



# Adding Actuarial Information on Defined Benefit Pensions to the US National Accounts

**Marshall Reinsdorf**

US Bureau of Economic Analysis

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# Cash approach currently used in NIPAs

- The US national income and product accounts (NIPAs) will change from a cash approach to an accrual approach for defined benefit pension plans as part of the 2013 comprehensive revision.
- Under the cash approach of the NIPAs, pension plan assets are treated as property of households. This means that:
  - Employer contributions count as compensation income;
  - Income from plan assets counts as property income of households;
  - Benefit payments are not income, but purely financial transactions.
- NIPAs do not have different measures of household pension income when measuring disposable income and saving (“dual recording”).

# Accrual basis measure of DB pension wealth

- To measure DB plan transactions on an accrual basis, actuarial methods must be used.
- Households' pension wealth consists of benefit entitlements, which equal the present value of participants' claims to future benefits.
- Benefit entitlements are same as the plan's actuarial liability (AL).
- The *unfunded actuarial liability* (UAL) = the difference between the accrual and cash measures of household pension wealth, or  $AL - \text{value of pension plan's assets}$ .
- UAL is frequently positive, but negative values of UAL can occur.

# Accrual measure of compensation type income

- Households' compensation income = claims to benefits accrued through service to employer during the accounting period LESS employee contributions PLUS administrative expenses of plan.
- *Employers' imputed contributions* = households' accrued compensation income – employer's cash contributions
- Claims to benefits accrued through service are also called *service cost* or *normal cost*.
- Claims to benefits accrued through service LESS employee contributions are sometimes known as “employer normal cost”.

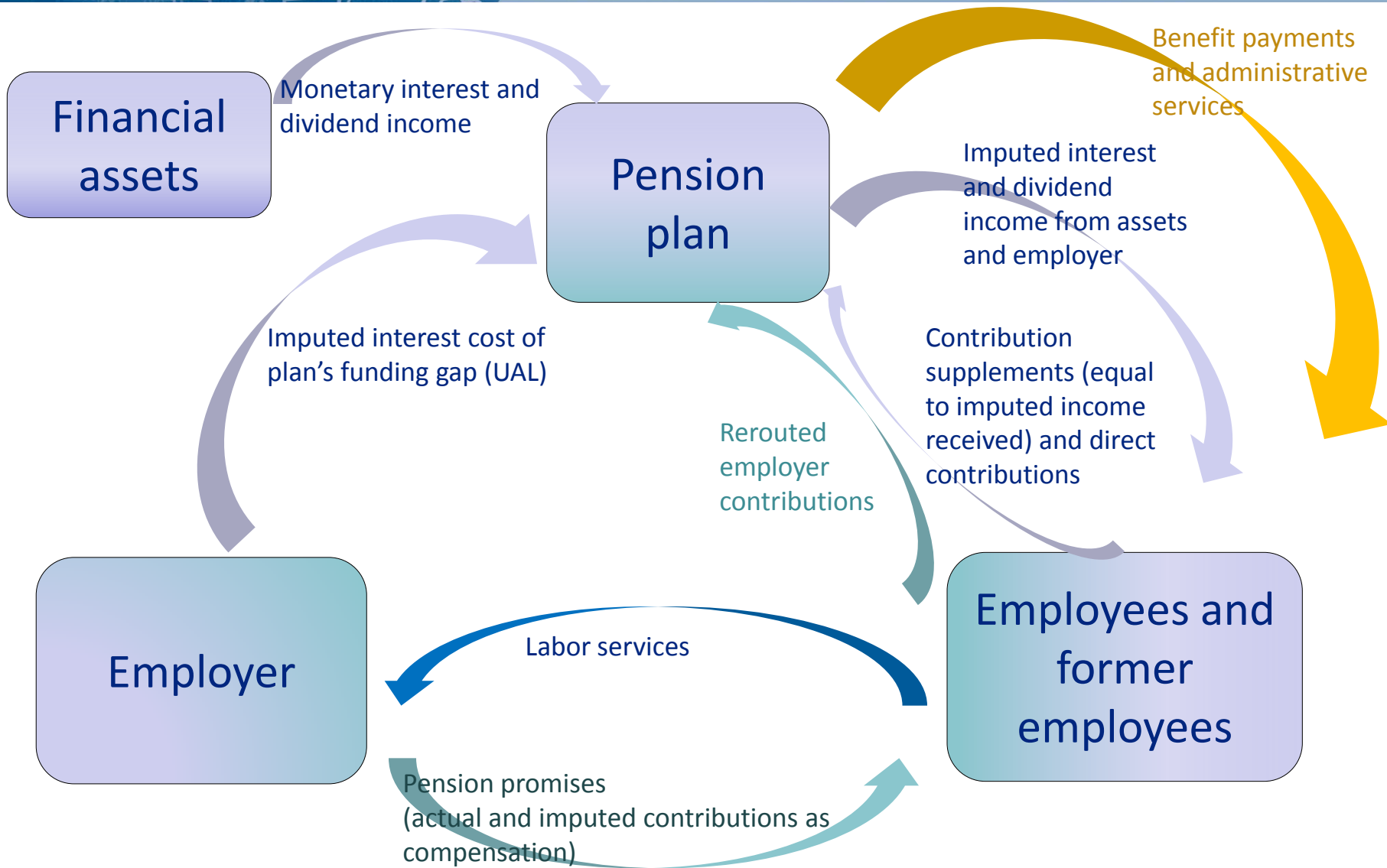
# ABO and PBO Measures of Normal Cost

- In PBO approach, projected future salary increases are factored into value of claims to benefits accrued through service.
- In ABO approach, normal cost includes effect on the AL of actual salary increases during the accounting period.
- ABO normal costs for an individual employee tend to rise rapidly as the employee nears retirement, so aggregate estimates of normal cost tend to be higher using ABO than using PBO.
- Yet ABO estimates of benefit entitlements are *lower* than PBO estimates, provided that at least some of the plan participants are still in the employed phase of the life cycle.

# Interest component of change in benefit entitlements

- Interest payable on benefit entitlements is an important source of the growth of benefit entitlements.
- Estimates of benefit entitlements are affected by changes in actuarial assumptions, particularly the interest rate, and by changes in plan rules.
- If there are no revisions to assumptions or plan rules then:  
Change in AL = service cost + **interest cost** – benefits paid.
- SNA treats interest payable on benefit entitlements (“interest cost”) as imputed property income of households.
- Households send the property income that they get from their benefit entitlements back to the plan as *contribution supplements*.

# DB Pension Flows in the NIPAs



# Household Total Contributions in SNA Table 17.8

- Calculation of *Household total contributions* includes household contribution supplements and also includes a negative imputation for administrative services, which are recorded as implicit sales of output to households.
  
- Household total contributions = Gross accruals of pension entitlements.
  
- *Adjustment for change in benefit entitlements* = Household total contributions – benefits paid.



# Saving of DB pension plans in the SNA

- *Interest accruing on pension entitlements* is paid by plan to households and contributed back as contribution supplements. The *adjustment for the change in pension entitlements* = *HH total contributions*–*benefits paid*, so an algebraic decomposition of plan's total expenses includes a term equal to  $2 \times (\textit{interest accruing on pension entitlements})$ .
- Pension plans receive *contribution supplements* and *property income from their assets*.
- **Saving of plans = property income from plan assets – interest accruing on pension entitlements.** Often negative because:
  - assets < pension entitlements (underfunding)
  - income yield on assets < interest rate in actuarial calculations because investment returns come in form of holding gains.

# Decomposing plan saving: An example

- Let *actuarial value of benefit entitlements* = 1.2 million.
- Let *interest rate for actuarial calculations* = 5 percent. Then:
- *Interest payable on benefit entitlements* in a year = 60,000.
- Let *plan assets* = 1 million.
- Let *annual property income from plan assets* = 30,000. Then:
- Implied funding of benefits from expected holding gains = (1 million)(5 percent – 3 percent) = 20,000.
- Claim of plan on the employer for the UAL = 200,000.
- Interest payable to plan from claim on the employer = 10,000.
- Saving of pension plan =  $-(10,000 + 20,000) = -30,000$ .

# Special Features of the NIPA Treatment

- Mixed use of ABO and PBO approaches.
- Interest is recorded on the claim of the plan on the employer for the UAL. (Can be negative if UAL negative.)
- DB pension plans always have saving of zero.
- Property income that plans pay to households equals the sum of the property income received plan assets and the interest received on the plan's claim on the employer for UAL.
- Plans are pass-through entities: their dividend income is paid to households as imputed dividend income, and their interest income is paid to households as imputed interest income.
- Entrepreneurial income of financial corporations sector is not affected by pension plan receipts and expenditures.

# Mixed Use of ABO and PBO Approaches

- NIPAs will use ABO approach for private plans and for state and local government plans.
- ABO fits the definition of a liability, as it is not contingent on future events that are at the discretion of the employer.
- Ability to benefit from future raises is highly uncertain for private sector employees, and increases in contribution rates are common for state and local government employees.
- Private plans report ABO data on their tax returns.
- On the other hand, contribution requirements for most Federal government plans are based on PBO.
- Actuarial reports of Federal government plans report PBO benefit entitlements and normal cost.

# Source Data for Private Plans

- We add up variables on the ABO, normal cost, contributions, benefits, and assets from data sets on almost 40,000 tax returns per year that we get from the PBGC.
- Interest and dividend income of plans is estimated by multiplying average rates of return by relevant values of assets.
- We use data sets from 2000 on (for early years extreme and missing values were problems, and some plans were missing.)
- For pre-2000 years, we extrapolated back normal cost rate using future benefits as a indicator.
- Reported numbers adjusted to reflect a common interest rate assumption based on AAA corporate bond yields (5.5 percent in recent years).

# Part 1 of actuarial schedule of tax return

- Shows the ABO (“funding target”) and the normal cost.

Part I		Basic Information	
<b>1</b>	Enter the valuation date: Month _____ Day _____ Year _____		
<b>2</b>	Assets:		
	<b>a</b> Market value .....	<b>2a</b>	
	<b>b</b> Actuarial value .....	<b>2b</b>	
<b>3</b>	Funding target/participant count breakdown:	(1) Number of participants	(2) Funding Target
	<b>a</b> For retired participants and beneficiaries receiving payment .....	<b>3a</b>	
	<b>b</b> For terminated vested participants .....	<b>3b</b>	
	<b>c</b> For active participants:		
	<b>(1)</b> Non-vested benefits .....	<b>3c(1)</b>	
	<b>(2)</b> Vested benefits .....	<b>3c(2)</b>	
	<b>(3)</b> Total active .....	<b>3c(3)</b>	
	<b>d</b> Total .....	<b>3d</b>	
<b>4</b>	If the plan is in at-risk status, check the box and complete lines (a) and (b)..... <input type="checkbox"/>		
	<b>a</b> Funding target disregarding prescribed at-risk assumptions .....	<b>4a</b>	
	<b>b</b> Funding target reflecting at-risk assumptions, but disregarding transition rule for plans that have been in at-risk status for fewer than five consecutive years and disregarding loading factor .....	<b>4b</b>	
<b>5</b>	Effective interest rate .....	<b>5</b>	%
<b>6</b>	Target normal cost .....	<b>6</b>	

## Statement by Enrolled Actuary

To the best of my knowledge, the information supplied in this schedule and accompanying schedules, statements and attachments, if any, is complete and accurate. Each prescribed assumption was applied in accordance with applicable law and regulations. In my opinion, each other assumption is reasonable (taking into account the experience of the plan and reasonable expectations) and such other assumptions, in combination, offer my best estimate of anticipated experience under the plan.

# Data for State & Local Government Plans

- For state & local government plans, we collected samples of actuarial valuation reports covering 90% of assets and membership back to 2000.
- We used membership data and estimates of normal cost rates to extrapolate back to 1929 (beginning of time for the NIPAs).
- Census Bureau will collect normal cost data in future, helped by new reporting standards promulgated by GASB.
- Most of the reports use the Entry Age Normal method and assume a high rate of interest; we adjusted them to ABO method and to use same interest rate as we used for private plans.

# Data for Federal Government Plans

- Actuarial reports go back to 1979 (civilians) or 1985 (military).
- Use PBO approach; legal funding targets are also based on PBO.
- Normal cost for each year, the PBO for 2013, and actual plan expenses used as inputs into simulations. For older years, I multiplied payroll by an estimated normal cost rate. Civilian simulation incorporated plan rule changes in 1930, 1942, 1948, 1956 and 1969.
- I assumed that trust fund received contributions equal to normal costs and earned interest on assets at the rate used by the federal actuaries. It pay benefits and administrative expenses.
- My trust fund balance served as estimate of PBO, with upward adjustments in 1970 for inflation surprise and in 2009-2010 for interest rate decline that was not matched by inflation decline.



# Illustrative Tables

- The following tables are meant to provide examples of numbers calculated using the actuarial approach to be adopted by the NIPAs, but they are not official estimates. The official estimates will be available at the end of July; they will not necessarily match these examples, but the general pattern should be the same.
- In the year of the example, 2007, GDP was 14 trillion. Disposable personal income and saving by sector, in billions, is below.

Disp. personal income	Personal Saving	Private business saving	State & Local Government saving	Federal government saving
<b>10,424</b>	<b>248.7</b>	<b>270.7</b>	<b>12.2</b>	<b>-245.2</b>

# Example of Table for Private Plans, 2007

1	<b>Current receipts, accrual basis</b>	<b>223.3</b>
2	<b>Output</b>	<b>9.8</b>
3	<b>Household Total Contributions</b>	<b>147.5</b>
4	Claims to benefits accrued through service to employers	81.4
5	Actual employer contributions	67.1
6	Imputed employer contributions	23.3
7	Household actual contributions	0.8
8	Less: Pension service charges	9.8
9	Household pension contribution supplements	66.1
10	<b>Income receipts on assets</b>	<b>66.1</b>
11	Interest	33.9
12	Monetary interest	37.6
13	Imputed interest from employers for unfunded actuarial liability	-3.7
14	Dividends	32.2
15	<b>Current expenditures, accrual basis</b>	<b>223.3</b>
16	<b>Administrative expenses</b>	<b>9.8</b>
17	<b>Imputed income payments on assets to persons</b>	<b>66.1</b>
18	Interest	33.9
19	Dividends	32.2
20	<b>Benefit payments and withdrawals</b>	<b>158.8</b>
21	<b>Net change in benefit entitlements</b>	<b>-11.3</b>

# Rest of Example Table for Private Plans

22	<b>Cash flow</b> (= adjustment for change in HH pension equity of SNA93)	<b>-30.9</b>
23	Actual employer and household contributions (5 + 7)	67.9
24	Monetary income receipts on assets (12 + 14)	69.7
25	Less: Benefit payments and withdrawals	158.7
26	Less: Administrative expenses	9.8
	<b>Effect of participation in defined benefit plans on personal income, saving, and wealth</b>	
27	Effect on personal income (1 - 7 - 9 or 15 - 7 - 9)	156.5
28	Less: Effect on personal consumption expenditures (2)	9.8
29	Equals: Effect on personal saving	146.7
30	Plus: Implied funding of benefits from holding gains on assets	73.0
31	Interest accrued on benefit entitlements	139.1
32	Less: Investment income received by plans (10)	66.1
33	Equals: Change in personal wealth	219.7
34	Less: Benefit payments and withdrawals (20)	158.7
35	Plus: Household actual contributions (7)	0.8
36	<b>Equals: Change in benefit entitlements including implied funding from holding gains on assets</b>	<b>61.8</b>

# State & Local Governments, 2007

1	<b>Current receipts, accrual basis</b>	<b>411.8</b>
2	<b>Output</b>	<b>14.0</b>
3	<b>Household Total Contributions</b>	<b>292.6</b>
4	Claims to benefits accrued through service to employers	187.4
5	Actual employer contributions	77.7
6	Imputed employer contributions	88.1
7	Household actual contributions	35.6
8	Less: Pension service charges	14.0
9	Household pension contribution supplements	105.2
10	<b>Income receipts on assets</b>	<b>105.2</b>
11	Interest	74.9
12	Monetary interest	61.6
13	Imputed interest from employers for unfunded actuarial liability	13.2
14	Dividends	30.3
15	<b>Current expenditures, accrual basis</b>	<b>411.8</b>
16	<b>Administrative expenses</b>	<b>14.0</b>
17	<b>Imputed income payments on assets to persons</b>	<b>105.2</b>
18	Interest	74.9
19	Dividends	30.3
20	<b>Benefit payments and withdrawals</b>	<b>173.5</b>
21	<b>Net change in benefit entitlements</b>	<b>119.0</b>

# Rest of Table for State & Local Government Plans

22	<b>Cash flow</b>	<b>17.7</b>
23	Actual employer and household contributions (5 + 7)	113.3
24	Monetary income receipts on assets (12 + 14)	92.0
25	Less: Benefit payments and withdrawals	173.5
26	Less: Administrative expenses	14.0
	<b>Effect of participation in defined benefit plans on personal income, saving, and wealth</b>	
27	Effect on personal income (1 - 7 - 9 or 15 - 7 - 9)	271.0
28	Less: Effect on personal consumption expenditures (2)	14.0
29	Equals: Effect on personal saving	257.0
30	Plus: Implied funding of benefits from holding gains on assets	82.0
31	Interest accrued on benefit entitlements	187.2
32	Less: Investment income received by plans (10)	105.2
33	Equals: Change in personal wealth	339.0
34	Less: Benefit payments and withdrawals (20)	173.5
35	Plus: Household actual contributions (7)	35.6
36	<b>Equals: Change in benefit entitlements including implied funding from holding gains on assets</b>	<b>201.0</b>

# Federal Government, 2007

1	<b>Current receipts, accrual basis</b>	<b>327.1</b>
2	<b>Output</b>	<b>0.3</b>
3	<b>Household Total Contributions</b>	<b>185.2</b>
4	Claims to benefits accrued through service to employers	43.6
5	Actual employer contributions	98.5
6	Imputed employer contributions	-58.4
7	Household actual contributions	3.8
8	Less: Pension service charges	0.3
9	Household pension contribution supplements	<b>141.6</b>
10	<b>Income receipts on assets</b>	<b>141.6</b>
11	Interest	141.6
12	Monetary interest	48.1
13	Imputed interest from employers for unfunded actuarial liability	93.5
14	Dividends	0.0
15	<b>Current expenditures, accrual basis</b>	327.1
16	<b>Administrative expenses</b>	0.3
17	<b>Imputed income payments on assets to persons</b>	141.6
18	Interest	141.6
19	Dividends	0.0
20	<b>Benefit payments and withdrawals</b>	<b>105.0</b>
21	<b>Net change in benefit entitlements</b>	<b>80.2</b>

# Rest of Table for Federal Government Plans

22	<b>Cash flow</b>	<b>45.1</b>
23	Actual employer and household contributions (5 + 7)	102.3
24	Monetary income receipts on assets (12)	48.1
25	Less: Benefit payments and withdrawals	105.0
26	Less: Administrative expenses	0.3
	<b>Effect of participation in defined benefit plans on personal income, saving, and wealth</b>	
27	Effect on personal income (1 - 7 - 9 or 15 - 7 - 9)	181.7
28	Less: Effect on personal consumption expenditures (2)	0.3
29	Equals: Effect on personal saving	181.4
30	Plus: Implied funding of benefits from holding gains on assets	0
31	Interest accrued on benefit entitlements	141.6
32	Less: Investment income received by plans (10)	141.6
33	Equals: Change in personal wealth	181.4
34	Less: Benefit payments and withdrawals (20)	105.0
35	Plus: Household actual contributions (7)	3.8
36	<b>Equals: Change in benefit entitlements including implied funding from holding gains on assets</b>	<b>80.2</b>

# Effects on Saving by Sector (\$ billions)

	Private Business	State & Local Governments	Federal Government	Households
Revision in Saving	<b>-19.6</b>	<b>-101.3</b>	<b>-35.1</b>	<b>+156.0</b>
as percent of disposable personal income	<b>-0.2</b>	<b>-1.0</b>	<b>-0.3</b>	<b>+1.5</b>
Currently published	<b>270.7</b>	<b>12.2</b>	<b>-245.2</b>	<b>248.7</b>
Based on Accrual Measures of DB Pensions	<b>251.1</b>	<b>-89.1</b>	<b>-280.3</b>	<b>404.7</b>