", Survey of Current Business, August 2009; and D. Durant and M. Reinsdorf, op. cit.

11 In the US private sector, newly established pension schemes are almost always defined-contribution schemes. The number of private sector defined-benefit schemes is declining very slowly but remains above 40,000. The population covered is ageing rapidly, so that benefit payments are rising faster than contributions. Moreover, the United States also has over 2,500 defined-benefit pension schemes for employees of state and local governments, while the federal government manages about 40 defined-benefit schemes for its employees.

12 Social security is covered in the estimates for the United States. It is a social insurance programme, not a social assistance programme. It is not very different from social security in Europe, except that the benefits are generally lower relative to average earnings because of the expectation that the retiree will also have income from employer schemes or from individual insurance schemes.

in Table 4 and Chart 4 are based on various model assumptions, with a baseline scenario assuming a long-term real discount rate of 3% and an annual real wage growth of 1.5%. To check the robustness of the results, the baseline assumptions were changed as indicated in the table and in the chart. For these calculations, the projected-benefit-obligation (PBO) method was applied (see Box 2).

As shown in Chart 4, the impact of a change in the real discount rate on the amount of pension entitlements is substantially higher

than that of changes in the real wage growth. The calculations based on the PBO valuation lead to stocks of pension entitlements that are usually 10% to 20% higher than entitlements valued on the basis of the accrued benefit obligations (ABO). Moreover, the sensitivities in the case of PBO valuation are more pronounced than in the case of ABO valuation. Hence, accrued-to-date pension entitlements related to government-managed pension schemes amounted to between 430% and 570% of household GDI in the euro area at the end of 2007.

## Box 2

### ACTUARIAL ESTIMATES OF PENSION ENTITLEMENTS

All pension entitlements of households are assessed as part of the extended household balance sheet in the national accounts (showing assets and contingent assets) at a certain point in time, usually at the year-end. The pension entitlements under unfunded social insurance are recorded in gross terms, meaning that no accrued-to-date obligations of households reflecting future social contributions to finance the pension entitlements are taken into account; instead only the accrued-to-date pension entitlements for current and future pension benefits are covered, i.e. the pension entitlements accrued by current workers (including deferred pension entitlements) and the remaining pension entitlements of existing pensioners. As for all national accounts data, the data are measured ex post, as they include only the current values of the entitlements that arise from already accrued pension rights. The method is based on observable past events and transactions, such as membership of the pension scheme and contributions paid. However, these ex post measures also rely on some assumptions in the modelling process. The probability that current contributors may die or become disabled before reaching pensionable age needs to be estimated. The approach also covers future changes to the (defined) pension benefits owing to any legislation enacted prior to the year for which pension entitlements are calculated. Finally, the method requires assumptions about future developments, notably the development of the discount rate for future pension disbursements.

As with all other assets, the pension entitlements are entered into the extended household balance sheet at their value on the balance sheet date. Since actuarial values for pension entitlements related to unfunded social insurance in the euro area are typically not made available by the manager of the pension scheme, compilers of national accounts have to estimate the actuarial value.

The real discount rate applied has a relatively large impact on the overall amount estimated. Sensitivity analyses using several different discount rates (or discount rate differentials) are strongly recommended. Three choices may be considered for a discount rate to be applied

to government-managed pension schemes: (i) a discount rate based on the yield on (central) government bonds; (ii) a discount rate based on the yield on high quality corporate bonds; and (iii) a risk-free rate reflecting the time value of money. The preferred discount rate is the yield on central government bonds (or, exceptionally, high quality corporate bonds). These should, ideally, have a residual maturity of the same order as the pension entitlements (e.g. 30 years, which corresponds to the average length of pension entitlement payments).

Another important aspect is the assumption about real wage growth used in the calculations of entitlements under defined-benefit pension schemes, where the level of pensions is determined by applying a formula to the member's salary. One approach is to assume that there is no future real wage growth – the accrued-benefit-obligation method. The alternative approach is to make an explicit non-zero assumption for wage growth – the projected-benefit-obligation method – which would take account of expected promotions and other factors driving real wages.

#### A COMPREHENSIVE VIEW OF HOUSEHOLD PENSION ENTITLEMENTS AND GOVERNMENT PENSION OBLIGATIONS

The data provided in balance sheets for the euro area and in these preliminary compilations allow a more comprehensive picture of household assets – including household contingent pension assets – and liabilities, to be drawn. Household wealth is broken down into non-financial assets (housing) and financial assets. Table 5

illustrates that household assets in the euro area (excluding contingent pension entitlements) were more than seven times annual household GDI at the end of 2007; the same calculation for the United States shows that household entitlements were more than eight times larger than annual household GDI. Contingent pension entitlements of households in the euro area are larger than those in the United States – at approximately five times and two times annual household GDI respectively. There are

**Table 5 Household assets, liabilities, net worth and contingent pension entitlements in the euro area and the United States**

(multiples of household GDI; end-2007)

Item	Euro area	United States
<b>Assets</b>	<b>7.3</b>	<b>8.3</b>
Non-financial assets	4.4	2.8
Financial assets	3.0	5.5
<i>Of which:</i>		
Life insurance and pension assets (as currently reported)	0.8	1.3
<i>Of which:</i>		
Pension entitlements under private defined-benefit schemes <sup>1)</sup>	.	0.8
<b>Liabilities</b>	<b>0.9</b>	<b>1.4</b>
<b>Net worth (assets minus liabilities)</b>	<b>6.4</b>	<b>6.9</b>
<i>Memo items:</i>		
<i>Contingent pension entitlements</i>	<i>4.9</i>	<i>1.6</i>
<i>Under government-managed defined-benefit schemes<sup>2)</sup></i>	<i>0.8</i>	<i>0.0<sup>3)</sup></i>
<i>Under social security pension schemes</i>	<i>4.2</i>	<i>1.6<sup>4)</sup></i>

Sources: ECB, European Commission (Eurostat), Research Centre for Generational Contracts, Freiburg University, US Bureau of Economic Analysis and US Federal Reserve Board.

1) For the euro area, data are not yet available; for the United States, data refer to end-2006.

2) Government-managed defined-benefit schemes are predominantly unfunded in the euro area, but are predominantly funded in the United States.

3) Government-managed unfunded defined-benefit schemes are practically non-existent in the United States although the pre-1983 federal government scheme was unfunded and still supports many retirees.

4) US households have contingent social security pension entitlements.

**Table 6 General government debt and contingent pension entitlements in the euro area and the United States**

(multiples of GDP; end-2007)

Item	Euro area	United States
<b>Maastricht debt</b>	<b>0.7</b>	<b>0.6<sup>1)</sup></b>
<i>Memo items:</i>		
<b>Contingent pension obligations</b>	<b>3.3</b>	<b>1.1</b>
<i>Government-managed defined-benefit schemes<sup>2)</sup></i>	<i>0.5</i>	<i>0.0<sup>3)</sup></i>
<i>Social security pension schemes</i>	<i>2.8</i>	<i>1.1<sup>4)</sup></i>
<b>Debt including contingent pension obligations</b>	<b>4.0</b>	<b>1.7</b>

Sources: ECB, European Commission (Eurostat), Research Centre for Generational Contracts, Freiburg University, US Bureau of Economic Analysis and US Federal Reserve Board.

1) Currency and deposits, loans and debt securities incurred by general government (consolidated).

2) Government-managed defined-benefit schemes are predominantly unfunded in the euro area, but are predominantly funded in the United States.

3) Government-managed unfunded defined-benefit schemes are practically non-existent in the United States.

4) US households have contingent social security pension entitlements.

practically no pension entitlements recorded under US government-managed unfunded defined-benefit schemes, but many under social security pension schemes.

From the figures shown in Table 5 information can be derived on government pension obligations arising from government-managed pension schemes at the end of 2007. Table 6 provides an overview of gross government debt in the euro area and in the United States as conventionally measured. It shows that government debt was between 60% and 70% of GDP (see Table 6). If all contingent pension liabilities are taken into account, government obligations in the euro area at the end of 2007 were more than five times higher than gross government debt (see Table 6). The associated increase in government obligations is less significant in the United States.

#### ASSESSING THE IMPACT OF PENSION REFORMS ON ENTITLEMENTS UNDER GOVERNMENT PENSION SCHEMES

The calculations presented above may have substantial implications for future rates of benefits, taxes and social contributions. Reforms of government-managed defined-benefit pension schemes are on the agenda of most governments in the euro area as these schemes are far more strongly affected by demographic changes than defined-contribution pension schemes. A demographic

change that reduces the number of contributors relative to the beneficiaries will require a reduction in average pension benefits if contribution rates are to remain constant. Alternatively, for constant pension benefits, contribution rates (or tax payments) would have to be increased. To avoid an unbalanced burden either on beneficiaries or on contributors, different strategies of pension reform are typically considered.

Reforms may take the form of adjusting the existing scheme arrangements with regard to the level of pension benefits and social contributions (parametric reforms). Alternatively, fundamental changes may be made to the structure of the financing of pension benefits (systemic reforms). They may be carried out by setting up a new scheme for new contributions or new contributors, while largely maintaining the current scheme for accrued entitlements. Policy simulations based on pension models are useful for broadly assessing the impact of parametric pension reforms by modifying parameters and input data for existing schemes. In this context, several important determining factors of the accrued pension entitlements can be identified. The levels of pension benefits actually paid are regarded as quite important as they are a direct determinant of the stock of pension entitlements. The retirement age is an additional determining factor. Other factors are the indexation of pension benefits, as well as reductions in future pension benefits on account of pension reforms already enacted.

In several euro area countries, pension reforms have been carried out in recent years by, inter alia, gradually raising the statutory retirement age. If the effective retirement age rises in line with the increase in the statutory retirement age, pension benefits will decrease as eligible individuals will draw pension payments for a shorter period of time. In parallel, the payment of pension contributions over a longer period adds to the revenue of pension schemes.

According to policy simulations, the impact of raising the effective retirement age for the euro area by one year would lower pension entitlements by 2.7%, and by 5.2% if it is increased by two years (relative to the baseline scenario shown in Table 4). A further aspect to be considered when modelling such an increase in the retirement age is that the outcome of the reform depends also on the behavioural assumptions regarding new beneficiaries with respect to changes in the retirement age, the penalty for early retirement and legislation on, for example, granting disability benefits.

#### 4 PROJECTIONS OF THE IMPACT OF AGEING POPULATIONS ON GOVERNMENT PENSION EXPENDITURE – THE 2009 AGEING REPORT

In April 2009 the ECOFIN Council endorsed the 2009 Ageing Report for the EU-27 Member States (2008-2060), which had been prepared by the European Commission and the Economic Policy Committee on the basis of commonly agreed demographic and macroeconomic assumptions. As explained in Box 3, the concept

of implicit pension liabilities, as applied in the Ageing Report, differs from that of estimating accrued-to-date pension entitlements in the national accounts as it projects total age-related government expenditure including pensions over a long horizon.

Both concepts are linked to each other: accrued-to-date pension entitlements are compiled ex post taking into consideration all “claims” accrued by current workers and the remaining pension entitlements of existing pensioners. In this respect, they are only a sub-set of implicit pension liabilities. Implicit pension liabilities also include, in addition to pension entitlements that have accrued to date, inter alia, pensions to be paid to people who are not yet in the labour market, some of whom have not even been born yet. To this extent, implicit pension liabilities are a forward-looking concept that is based on a broader set of projections.<sup>13</sup>

<sup>13</sup> The amount of such implicit liabilities may be much higher than the amount of accrued-to-date pension entitlements. In an empirical study undertaken with data for the social security pension scheme in Germany, these implicit pension liabilities (open-system gross pension obligations) were calculated at 622% of GDP in 2006 of which less than half were accrued-to-date pension obligations. Future social contributions and taxes added up to 535% of GDP in 2006 leading to a relatively low balancing item, the “financing gap” of approximately 88% of GDP. See C. Müller, B. Raffelhueschen and O. Weddige, “Measuring pension liabilities and the perspective of sustainability: the case of the reformed German statutory pension scheme”, Discussion Paper No 39, Research Centre for Generational Contracts, Freiburg University, September 2009.

## Box 3

**PENSION ENTITLEMENTS ACCRUED TO DATE AND IMPLICIT PENSION LIABILITIES**

The concepts of accrued-to-date pension entitlements and implicit pension liabilities, as applied in the 2009 Ageing Report for the EU-27 Member States (2008-2060), are linked to each other. Accrued-to-date contingent pension entitlements are compiled on the basis of a national accounts concept. They are derived *ex post* as they only include the pension entitlements accrued by current workers and the remaining pension entitlements of existing pensioners.

Pension entitlements accrued to date are a component of a broader definition of implicit pension liabilities. They represent only a fraction of the pensions to be paid in the future. According to the 2009 Ageing Report, government pension expenditure in the euro area is projected to increase by 2.8 percentage points to nearly 14% of GDP by 2060 if it is assumed that policies remain unchanged.<sup>1</sup> These future payments can be divided into four groups: (a) for each year, pensions have to be paid to people who have already retired today. Given the mortality of pensioners, this group of payments is expected to progressively decline in importance and will become zero upon the death of the last people who have already retired today; (b) pensions have to be paid in future to people working today, in relation to the entitlement they have already acquired up to the present moment. This share of payments will increase for several years, as people currently working will progressively retire; it will then decrease in line with mortality; (c) pensions have to be paid to people already in the labour market, in relation to the entitlements they will accumulate from the present moment until their retirement; and (d) pensions have to be paid in the distant future to people who are not yet in the labour market, some of whom are yet to be born.

Accrued-to-date pension entitlements, as measured in national accounts, correspond to (a) and (b) if account is taken of the necessary modelling assumptions such as the discount rate or wage growth. The concept that is relevant for assessing sustainability, by contrast, corresponds to (a) to (d), together with the related government revenues. However, implicit pension liabilities are also derived by making corresponding assumptions related to the discount rate and other parameters of pension models.

Accordingly, accrued-to-date pension entitlements are based on a backward-looking actuarial estimation, even though the estimation requires projections on the future development of interest rates, wages and the population. By contrast, implicit pension liabilities are a forward-looking concept based on a broader set of projections, and they are set to be used in the EU's new medium-term budgetary objectives. For reasons of consistency, it is appropriate to harmonise the data input for calculations of accrued-to-date contingent pension entitlements and also for projections of government pension expenditure.

In practice, there are cases in which the results derived for accrued-to-date pension entitlements and for implicit pension liabilities appear to point in different directions. Countries may have large accrued-to-date contingent pension entitlements, but their implicit pension liabilities are not expected to increase in the future. These countries have mature pension systems, so that large accrued-to-date contingent pension entitlements have been accumulated over time.

<sup>1</sup> The results of the 2009 Ageing Report are described in Box 7 of the June 2009 issue of the Monthly Bulletin.



On account of both demographic developments and the design of the pension system, however, future pension expenditures are not under strain. On the other hand, there are also countries that may have small accrued-to-date contingent pension entitlements, but their implicit pension liabilities are expected to increase in the future. These are typically countries that have a new pension system, so that the accrued-to-date contingent pension entitlements are still small. These countries will have obligations for the future pensioners in the future, and these are reflected in their implicit pension liabilities.

## 5 CONCLUSION

As described in the article, the 2008 SNA foresees supplementary data on pension entitlements of households under government pension schemes, as will the European System of Accounts, which is currently being revised. Following this approach, the European Commission (Eurostat)/ECB Task Force on Pensions has already undertaken preparatory work to provide estimates of these pension entitlements under unfunded defined-benefit schemes managed by government and under social security schemes. In the absence of data from other sources or reporting agents, the national statistical institutes have carried out these estimates in cooperation with other national agencies. This was a rather new and challenging task, requiring extensive experience in actuarial finance.

The data compiled in accordance with the new, globally agreed and harmonised methodology confirm that accrued-to-date contingent pension entitlements are very significant in the euro area, even exceeding the portfolio of all financial assets or that of non-financial assets owned by households. They total approximately 490% of households' annual gross disposable income (or 330% of GDP). In terms of government obligations, they are about five times higher than government debt. The results are in line with those of earlier studies reviewed by the World Bank for a wide range of countries, including several euro area countries, and with estimates calculated by the national statistical offices of Germany and France.

It must be stressed that the compilation of general government accrued-to-date pension

obligations does not allow an assessment of the sustainability of public finances. This would only be possible if the evolution of future contributions to the pension schemes were fully accounted for. Nevertheless, if recorded systematically over a long time horizon, data on accrued-to-date pension obligations may contribute usefully to gauging, inter alia, to what extent the size of pension obligations changes in response to reforms of government pension schemes, e.g. increases in the statutory retirement age.

Given the size of the ageing-related fiscal burden, it is necessary for countries to find an intergenerational balance between securing appropriate pensions in the future and maintaining the social security burden for members of the labour force within tolerable limits. The same also applies to other types of government obligations in the form of health care and long-term care. The implementation of the so-called three-pronged strategy agreed upon by the Stockholm European Council in 2001 is essential. It comprises (i) fostering fiscal consolidation, (ii) increasing productivity and employment and (iii) reforming social security systems including pensions.