



Working Party on Financial Statistics

WORKSHOP ON PENSIONS

22-24 April 2013

DOCUMENT A. II. 2.

Comment on the Treatment of defined Benefit Pension Plans in the SNA

by Marshall Reinsdorf (US Bureau of Economic Analysis)

Comment on the Treatment of Defined Benefit Pension Plans in the SNA

by Marshall Reinsdorf
US Bureau of Economic Analysis
April 2, 2013

Accrual-basis recording of the transactions of defined benefit (DB) pension plans is discussed in paragraphs 17.144-17.186 of the SNA. In this discussion, the accrual-basis measure of the DB pension wealth of households is termed “pension entitlements”; “benefit entitlements” is another term for this concept. Assuming that there are no changes in plan provisions or revisions to actuarial assumptions (which would be classified as “other changes in volume of assets”), the pension entitlements of the households participating in DB pension plans are equal to the present value of the future benefit payments that these households have accrued from service to employers and from interest on their existing pension entitlements. Pension entitlements are retired by cash payments of benefits. For example, in the case of a DB plan with no participants that are still in employment phase of the life cycle, benefit payments will exceed the interest accruing on existing pension entitlements, so the net change in pension entitlements will be negative.

How the SNA Measures Household Income from Participation in DB Pension Plans

DB plans usually determine a participant’s annual benefit using a formula that takes into account the number of years of service to the employer and the pay level in the final year, or final few years, of the career. One of the ways that households with DB pension plans accrue additional pension entitlements is therefore through credit for additional service time; if the ABO approach is used for the actuarial calculations, the effects of salary increases received during the year are also included in the measure of benefits accrued through service.

The transactions of DB pension plans in the SNA are illustrated in table 17.8 of the SNA. In this table, imputed contributions to the pension plan from employers equal to the difference between employers’ actual contributions and the contributions that would be necessary to cover the cost of the pension entitlements that the employees accrue through service, less any amounts contributed by the employees themselves, and plus the amount needed to cover the plans’ administrative expenses (see table 1). Consequently, the sum of employers’ actual and imputed contributions is the accrual-basis measure of the compensation income that employees receive from their participation in DB pension plans.

Households also accrue additional pension entitlements by receiving interest on their existing pension entitlements. This income reflects the unwinding of the discounting applied to future streams of benefit payments as the waiting times to the payment dates shorten. In the SNA, pension plans pay this interest to households as property income payable on the pension entitlements.

In the SNA, all of the income that households receive from employers and pension plans is reinjected into the pension plan. This is explicitly shown in the case of property income on the line for “household pension contribution supplements”. The total of all the contributions made by or attributed to households, less a deduction for the pension service charges that were included in employer imputed contributions, therefore equals the gross change in pension entitlements before payment of benefits. In the SNA, this total is termed “household total pension contributions”, but here I will call it simply “household total contributions.”

Because of the way in which employer imputed contributions is defined, adding up all the components of household total contributions in the SNA results in the measure of households’ gross accruals of benefit entitlements. To find the net change in pension entitlements, benefit payments must be subtracted from household total contributions. In the SNA, the net change in pension entitlements is labeled “adjustment for change in pension entitlements.” This adjustment represents the difference between a cash measure of households’ pension income and an accrual measure of households’ pension income.

Besides adding employer contributions and property income on the benefit entitlement, another way to measure household income from participation in DB pension plans is as the gross accruals of pension entitlements, plus the in-kind transfers to households of pension administrative services, less actual household contributions. Some of the gross accruals of pension entitlements are paid to households in the current period as benefits, and the remainder is credited to them as the net change in their pension entitlements, (or “adjustment for change in pension entitlements”). If “Other changes in volume of assets” equal zero, then the net change in pension entitlements during the year will equal the difference between the end-of-year value of pension entitlements and the beginning-of-year value of pension entitlements.

How the SNA Measures Income and Outlays of DB Pension Plans

DB pension plans receive income from employer contributions (which are routed through the household sector), from actual employee contributions, and from property income (mostly interest and dividends) generated by the financial assets that they hold. In the SNA, the property income received by the plan is transferred to households, who then contribute it back to the plan as contribution supplements. (The double counting of property income from plan assets that occurs because it is first received directly by the plans and then received again in an indirect way through contribution supplements is offset on the outlay side by an imputed payment of this property income to households.) Also, in the SNA, the service charges that are included in employers’ imputed contributions are removed from “household total contributions” and shown separately as revenue from implicit sales of output to households.

The cash outlays of pension plans consist of the costs of producing administrative services and payments of benefits. In addition, the accrual measure of pension plan outlays includes the net change in the pension entitlement. Finally, to provide the households the funds that they use for contribution supplements, the SNA shows a payment to households of the property income that the plans have received from the assets.

How the SNA Measures Saving of DB Pension Plans

Summing up all the pension plan outlays and subtracting the result from the pension plans' income gives the SNA measure of pension plan saving (and also their net lending if they have net capital transfers of zero.) Pension plan income includes property income from the assets held by the plan in two places. The outlays, on the other hand, include this property income from the plan assets in one place and the property income payable on the pension entitlements in another place. Saving by pension plans therefore equals the property income from plan assets less the property income payable to households on the benefit entitlement.

In practice this difference between property income receivable on plan assets and property income payable on the pension entitlements will often be negative. This can happen in either of two ways: (1) the investment strategy of the pension manager is to seek holding gains rather than dividend and interest income, or (2) the plan assets are smaller in value than the pension entitlements of the plan participants, which means that the plan is underfunded.

Negative Saving that is Offset by Expected Holding Gains

Many pension managers invest in equities and other financial assets that are expected to provide part of their investment returns from holding gains. If the holding gains materialize as expected and the plan is fully funded, the plan will be able to pay the promised benefits even though its saving is persistently negative.

Many DB pension plans use holding gains on assets to help fund benefit payments. For these plans, the benefits that are expected to be funded via holding gains can be measured by the gap between interest that the plan assets would have earned had they all earned interest at the rate assumed in the actuarial calculations the property income that the assets actually did earn. For example, if the plan assets are 1 million, the rate of interest assumed in the actuarial calculations is 5 percent, and the property income from the assets is 30,000, then the implied funding of benefits from expected holding gains is 20,000.

A pension plan whose financial strategy is to convert holding gains into cash for payment of benefits can reasonably be regarded as having negative saving because it is, in effect, counting on selling appreciated assets to meet its operating expenses. Nevertheless, even in this case, recording negative saving of pension plans will have some practical disadvantages. The entrepreneurial income of the financial corporations sector (which includes pension plans) will, for example, be distorted downwards. In addition, household income will implicitly include a holding gains component, even though holding gains are not part of national income, nor among the distributions that are recognized as income in the SNA.

In light of these disadvantages, a reasonable alternative would be to exclude the part of benefit payments that is funded by expected holding gains from the property income of households. In the case of a fully funded plan (one with assets equal to the pension entitlement of its participants) this can be done by setting the property income payable on pension entitlements equal to the property income receivable on plan assets. Saving by the pension plan would then equal zero by construction.

Because holding gains are not part of saving of the total economy, including accruals of 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 some other sector. The subtraction cannot occur in the sector of the employer, however. Calculating employer imputed contributions in a way that gives no credit for the expected holding gains received by the plans will result in an overstatement of the employer's pension expense and an understatement of saving by the employer.

The only two admissible options are thus to exclude benefits funded via expected holding gains from the measure of the property income payable on the benefit entitlement, thereby excluding them from saving of households, or to let the pension plan have negative saving equal to the expected holding gains. These alternatives should both be considered acceptable.

Underfunded Plans have a Claim on the Employer for the Funding Gap

Pension plan underfunding is more common than plan overfunding, particularly if the smaller gaps between pension plan assets and pension entitlements are ignored. Underfunding can arise because investment returns have been worse than projected, or because the discount rate used to calculate the present value of future benefit flows has been revised downward. Frequently, however, underfunding is not the result of bad luck but rather stems from a failure by the employer to make adequate contributions to the plan. Some of the contributions needed to cover current service costs may have been deferred on account of the employer's cash flow problems, or the employer may have been assuming that unrealistically high future investment returns. Also, some employers may implicitly include an element of pay-as-you-go financing in their pension plan funding strategy, worrying only whether their plan is in danger of being unable to make the benefit payments coming due in the very near future. For example, financial analysts specializing in state and local governments in the US have a rule of thumb that the pension plan is adequately funded if its assets cover 80 percent of its actuarial liability.¹ Finally, some pension systems have inherited a large unfunded actuarial liability from an earlier era when pay-as-you go funding was the norm. For such pension systems, the transition to a fully funded status cannot happen quickly because of the large amount of interest accruing on the inherited actuarial liability. The pension system of the US federal government fits this example.

In the SNA, pension plans have a net worth of zero, so in the case of an underfunded plan a claim on the pension manager is recorded as an additional plan asset. This claim on the pension manager covers the gap between the pension entitlements of the plan participants and value of the plan's assets.

Although the SNA treatment allows for situations in which the pension manager who is not the same as the employer bears all the risks arising from the pension plan, treating the employer as the pension manager will usually be appropriate in practice. In most cases, the employer who has made the pension

¹ When a pension plan is severely underfunded, cash flow projections usually imply that large increases in contributions will soon be needed just to maintain plan solvency, but moderate amounts of pension underfunding typically do not pose any immediate threat to the sustainability of the finances of the sponsoring government. Pension entitlements of households participating in a pension plan are equal to the pension plan's actuarial liability by definition.

promises is the one who is ultimately responsible for making sure that the plan has the means to pay the promised benefits. Treating the claim on the pension manager as a liability of the employer also has the advantage of consistency with the way shortfalls in contributions are handled. These shortfalls are recorded as imputed employer contributions. It is hard to see how a shortfall in contributions can be the responsibility of the employer in the period in which the contribution should have been paid, but then become the responsibility of someone else one period later.

In the case of the US, there is generally no doubt that the claim on the pension manager for unfunded pension entitlements should be assigned to the employer. Private sector employers in the US are legally and contractually bound to fund to benefits that have been accrued to date. (But unless there is a union contract that prohibits it, they are under no obligation to continue to allow employees to accumulate additional benefits in future years.) This means that a private employer whose pension plan is underfunded has a liability to the plan equal to the difference between the ABO and the value of the plan's assets. In recent years many private employers who are not bound by a union contract have terminated their pension plans. In the event of a plan termination, the employer is legally required inject enough money into the plan so that it can purchase annuities from a life insurance that pay the benefits that have been accrued up to the date of the plan termination.² Thus for many private employers in the US, having to actually pay the difference between the ABO and the plan's assets as a lump sum is by no means a remote scenario. Employees of state and local governments also have property rights to the benefits that they have accrued.

Imputing Interest Payable on the Claim on the Employer

When an employer fails to make a contribution in a timely manner, the plan is deprived of the opportunity to earn property income. The plan will need this property income to be able to pay the benefits that are due to the retirees and survivors, so besides making the missed contribution, an employer who fails to make the contribution needed to cover the plan's service cost must also replace the property income that the plan would have been earned had the contribution been made on time. An interest charge should therefore be imputed as payable on the claim on the employer created by missed or delayed contributions. Indeed, all pension funding gaps should result in an imputed interest charge on the plan's claim on the employer because all shortfalls in plan assets compared with the amount needed to cover the benefit entitlement result in shortfalls in plan property income compared with the interest payable by the plan on the benefit entitlement.

In actuarial statements of pension plans, the funding gap is known as the unfunded actuarial liability or UAL. Letting the employer pay interest on the UAL prevents a downward distortion in the present value of the employer's stream of contributions from occurring any time the employer chooses to delay the

² Plan terminations are often preceded by plan freezes. In a plan freeze, employees are given notice that after a certain date, such as the next January 1st, they will cease to accrue any new benefit entitlements. Then later, when the plan is terminated, the employees have the right to choose the timing and survivorship rights of the annuity that they receive from a life insurer. One of the available annuity options gives them the same stream payments that they would have received from the pension plan had it stayed in existence. Employees can freeze a plan but not terminate it want to accept the responsibility of keeping the plan running until the last survivor dies.

payment dates of the contributions. Imputing interest on the plan's claim on the employer also makes saving by the pension plan zero if the property income yield of the actual plan assets is the same as the interest rate assumption used in the actuarial calculations. Some other advantages that will result from recording interest on the plan's claim on the employer are:

1. The accrual measure of the employer's pension expense will be consistent with the cash amounts that the employer will have to contribute to the pension plan.
2. The accrual measure of household income will be consistent with the cash benefits and in-kind services that the households receive from the plan.
3. The resources at the disposal of the pension plan will in balance with its recorded uses of resources.
4. The entrepreneurial income of the financial corporation sector will not be distorted by negative saving in the pension plan component of this sector.

To be consistent, in cases of pension plan overfunding, the employer will have a claim on the pension plan for the amounts of expenses that were prepaid. Also, if the excess contributions earn the rate of return assumed in the actuarial calculations, the employer will be able to make smaller contributions in the future. Imputed interest payable to the employer should therefore be recorded on plan overfunding.

An Example

DB pension plans for employees of the US federal government illustrate the importance of recognizing as an expense to the employer the gap between property income payable on benefit entitlements and property income receivable on pension plan assets. For these plans, I estimated that the benefits accrued through service in 2007 net of employee contributions had a value of 40.9 billion dollars and that the interest payable on benefit entitlements was 139.6 billion (table 1). Employer actual contributions were 98.0 billion. 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, and the employers total contributions are +41 billion. The plan's property income from its assets was only 49.4 billion, leaving a shortfall of 90.2 billion compared with interest payable on the benefit entitlement.

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 nonfinancial corporations. Implementing the approach of table 17.8 then results in the breakdown of saving by sector shown in table A:

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

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

Correct 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 must impute payments of interest payments on the claim of the pension fund on the employer. The amount of this imputation is set 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 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.

**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	2.2 – 0.6	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.