

International Workshop on  
**The Balance Sheet of Social Security Pensions**

**On a Columbus's Egg: A Comment on Settergren's Paper**

By

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## 1. Introduction

In the last few years, Sweden's new pay-as-you-go pension scheme has attracted much interest as a model of public pension reform. In Japan, where public pension reform had been on the political agenda for the last two years, Professor Takayama has been very effective in educating our politicians, bureaucrats and general public in the new Swedish system. As a matter of fact, the new Japanese public pension system has a similar, albeit limited, built-in stabilized as the balance mechanism.

Today, I was very impressed by Mr. Settergren paper. Mr. Settergren was one of the prime architects of the new Swedish plan and his paper explains why the new Swedish plan is not just an innovative reform, but a beautiful new system that are comprehensive and stable. I am convinced that the Swedish plan is an important turning point in the history of public pension reforms. Rather than giving my superficial comments, I will try to do my best to rephrase what Mr. Settergren has written, hoping to reach and inform a wider audience on what the new Swedish plan stands for.

## 2. The Nature of the Problem

In his introduction, Mr. Settergren argues quite persuasively that in most countries, in spite of its importance, financial reporting on public pension suffers from two shortcomings, namely, scarcity and low quality;

*Public pension plans are probably the largest financial transaction systems that we have. In OECD countries their expenditure ranges from 5 to 15 percent, and their liabilities, as a rough estimate, from 150 to 300 percent of gross domestic product (GDP). For many governments,*

*pension payments are the single largest expenditure. National pension plans also represent one of the most long-term commitments of governments. The size of these systems is of course reflected in their importance to insured citizens. For many, perhaps most, the claim of individuals on the public pension system represents their single largest “asset”. In spite of the economic importance and long-term commitment of these pension plans, their financial reporting is essentially medieval.*

According to Mr. Settergren, the best way to improve the quality of reporting of public pension schemes is to discard the traditional single-entry bookkeeping, or statements and projections of cash flows, and adopt double-entry bookkeeping, as Sweden did in 2001.

*The various cash-flow measurements that are used to show the financial status of public pay-as-you-go pension schemes do not effectively answer the questions what cause, what effect, by what means, and at what rate.... The single most important measure to enhance expert, public and policymaker knowledge of the workings of public pay-as-you-go pension plans would be to introduce double-entry bookkeeping for these systems.*

As examples of such reporting, Mr, Settergren takes Sweden before the 2001 reform and compares it with the United States which he considers has the best reporting among single-entry bookkeeping countries;

*In Sweden, RFV was obliged to present an analysis every five years of the financial status of the public pension scheme and, in relation to this analysis, to propose a suitable contribution rate, or payroll tax. The analysis was presented mainly as a projection of buffer-fund development, in terms of fund ratio,<sup>1</sup> assuming a fixed contribution rate and unchanged benefit provisions. Normally financial balance, i.e. a buffer fund that never dropped below a certain level in a specific scenario, would be secured by proposing an upward adjustment of the contribution rate. The*

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<sup>1</sup> The market value of the fund divided by one year of pension disbursements. In Sweden this measure is usually referred to as “fund strength”.

*range of these projections varied, but prior to 1990 they were never longer than 50 years.*

*The US Social Security Administration (SSA) reports annually on the financial status of the Social Security system. In this report, it uses a similar but slightly more sophisticated, or dense measure of financial balance than the RFV previously used: a single figure called actuarial balance. Briefly, the actuarial balance -- deficit or surplus -- reflects how much the contribution rate must be increased (decreased), to ensure that the Social Security buffer fund, the trust fund, never drops below a stipulated level in the standard 75-year projection of the SSA.*

### 3 Construction of Pay-as-you-go Balance Sheet

#### 3.1 Conceptual Problem

There is, however, some conceptual difficulty in constructing a balance sheet for a pay-as-you-go pension plan. On one hand, few would question the notion that a pay-as-you-go system has liabilities, both to retired persons and to those who are working and paying the contributions. Hence, it is clear that we should be able to measure these liabilities at any given time. On the other hand, it is far more difficult to claim that these liabilities are fully or partially covered by something that we may call “assets”, as a pay-as-you-go plan usually holds very little “tangible” assets.

In contrast to a funded plan, however, a pay-as-you-go plan is free to use anyone’s contributions to pay off its pension liabilities. Thus, in a pay-as-you-go pension system, the contribution flow should be considered as its principal asset<sup>2</sup>.

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<sup>2</sup> Of course, the contribution is a source of a new pension liability which is taken care of on the liability side.

The double-entry bookkeeping of the new Swedish pay-as-you-go pension plan is based on this reasoning.

### 3.2 Pension Liabilities: Simplicity in Swedish Notional Account

In the Swedish defined-contribution plan, the present values of pension liabilities are considered to be equal to their nominal values. In the first place, the pension liabilities to retirees are simply obtained as the product of their pension amounts and the expected numbers of years the amounts will be paid. Secondly, the present values of the pension liabilities to persons who are still active are simply given by the balances in their “notional” accounts. Thus the sum of the two stands for what the pension owes at any given year.

### 3.3 Contribution Asset: A Columbus’s Egg

In the Swedish scheme, the value of the contribution flow is termed as the contribution asset<sup>3</sup> and it is obtained as follows;

*It is surprisingly simple to calculate the value of the contribution flow: it is the product of the size of the flow per time unit, which in practice is a year, and the expected time between payment of contributions and receipt of pensions. The averages are weighted by the age-dependent amounts of expected contributions and pensions. In Sweden the expected contribution-weighted average age of contributors is about 42, and the expected pension-weighted age of retirees is about 74. Thus, the relevant time span is about 32 (74-42) years, and the contribution asset is 32 times one year’s contributions.*

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<sup>3</sup> R. Lee, an economic demographer uses the term *transfer wealth* for what in Sweden has been termed the contribution asset .

Why is it a useful way to see if the contribution flow is sufficient or not, given the existing pension liability? Consider a demographic steady state where any difference in any two cohorts is due to their biological ages, including mortality risks. The contributors as a group are paying  $x$  dollars a year, and “on the average”, they are  $a_1$  years old. The pensioners as a group are receiving  $x$  dollars a year, and “on the average”, they are  $a_2$  years old. We can think of an alternative hypothetical funded plan in which a single (giant) worker starts paying  $x$  dollars once he reaches age  $a_1$ , and stop paying it once he reaches age  $a_2$ , when he starts receiving the pension. How much pension can he expect to receive throughout his retirement? It should be what he has paid in and, if there is no interest on saving, it is  $x$  dollars/year times  $(a_2 - a_1)$  years, or  $(a_2 - a_1)$  times  $x$  dollars. If he is promised to be paid more than the amount in his retirement, he is over-paid: if he is promised to be paid less than the amount, he is under-paid. A steady-state pay-as-you-go plan cannot be distinguished from this hypothetical single worker plan, and hence, the same conclusion holds.

Thus, the (expected) turnover duration becomes the key parameter that determines the size of the contribution asset of the plan. Since it is the difference in the (weighted) average contributor’s age and the (weighted) average pensioner’s ages, where averages are computed by using the age-specific contributions or pensions as weights, it can be easily computed from the annual report of the pension plan.

*The turnover duration measures inform, in a single figure, the effect that changes in fertility<sup>4</sup> and age-related income patterns and mortality have on the capacity of the contribution flow to finance pension liability.*

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<sup>4</sup> In the legislation on the Swedish scheme, the effects of fertility changes on turnover duration are disregarded.

#### 4. Income Statement: The Bottom Line

In any double-entry bookkeeping, income statements are derived from the entries of the balance sheets. The income statement in the Swedish system is explained in detail in Sttergren's paper, but it is clear that all the entries in the income statements should belong to one of the following three groups; namely, (1) change in fund assets, (2) change in contribution asset, and (3) change in pension liability.

To obtain (1), the contribution (+), the disbursement (-), the return on investment (+), and the cost of administration (-) are added with appropriate signs. In the Swedish statement, however, most of the return on investment is due to the value of the funded *premium pension*, which is not relevant to the analysis of the paper. To obtain (2), the value of change in contribution revenue (+) and the value of change in turnover duration (+) are added<sup>5</sup>. There are seven entries in (3), but the first three entries, namely, new pension liability (-), pension disbursements (+), and change in value (-), are the same as the first three entries in (1), meaning that they are simply the liability side of the net cash inflow. Among the other entries, the real interesting entry is the fifth entry (the decedents' capital) (+) which is analogous to the undistributed asset belonging to the deceased pension receiver, and the sixth entry (the inheritance gains

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<sup>5</sup> Since the contribution asset is calculated as the contribution flow (C) times the turnover duration (TD), *the value of change in contribution revenue* is computed

distributed) (-) standing for the transfer of the asset to the pension savers as a group<sup>6</sup>. Summing the entries of these three groups, we obtain the net income of the pension for a given year, or the bottom line. What this bottom line tells us is whether the asset and liability of the pension are growing together or not, but each entry above the bottom line gives us information on whether or not each factor is putting pressure on the financial position.

## 5. Balance Sheet in Action: Balance Ratio and Balance Mechanism

The nominal valuation of assets and liabilities of the Swedish pension plan imply that all valuations are solely based on what is observable at the time of valuation.

*For example, the normal assumption that contribution revenue increases at the rate of economic growth is not explicitly considered in the calculation of the contribution asset. Nor is the assumption that pension disbursements, because of factors like indexation, will increase in the future considered in the valuation of the pension liability. The main reason (...) is that the financial position of the system is not dependent on the amount of assets and liabilities (...). The financial position of the system is determined exclusively by the relationship between assets and liabilities, in other words, by the so-called balance ratio.*

Thus, if we have to select one single financial indicator of financial position of the Swedish pension, it is total assets divided by pension liability, or its *balance ratio*, rather than the bottom line. If this ratio is less than one (1) the

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as  $(C_t - C_{t-1}) \times (TD_t + TD_{t-1}) / 2$ , **while** the value of change in turn over duration is calculated as  $(TD_t - TD_{t-1}) \times (C_t + C_{t-1}) / 2$ .

<sup>6</sup> The computation methods are explained in detail in the Swedish Pension System Annual Report 2003.

system has a deficit, or a negative net present value: if it is above one, the system has a surplus, or a margin. In the Swedish system, if the balance ratio is below one, the balance mechanism is triggered.

*When the balance mechanism is triggered the indexation of the pensions and pension credits will be effectuated by the change in average income adjusted by multiplying the index with the balance ratio, starting of a new index series. The balancing of the system means that an amount equal to the closing deficit in the balance sheet will be eliminated. If the balance ratio after being triggered grows bigger than one the closing balance, surplus is automatically distributed by increasing the indexation. This continues until the balance index reaches the level of the income index.*

If the *balance ratio* falls below one, the pension liability exceeds the total asset and the *balance mechanism* kicks in. By reducing the indexation adjustment downward, it will eventually reduce the pension liability to the same level as the total asset, if not in a single year. If the balance ratio exceeds one, liabilities will be augmented to the same levels as the total assets and absorb the surpluses. Thus, a very close link between the assets and liabilities is always maintained by the *balance mechanism*, and, Settergren concludes, valuing the assets and liabilities of the system solely on the basis of directly observable variables at the time of valuation involves little or no risk of overestimating assets in relation to liabilities in the long run.<sup>7</sup>

*Together with other design features the provisions for automatic balancing have eliminated the need for making explicit assumptions about*

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<sup>7</sup> The manner of calculating turnover duration involves an implicit assumption that the population growth is zero. Thus, turnover duration will be (slightly) over estimated in cases where the working-age population is decreasing. This entails a risk that the calculations will (slightly) overestimate the system's assets in relation to its liabilities. However, it is reasonable to assume that the population decline will cease at some point. If so, the deficit will be temporary.

*future economic and demographic developments in order to ensure the financial stability of the system.*

If a national pension plan other than Sweden's wants to prepare income statements and balance sheets, it should be able to do so. However the amount of work involved to prepare a complete income statement and balance sheet for a given defined-benefit plan should not be underestimated. A less ambitious endeavour, but a still worth while financial indicator, would be to start to annually publish the change, most likely increase, of the pension liability caused by changes (increases) in life expectancy.<sup>8</sup>

#### References

*The Swedish Pension System Annual Report 2003, The Social Insurance Office*  
*Settergren, O. (2004) "New Use of an Old Italian Invention*  
*– The double-entry bookkeeping used to monitor and secure financial stability of the new Swedish pay-as-you-go pension plan"*

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<sup>8</sup> If this is done the positive effect on the expected turnover duration from increases in life expectancy should be deducted.