

Unclassified

STD/CSTAT/WPNA(2011)12

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development

22-Nov-2011

English - Or. English

**STATISTICS DIRECTORATE
COMMITTEE ON STATISTICS**

Working Party on National Accounts

Comment on the Treatment of Defined Benefit Pensions in SNA 2008
Marshall Reinsdorf
US Bureau of Economic Analysis
July 28, 2011

To be held on 27-28 October 2011
OECD Conference Centre
Beginning at 2:30 p.m. on the first day

The complete document is only available in PDF format

This document has been prepared by Marshall Reinsdorf, US Bureau of Economic Analysis. It will be under item 1.c of the draft agenda as an information document.

JT03311875

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The draft *UN-ECB Handbook on Financial Production, Flows and Stocks in the System of National Accounts* (circulated in May 2011) includes a discussion of the new treatment of defined benefit (DB) pension plans in the 2008 SNA. Unfortunately, this treatment is difficult to explain because the 2008 SNA is not entirely clear and its recommendations can result in overstated measures of saving by the employer. The genesis of the problem might be a supposition that shortfalls in the property income from assets in pension funds are covered by holding gains on those assets. Substitution of holding gains for property income can indeed cause of a shortfall in property income, but so can insufficient assets or low rates of return on investments. Many pension funds have insufficient assets or rates of return on investments that are below the one assumed in actuarial calculations, so it is important to handle these cases correctly.

The example of the recording of DB pension transactions shown in table 17.8 of the 2008 SNA (pp. 364-365) has saving by the pension fund equal to -1.2 (SNA 2008, 17.173).¹ This implies that saving by the pension fund need not be zero. Letting the pension fund have non-zero saving results in a misleading picture of saving by institutional sectors. For example, in the case of a pension fund that is recorded as having negative saving and that does not have holding gains, the employer's pension expense will be understated and the employer's saving will be overstated. For the government sector of the US, these distortions are quite significant.

In addition, a problem of clarity arises in the last three rows of table 17.8. In these rows, the change in assets of the pension fund is $4.1 - 2.3 = 1.8$ and the change in liabilities of the pension fund is 3.0. The implied negative change in net worth seems at odds with paragraph 17.165, which states that the net worth of the DB pension fund is always exactly zero. If the assumption is that holding gains bring the change in the fund's assets up to +3, that it is not made clear by the example. In any event, in the concluding section of this comment I suggest an alternative method for recording the property income transactions of pension funds that have holding gains.

¹ The table also shows the pension fund as having service charges and output of 0.6, but neglects to show this amount as paid to anyone. The 0.6 must represent purchases of intermediate inputs from other sectors or payments of compensation to the pension fund's own employees. As shown in the attached revised version of table 17.8, the change in pension fund assets should thus be -2.9 , not the -2.3 shown in the table, and saving by the pension fund should be -1.8 . But consistent recording of pension fund service charges is not the main focus of this comment.

Employers' Imputed Interest Expense as a Counterpart to Employers' Imputed Contributions

In table 17.8 employers' imputed contributions are calculated as the difference between the benefit entitlements accruing through service to the employer net of employee's own contributions and employers' actual contributions to the pension fund plus the amount needed to cover the cost of the pension fund's operations (17.152). This is appropriate, because the total of employers' actual and imputed contributions is used to measure pension-related compensation of the employees enrolled in the plan (17.153).

Benefits accruing through service that exceed actual contributions are the only kind of funding gap that results in an imputed transaction between the employer and the pension fund. Yet the employer who makes the pension promises is generally also responsible for covering shortfalls between the property income accruing on households' benefit entitlements and the returns that the pension fund receives on its assets.² This makes a different treatment of these two current sources of increase in benefit entitlements hard to justify. Indeed, benefits accruing through service to the employer are effectively calculated as a residual by subtracting property income on the benefit entitlement from the current change in the value of the benefit entitlement. If the opening plan assets are equal in value to the opening benefit entitlements and the plan assets earn the rate of return that is assumed in calculating the property income on the benefit entitlements, then an employer contribution equal to the net benefits accruing will be sufficient to prevent a gap from emerging between benefit entitlement the pension fund assets arise. On the other hand, this amount will be insufficient if the employer has made inadequate past contributions. Missing assets imply missing property income, which will eventually have to be replaced by increased contributions from the employer.

In the example of table 17.8, households are shown as receiving the full amount of the property income accruing on their pension entitlements even though the pension fund does not receive the resources needed to pay this amount. The shortfall between the pension fund's actual property income and the property income payable on the benefit entitlements is covered by negative saving by the pension fund. If pension benefit payments are partly funded from holding gains and the holding gains equal to the shortfall in the property income received by the pension fund, recording negative saving for the pension fund might be justified on the grounds that the holding gains will enable the pension fund to pay the promised benefits with no increase in contributions from the employer. Yet even in this case, the allocation of total economy saving to the five institutional sectors of paragraph 4.24 would be distorted by the inclusion of the negative saving of the pension funds in the saving of the financial corporations sector.

² Like table 17.8, I am assuming that there are no agreements transferring responsibility for repairing shortfalls in the pension fund's assets to parties other than the employer. Pension rules can specify automatic increases in **employee** contributions when benefit entitlements grow faster than the pension fund's assets. This makes covering shortfalls in property income a shared responsibility of the employer and the employees. But such rules are unusual.

Moreover, a shortfall in assets caused by a history of inadequate actual contributions is often the cause of the shortfall in income from pension fund assets. In these cases, treating a shortfall in property income as negative saving by the pension plan may result in an expense of a government or a nonfinancial corporation being mischaracterized as an expense of the financial corporations sector.

This problem can be avoided by recording imputed interest on the pension fund's claim on the employer. Employer's imputed contributions are treated as net lending from the pension fund to the employer, so adding an entry for imputed interest on these imputed loans to the employer would make the logic of table 17.8 internally consistent.

A Real World Example

DB pension plans for employees of the US government illustrate the importance of recognizing the gap between property income payable on benefit entitlements and property income receivable on pension plan assets as an expense to the employer. For these plans in 2007, benefit entitlements accrued through service net of employee contributions were 40.9 billion dollars and employer actual contributions were 98.0 billion (Table 1). Adding 0.1 billion to cover the plans' administrative expenses, the employer imputed contributions defined in SNA table 17.8 therefore equals -57.0 billion. Yet these plans also had an interest expense on benefit entitlements of 139.6 billion, and property income on assets of only 49.4 billion, leaving a shortfall of 90.2 billion.

Suppose for purposes of illustration that the assets held by the pension funds were bonds issued by nonfinancial corporations and that the administrative expenses represent purchases of intermediate inputs from these corporations. Accounting for the government pension plans using the approach of table 17.8 then results in the following breakdown of saving by sector:

Table A: Saving by Sectors in 2007 for US Government DB Pension Plans

Employer (Government)	Pension Funds (Financial Corps.)	Households	Nonfinancial corporations
$-40.9 - 0.1 = \mathbf{-41.0}$	$49.4 - 139.6 = \mathbf{-90.2}$	$40.9 + 139.6 = \mathbf{+180.5}$	$-49.4 + 0.1 = \mathbf{-49.3}$

A proper accounting would show that the employer's saving is -131.2 billion and the pension fund's saving is 0. The employer is just as responsible for the making up the difference between the property income accrued on the accumulated benefit entitlement and the actual property income on pension fund assets as for making up the difference between actual contributions and

accruals of benefit entitlements. Indeed, the actuarial calculation of the cost of current service to the employer assumes that property income equal to the value of the property income accrued on the benefit entitlement will help to fund the benefit payments. If the property income on the assets in the pension fund (plus holding gains on these assets, if applicable) is less than the amount assumed in calculating the service cost to the employer, sooner or later the employer will have to make additional contributions to replace the missing property income.

To rectify this problem, we can recognize employers' imputed interest payments on the accumulated claims of the pension fund on the employer (who is the same as the pension manager for this purpose). The amount shown of this entry is the x such that the sum of the actual property income on pension fund assets (2.2 in table 17.8) and imputed interest income on the fund's claim on the employer (x) equals the household pension contribution supplements (4.0 in table 17.8). This is illustrated in the revised version of table 17.8, which follows table 1.

An Alternative Approach for Plans that Use Holding Gains to Fund Benefits

Many DB pension funds use holding gains on their assets to help fund benefit payments. Because holding gains are not part of saving of the total economy, including changes in benefit entitlements that are funded by holding gains in the saving of households implies that those holding gains must be subtracted from the saving of other sectors. If we adopt the principle that saving by DB pension funds must equal zero, the subtractions will occur in the sectors of the employers.

To avoid an overstatement of the employers' pension expenses when the pension funds have holding gains, the imputed interest on the pension fund's claim on the employer should be measured by applying the rate of interest that was assumed in calculating the value of the benefit entitlements to the value of this claim. Households' property income on benefit entitlements (and also "household pension contribution supplements"), should then be measured as the sum of the actual property income on pension fund assets and the imputed interest on the pension fund's claim on the employer. If the actual property income on plan assets is low because the assets generate their returns in the form of holding gains, this sum will typically be smaller than the property income payable on the entire amount of the benefit entitlements. On the other hand, if the property income is low only because of past underfunding by the employer, the sum will equal the property income payable on benefit entitlements that is now calculated in the SNA.

**Table 1. Household Wealth and Income from Federal Government DB Pension Plans
PBO Approach using Interest, Inflation and Salary Growth Rates Assumed in Plans' Actuarial Reports**

	2000	2001	2002	2003	2004	2005	2006	2007
Benefits accrued during the plan year	34.1	37.7	41.7	38.5	38.3	41.6	42.4	45.1
LESS: Employee contributions	4.8	4.7	4.6	4.6	4.6	4.5	4.4	4.2
EQUALS: Benefits accrued, net of employee contributions	29.3	33.0	37.1	33.9	33.7	37.1	38.0	40.9
PLUS: Interest cost of actuarial current liability	113.3	116.7	116.9	114.8	118.4	126.9	133.0	139.6
EQUALS: Household saving	142.6	149.7	154.0	148.7	152.1	164.0	171.0	180.5
PLUS: Plan administrative expenses	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EQUALS: Household income	142.7	149.8	154.1	148.8	152.2	164.1	171.1	180.6
LESS: Property income from plan assets	48.1	49.2	49.1	48.2	47.0	49.6	47.9	49.4
EQUALS: Employers' current pension expense	94.7	100.6	105.0	100.6	105.2	114.6	123.3	131.2
LESS: Employer contributions	66.6	68.6	72.2	70.4	81.3	85.1	91.2	98.0
EQUALS: Implicit net lending by plans to employer	28.1	32.0	32.7	30.2	23.9	29.4	32.1	33.2
PLUS: Change in plan assets from current transactions	39.3	38.8	40.0	35.3	41.0	42.4	40.6	43.3
EQUALS: Current change in benefit entitlements	67.5	70.8	72.7	65.5	64.9	71.8	72.7	76.4
Addendum:								
Actuarial liability for future benefits	1762.3	1821.2	1859.8	1929.4	2067.9	2169.2	2316.1	2415.1
Plan assets	672.5	711.3	748.4	787.0	822.6	852.1	886.3	907.0
Unfunded actuarial liability	1089.8	1109.9	1111.4	1142.4	1245.3	1317.1	1429.8	1508.1
Funded ratio (%)	38.2	39.1	40.2	40.8	39.8	39.3	38.3	37.6
Change in actuarial liability	72.5	58.9	38.6	69.6	138.5	101.3	146.9	99.0
Change in unfunded actuarial liability	32.5	20.1	1.5	31.1	102.9	71.8	112.6	78.3
Employer's normal cost per active member (dollars)	7187	8082	9065	8197	8110	9011	9258	10010
Employer's normal cost as a % of covered payroll	14.8	16.2	16.7	14.2	13.3	13.9	13.8	14.2
Assumptions:								
Interest rate assumption, civilian plans	7.00%	6.75%	6.75%	6.25%	6.25%	6.25%	6.25%	6.25%
Inflation assumption, civilian plans	4.00%	3.75%	3.75%	3.25%	3.25%	3.25%	3.50%	3.50%
Rate of salary growth, civilian plans	4.25%	4.25%	4.25%	4.00%	4.00%	4.00%	4.25%	4.25%
Interest rate assumption, military plans	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.00%	6.00%
Inflation assumption, military plans	3.00%	3.50%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Rate of salary growth, military plans	3.50%	3.50%	3.50%	3.75%	3.75%	3.75%	3.75%	3.75%

Proposed Revisions to Table 17.8 in SNA 2008

Table 17.8: Accounts for pension benefits payable under a defined benefit scheme - uses

	Employer	Pension fund	Households	Other sectors	Total economy
<i>Production account</i>					
Output					
<i>Generation of income account</i>					
Employers' actual pension contributions	10.0				10.0
Employers' imputed pension contributions	4.1				4.1
<i>Allocation of primary income account</i>					
Employers' actual pension contributions					
Employers' imputed pension contributions					
Property income	1.8			2.2	4.0
Property income payable on pension entitlements		4.0			4.0
<i>Secondary distribution of income account</i>					
Household total pension contributions			19.0		19.0
Employers' actual pension contributions			10.0		10.0
Employers' imputed pension contributions			4.1		4.1
Household actual pension contributions			1.5		1.5
Household pension contribution supplements			4.0		4.0
Pension scheme service charges			-0.6		-0.6
Pension benefits		16.0			16.0

	Employer	Pension fund	Households	Other sectors	Total economy
<i>Use of income account</i>					
Final consumption expenditure			0.6		
Adjustment for change in pension entitlements		3.0			3.0
Saving (actual)	-10.0	-5.9	17.5	-1.6	0.0
Saving (imputed)	-5.9	5.9			0.0
<i>Financial account</i>					
Net borrowing/lending (actual)					
Net borrowing/lending (imputed)					
Change in pension entitlements			3.0		3.0
Change in claim of pension fund on pension manager		5.9			5.9
Other financial assets	-10.0	-2.9	14.5	-1.6	0.0

This table differs from “Table 17.8 – uses” on page 364 of SNA 2008 by including imputed payments of property income by the employer and by treating the output of the pension fund as purchases of intermediate inputs purchased from other sectors. Another possibility would be to assume that the output was produced by the pension fund employees themselves, in which case the payment of 0.6 would be added to household saving rather than to saving by other sectors.

Table 17.8 (cont.): Accounts for pension benefits payable under a defined benefit scheme - resources

	Employer	Pension fund	Households	Other sectors	Total economy
<i>Production account</i>					
Output		0.6			0.6
<i>Generation of income account</i>					
Employers' actual pension contributions					
Employers' imputed pension contributions					
<i>Allocation of primary income account</i>					
Employers' actual pension contributions			10.0		10.0
Employers' imputed pension contributions			4.1		4.1
Property income		4.0			4.0
Property income payable on pension entitlements			4.0		4.0
<i>Secondary distribution of income account</i>					
Household total pension contributions		19.0			19.0
Employers' actual pension contributions		10.0			10.0
Employers' imputed pension contributions		4.1			4.1
Household actual pension contributions		1.5			1.5
Household pension contribution supplements		4.0			4.0
Pension scheme service charges		-0.6			-0.6
Pension benefits			16.0		16.0

	Employer	Pension fund	Households	Other sectors	Total economy
<i>Use of income account</i>					
Final consumption expenditure					
Adjustment for change in pension entitlements			3.0		3.0
Saving (actual)					
Saving (imputed)					
<i>Financial account</i>					
Net lending (actual)	-10.0	-5.9	17.5	-1.6	0.0
Net lending (imputed)	-5.9	5.9			0.0
Change in pension entitlements		3.0			3.0
Change in claim of pension fund on pension manager					5.9
from current service	4.1				4.1
from interest on claim of fund on employer	1.8				1.8

This table differs from “Table 17.8 – resources” on page 365 of SNA 2008 by including imputed payments of property income by the employer and by treating the output of the pension fund as purchases of intermediate inputs from other sectors. Another possibility would be to assume that the output was produced by the pension fund employees themselves, in which case the payment of 0.6 would be added to household net lending rather than to net lending by other sectors.