

The property income element in contributions to unfunded schemes and the international comparability of labour costs

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Anton Steurer, Eurostat

Views are solely the author's and do not reflect the opinion of the European Commission.

A variant of the author's contribution dated 6 June 2003 was discussed by the EU's GNP Committee in July 2003. One issue was the quality of estimates of imputed contributions to employers' unfunded schemes of government. Actuarial estimates that could be used as a source are still rare. The benefits-paid method produces acceptable results in present circumstances in many countries as long as major organisational changes are properly taken into account. The Committee suggested that more work was needed on the role of property income in comparing the results of different methods, and on the effects of different schemes and different methods on the international comparability of labour costs.

Mr. Pitzer, with his contribution of 19 August 2003, has kindly reacted to questions raised in the author's contribution dated 6 June 2003. Mr Pitzer's contribution lays out some implications of not imputing liabilities and property income for employers' unfunded schemes. Mr. Pitzer points out that the costs of providing pension benefits to employees should not differ simply because of the means of financing. Paying unfunded pension benefits rather than contributions to a funded scheme means to pay the historical contributions plus the imputed property income accrued over the past decades. Future benefits should be discounted to their present value. The author agrees to these statements. This note supplements Mr. Pitzer's contribution of 19 August 2003 as well as the author's contribution dated 6 June 2003 and attempts to correct some possible misperception or imprecision that occurred in both contributions.

The focus in the author's contribution of 6 June 2003 was on the non-financial accounts. Here, an issue is the effect on the compensation of employees of different methods of imputing social contributions for unfunded schemes (actuarial 'as if funded', or benefits-paid 'as if PAYG'). This has further impacts, e.g. on operating surplus and in the case of non-market producers on GDP. The SNA states that for employers' unfunded schemes the preferred source for estimating contributions is actuarial estimates. In their absence, contributions may be set equal to benefits currently paid.

There are two potential sources of error when using the second method: demographic bias and property income bias. The 1993 SNA mentions the first source of error, but not the second. This note tries to clarify the concept of the property income bias (Section 1) and to indicate possible orders of magnitude of these errors (based on some extremely heroic shortcuts) in Section 2. Section 3 looks at the implications for international comparisons of labour costs when estimation methods or pension systems differ across countries. Additional sources of error are identified in this context, such as errors or differences in actuarial assumptions or part-funding of social security systems through tax revenue.

1 The property income element in imputed contributions to unfunded schemes

For a fully funded or 'as if funded' stable scheme, property income should be the same as the effect of discounting future benefits. We now demonstrate that total property income (the return on capital that would probably be recorded as D.44) in an actuarial model is much larger than the property income bias (the difference due to property income between contributions derived actuarially and contributions derived from benefits paid).

For a stable defined benefits scheme, when the rate of future salary increase is equal to the rate of discount or the assumed future return on the assets of a funded scheme, then the benefits currently paid are exactly equal to the contributions paid. (This assumes that the future benefits bear a relation to the final salary.) For an unfunded scheme there may be a large implicit property income element behind the benefits paid today. Nonetheless, these benefits are exactly as large as the contributions that would need to be made today to a funded scheme in order to secure payment of future benefits of today's employees. The property income bias in the estimate of imputed contributions is thus zero and using benefits paid as a proxy for actuarially calculated contributions introduces no error. (We look at

correctly measuring the contributions here, not imputed property income. Under the current SNA an unfunded scheme is treated in accordance with SNA Annex IV with no impact on savings etc.)

This is a bit surprising as we compare two totally different things here: (a) benefits paid today that relate to contributions made and rights acquired over past decades, with (b) rights acquired today that relate to benefits that will be paid some decades in the future. But as long as a scheme is stable, in a PAYG system, a fixed share of today's salaries paid as contributions 'purchases the right' to the same share in future salaries. The 'PAYG property income' results from the real rate of future salary increase.

The ratios between pensions paid today (assumed to be equal to PAYG contributions) and today's contributions to a funded scheme are shown in Table 1. The ratios are shown as a function of different combinations of rates of future salary increase and rates of return on the assets held by the scheme. The table shows that as long as the two rates are equal, the contributions to a funded scheme and to a PAYG scheme as well as the benefits paid today by either of these schemes are all equal. The ratios result from a simple actuarial model¹ for a stable scheme. The model is realistic enough to illustrate the order of magnitude of the possible bias.

The ratios are not very sensitive to other actuarial assumptions. The level of pensions (e.g. in % of the final salary) has no impact on the ratios. It only impacts on the contribution rates (% of salaries that need to be contributed to the scheme). Varying the rate of pension *increase* for those already retired impacts slightly on the ratios: higher pension increase rates increase the spread among the ratios. The career structure (modelled as salary increase with age rather than time) also has a slight impact: a steeper career structure lowers the spreads among the ratios. Logically, the lower the rates of return (salary increase), the higher the contribution rates for the funded (unfunded) scheme.

Table 1: Contributions to an unfunded scheme as a ratio of contributions to a fully funded scheme, at different rates of return on capital and rates of salary increase

Rate of salary increase	Rate of return on capital				
	0%	1%	2%	3%	4%
0%	1	1.3	1.7	2.3	3.1
1%	0.8	1	1.3	1.7	2.3
2%	0.6	0.8	1	1.3	1.7
3%	0.5	0.6	0.8	1	1.3
4%	0.4	0.5	0.6	0.8	1

Differences between the two rates translate into differences in contributions. A rate of return that is 1 percentage point higher than the rate of salary increase translates into a factor of 1.3, 2 percentage points a factor of 1.7 and 3 percentage points a factor of 2.3. When the rate of salary increase is higher than the rate of return the discrepancies are similar but not exactly the same because of the property income on the assets held by those already retired. In other words, the contributions to a PAYG system are half as large as those to a funded system when the rate of salary increase is 3 percentage points above the rate of return, and (more than) twice as large in the opposite case.

What spreads between the two rates can be expected in reality? The author has not had the time for research on this issue and can only offer the following:

¹ The model used 55 age cohorts of equal size, 40 for active workers and 15 for pensioners. Contributions were a fixed share of salaries for all active cohorts, and pensions a fixed share of final salaries (i.e. defined benefits system). The model was solved such that the assets of each cohort reaching the end of year 55 were exactly exhausted. Pensions paid were taken to measure the contributions to PAYG or employers' unfunded systems. The difference between pensions paid (=PAYG contributions) and contributions needed to ensure zero assets at the end of year 55 gives the ratios shown in Table 1.

- A) Pension funds may follow a rather conservative investment policy due to regulation. A rough indicator for the rate of return may be the real rate on 10 year government bonds. In the U.S., this rate was on average around 3% in the 60s, negative in the 70s, well above 5% in the 80s and below 4% in the 90s, with a falling trend. For Germany, a similar pattern can be observed, but less pronounced. The last 4 decades suggest (a) quite volatile real rates of return, and (b) a long-term average real rate of 3 or 4 %.
- B) If we accept the rate of growth of compensation of employees as a rough proxy for the rate of salary increase, it seems that that in several countries the year-to-year rates vary a lot but that on average the rates of GDP growth per capita and rates of salary increase were broadly similar in the longer term. The question then is whether real rates of return on low risk financial instruments are systematically higher than the rate of growth of GDP per capita, and if so by how much.
- C) Assumptions used in the actuarial estimates for a number of companies and governments suggest that spreads are quite variable, with the rate of return often 1 to 2 percentage points *above* the rate of salary increase, in some extreme cases also more. It seems that in recent years the actuaries have been revising the spreads downwards, with corresponding effects on companies' balance sheets.

2 The size of the property income and demographic errors in the benefits-paid method

The formula (2) in the author's contribution dated 6 June 2003 implies that the demographic bias is removed, whereas a residual property income element is included in contributions when the rate of return (discount) differs from the rate of salary increase (i.e. future increase in benefits). This residual property income element can in theory be positive or negative. In most years it will probably be positive.

If we assume for a moment that actuarial estimates are a reliable source, we can expect that the property income bias in imputed contributions that are based on benefits paid could reach some order of 30% to 50% in the 1990s. Assuming these contributions represent some 20% of compensation of employees on average, the effect on labour costs is 5 to 10%. This is the size by which benefits-based estimates could *overstate* the true costs of labour. Over time, the bias will fluctuate significantly. The bias was perhaps significantly negative in the 1970s (with low or negative real rates of return), rather large in the 80s and may have declined over the past few years back to some 'average' level.

The author knows little about the 'typical' size of demographic biases. These will differ significantly even across developed countries. A significant bias may be expected from the increase in average life expectancies and demographic structure (baby-boom generation, etc.). Projections for some countries suggest that the bias could reach some order of 30%-50% in the 2030s. This is the size by which benefits-based estimates could *underestimate* the true costs of labour. For past decades it is likely that the demographic bias in the benefits-paid method was negative or small but slowly rising, and it will rise relatively fast to a peak level in the 2nd and 3rd decade of this century. (In countries where population is not growing.)

In the current situation, comparisons of contributions derived from actuarial estimates (based on future benefits) with contributions based on today's benefits paid would thus be affected in two ways: due to the property income bias the benefits-paid method overestimate 'true' (i.e. actuarially estimated) contributions by some 30-50%; due to the demographic bias it underestimates 'true' contributions by some 30-50%. The two biases may follow different time patterns: 1-2 decades for rate of return cycles, 4 decades for demographic cycles and perhaps a systematic bias from lifetime expectancies. This conclusion seems to suggest that the benefits-paid method was a rather bad method 2-3 decades ago, and will again be a rather bad method in 2-3 decades. At present, though, the method may be quite good.

3 Pensions and the international comparison of labour costs

Not just comparisons of government debt but also comparisons of labour costs within and across countries are influenced by the pension fund issue. Indicators dominated by government labour costs are for example educational expenditure (e.g. the OECD expenditure per student indicators). These can be significantly biased when teachers are members of different systems in different countries. For example, the teachers in one country may be members of funded systems, in a second country members of the social security system and in a third country of an unfunded scheme for government employees.

We have already identified possible orders of magnitude of 30 to 50% for both property income bias and demographic bias in imputed contributions based on the benefits paid method. Social security systems are often pure PAYG systems and thus share these two biases. An additional issue is the part-financing of the system by taxes. In some countries, a tax revenue contribution to the social security system is set by law and can easily be in an order of (again) 30%. E.g., employees' and employers' contributions are set to contribute one third each to the financing needs of the system. This 'tax financing bias' may not impact fully on comparisons of aggregate labour costs. For example, income taxes may be correspondingly higher and may thus compensate (part of) the tax financing bias. However, this bias would distort intra-country comparisons when the type of scheme differs across industries or across other relevant categories (e.g. public-private).

Studies of the actuarial assumptions used by companies for calculating their pension scheme liabilities have been made. The business press covered the issue in recent years. The impression is that so far the assumptions used vary quite enormously with respect to e.g. the assumed inflation rates, real rates of return on invested assets and real rate of increase of salaries (including among companies in the same industry and country). It is not clear to what extent these differences reflect economic reality.

Biases in actuarial estimates may also arise for 'as-if-funded' schemes when the use of current expectations, end-of-year 'imputed fair values' and immediate recognition of changes in actuarial models result in upward or downward revision of liabilities and contributions. Labour costs may then fluctuate around some 'true average' labour costs as part of the 'true' labour costs is shifted to projected property income or back. The size of this bias is unknown to the author. Sizes of revisions of actuarial estimates suggest that an order of 30% is also easily attainable over a decade as e.g. real rates of return rise or fall.

We have identified 4 factors that can affect social contributions as observed or imputed and thus labour cost comparisons. Each one can potentially introduce an 'error' of some order of 5% to 10% to labour cost comparisons.

Conclusions (provisional—to be completed)

National accountants have to judge the quality of their data sources. For imputed contributions, possible errors could be large. It cannot currently be assumed that actuarial estimates made by the employer are in all countries a better source than benefits paid or wage shares.

The benefits-paid method for estimating imputed contributions to employers' unfunded schemes treats these schemes like social security systems (with no part-financing via taxes). If contributions to employers' unfunded schemes should be identical to those to an equivalent funded scheme, the benefits-paid method can only be used when the size of major potential errors can be assumed to be small. Subject to taking account of possibly large differences across countries, at the moment this seems to be the case.

The EDG so far has not spent much time addressing practical problems of what should be done when actuarial estimates are not available or, if they are, are judged to be biased.