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## Optimal financing of social security pension schemes and its design

Competing views of social security pension design and its impact on financing

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## ***Abstract***

*This paper discusses a series of selection points in the design and funding of social security systems. For each criterion, the paper lists and discusses advantages and disadvantages of the options available.*

*The selection points include:*

- *Funded versus PAYGO*
- *Voluntary versus Mandatory*
- *Individual Accounts versus Commingling of Risk*
- *Public versus Private sourcing*
- *Automatic Balancing Mechanisms (ABM)*

*It is the sincere hope of the author that this discussion will create even more debate of the issues surrounding these important selection criteria which, in turn, will result in better social security systems for all.*

## ***Keywords***

*Social security design and funding, Funded, Pay-as-you-go, Individual Accounts, Automatic Balancing Mechanisms*

## **Introduction**

This paper goes through a series of criteria that are decision points in the design and funding of social security systems. For each criterion, the advantages of the options available are outlined and discussed briefly. In this manner, the paper attempts to lead the reader to a set of selection points that would result in optimal design and funding for any social security system.

The paper is meant to be controversial in the hopes of stimulating wide discussion of these important debating points.

I should point out that the new Nominal DC systems in Sweden, Italy and Poland can be viewed as equivalent to Career Average DB plans with annual adjustments based on economic growth. Thus, if I make disparaging comments about DC Social Security, I do not necessarily include Sweden, Italy and Poland under that umbrella.

## **Financing: Funded versus PAYGO**

As a very first point, one should avoid entering into debates about the financing of social security when the program lists the session under a title which uses the word "funding". This

immediately biases the topic. Social security systems need not be funded. They only need to be financed in a sustainable manner, which is quite a different matter.

Funded social security systems will appear to be preferred when rates of return on investments exceed the rate of growth of the contributions base of the social security system. And, of course, vice versa.

The rate of growth of the contributions base of a social security system is itself a function of several variables. A primary factor is the growth rate of the work force. This, itself, will be the result of a growing population (through rising fertility or higher immigration) or it can be the result of higher labour force participation rates. Also, the contributions base will normally rise when there is real wage growth, which usually relies on productivity gains.

Further, as has been pointed out often, a funded social security system is inherently no more secure and is no more predictable (i.e., less volatile) than a PAYGO scheme.

Social security systems are effectively means to allocate goods and services between workers and retirees. If a PAYGO social security system has a 10 per cent contribution rate, then the worker has effectively agreed to pass all of his or her production on Monday morning over to the country's retirees for consumption.

If the plan is funded, then the transfer is more complex, but equivalent. The worker takes 10 per cent of pay (reflecting the value of 10 per cent of product) and seeks to buy assets. Such assets will be available from retirees (who amassed them during their working lifetime). Upon sale the retiree gets money for his/her assets and then uses this money to buy goods and services. The end result is equivalent to a PAYGO scheme.

Of course, there are some side issues to financing. Does the financing method create a more rapid rate of economic growth? Does a funded plan assist in creating a good banking system or a good stock market infrastructure? These are interesting questions but the answers seem to vary widely (i.e., there is no consensus).

## **Voluntary versus Mandatory**

Most national social security systems appear at first blush to be mandatory. However, there can be a number of ways that this feature is depreciated.

For example, some systems do not require contributions from workers until their earnings achieve a defined level. This may encourage workers (and their employers) to shift into the cash economy. This will be reinforced if the system provides some guaranteed minimum benefit or provides significant benefits for very short periods of attachment.

Other systems allow "drop-out" periods because of military service, disability, child rearing and so on without any commensurate decrease in ultimate benefits. Again, such features will only create incentives for negative action amongst the workers.

I say this as a result of the fact that I view a mandatory system as superior since it negates anti-selection.

In a recent paper, James et al. (2008) point out the advantages of not having to be concerned about anti-selection. According to their calculations, a mandatory, public social security system offering the same benefits as the Canada Pension Plan would cost between 8 and 9.5 per cent of pensionable earnings (as defined by the Canada Pension Plan). The variance between 8 and 9.5 per cent is dependent on the asset-liability matching strategy. Similar benefits under a voluntary, private annuity system would require contributions of 11 to 12.5 per cent. Private cost rates exceed the mandatory/public rate because of high private administrative costs and adverse selection costs (and these have about equal impact, i.e., 50/50.). There also has to be a profit margin in a private system.

Adverse selection occurs because potential annuitants know more about their health than the insurance company. If the insurance company prices the annuity using average population longevity, then individuals with lower-than-average life expectancy will not fully annuitize, biasing the average longevity upward. Ultimately, this spiral means that the insurance company must price with very high life expectancy assumptions leaving only the most select lives able to get a true market value in their purchase.

## **Individual accounts versus commingling of risk**

The primary purpose of a social security retirement income security system is to minimize the probability that retirees live in poverty. In that regard, the design of the social security system should be one that mitigates risk as much as possible in the goal of achieving income security.

For retirement income security, these risks include: investment and investment expense risk, interest rate risk, inflation risk and longevity risk.

In each of these four categories, commingled systems achieve superior expected outcomes than Individual Accounts; some through the effective application of the Law of Large Numbers, others through the efficiencies of scale.

In a commingled social security system, all participants (and this could represent the entire work force) share these risks. In an Individual Accounts system, the individual carries all of these risks unilaterally.

Further, a large commingled fund can hire extremely good investment management at low per unit cost. Such large funds can also participate in private placements not available to most investment funds.

These factors truly matter. In a recent paper, Ambachtsheer (2008) provides the following illustration. Your salary moves from CAD35,000<sup>1</sup> to CAD65,000 over a 40-year career. You want to replace 60 per cent of your final salary (CAD39,000) upon retirement. You will get CAD25,000 from social security (comparable to Canada and the United States), so you need CAD14,000 per annum indexed.

Assuming you can earn  $i = 4$  per cent real for 20 years and 3 per cent real thereafter, you need to contribute 6 per cent of salary over your lifetime to achieve this goal. If you have a well-managed plan (as can be expected from a large commingled plan) that can earn an extra 1 per cent per annum, then the 6 per cent contribution rate falls to 4.5 per cent. On the other hand, if you face management expense fees equivalent to 2 per cent (i.e., your rates of return are 2 per cent and 1 per cent real) then the contribution rate required rises to 10 per cent.

Further, if inflation is running at 2 per cent per annum, you have made no net gain in purchasing power at all.

We know that if individuals are responsible for managing their own capital accumulation accounts, they do so conservatively and receive lower rates of return. They also face management expense ratios that could decrease their net rate of return by as much as 3 per cent.

Finally, at retirement, the individual worker must either manage his or her own retirement or buy an individual annuity. We have already indicated the higher cost involved in having to purchase your retirement annuity from the private sector because of higher administrative costs and the anti-selection factor. Perhaps the only scenario that could be worse is managing your own account and your own longevity risk.

Finally, in a country where the achievement of retirement income security is a combination of public and private schemes, a fully-funded Individual Account social security system provides absolutely no diversification overall given that the majority of private-based benefits can be expected to be defined contribution, and fully-funded.

In short, there seems to be nothing to recommend Individual Accounts as the plan design preference for social security.

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<sup>1</sup> CAD = Canadian Dollars.

## Public versus Private

How much of the provision of retirement income security should be the responsibility of the government and how much should be left to private/individual initiative?

The answer to this will certainly vary based on local culture. It is doubtful that the Scandinavian countries would ever have the low social security replacement ratios common in the United States, for example (or vice versa).

Further, the discussion of what is public and what is private is often murky. If private retirement savings have measurable tax incentives (as in most countries) then is this not the same as public participation? And, many of these tax incentives have a regressive impact. This aspect is often missing in the average debate on these matters.

One design feature that actuaries should all agree to is that the mix of public and private should also lead to a diversity of plan designs and financing methods. There are times when Defined Benefit plans are superior. There are times when Defined Contributions plans shine. There are times when Funding is advantageous and times when PAYGO is clearly superior. So a mix of designs should be preferred because of the advantages of diversification.

All private Individual Savings (and Individual Accounts in Social Security) are, by definition, fully-funded and Defined Contribution.

Private employer-sponsored employment pension plans can be either DB or DC, but should be fully funded at any moment since the sponsor can disappear economically at any moment.

In many countries, notably the United States and the United Kingdom, employer-sponsored pension plans have shifted significantly over the last twenty years from DB to DC. Thus, in those countries, *all* the private-sector pension eggs are in the Fully-funded/DC basket.

So, at the least, one would not want to top this off with a Fully-funded/DC social security system. This would go against all economic logic of the advantages of diversity.

So, a partially funded or PAYGO DB social security system seems preferable in this regard.

## Automatic Balancing Mechanisms

Many social security systems around the world (e.g., Canada, Brazil, Sweden, Germany, and Japan) have introduced Automatic Balancing Mechanisms into their systems. These are meant to return a plan to sustainability when external forces create a non-sustainable balance of contributions and benefits.

It seems advisable that such ABM should react towards these imbalances by sharing the pain as equally as possible between workers and retirees. Only one of the above systems does this at the moment (Canada) and it can be shown that under "normal" circumstances even the Canadian ABM hits retirees harder than workers.

This does not seem preferable as retirees normally have no way to respond to reduced benefits and reduced standards of living.

## Conclusion

This paper has discussed a series of selection points in the design and funding of social security systems. For each criterion the paper has listed advantages and disadvantages of the options available. It is the sincere hope of the author that this discussion will create even more debate of the issues surrounding these important selection criteria which, in turn, will result in better social security systems for all.

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