

Reflections on Notional Defined Contributions Public Pension Schemes¹

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In the mid-1990s, the Notional Defined Contribution (NDC) system, an innovative approach to public pensions, was adopted as the principal component of a fundamental reform of the social security pension system in Sweden. At almost the same time, privately managed individual accounts defined contribution (DC) schemes were being strenuously promoted. (World Bank: 1994). The NDC system seemed to embody some of the advantages claimed for funded DC schemes while avoiding the risks sceptics foresaw in the funded DC approach. The NDC system is seen by some as an appropriate basis for reform of public pension schemes (European Commission: 2003; Holzmann: 2004).

Sweden's reputation as a caring welfare state ensured that wide attention has been devoted to the Swedish reform.² The *Scandinavian Insurance Quarterly* has contributed to the extensive literature which has built-up on the NDC system with a series of articles by Haggberg and Wohlner (4/2002), Settergren (2/2003), Scherman (4/2003), Könberg (1/2004), Casey (2/2004), Barr (3/2004), Lezner and Tipperman (4/2004), Cichon (2/2005). In this essay I draw on these articles and other sources, and set out some personal observations on selected aspects of the Swedish NDC system and on public pension reform in general.

Notional Defined Contribution schemes

During the accumulation period a NDC scheme is like a funded DC scheme. Contributions are

credited to individual accounts, called 'notional accounts', and accumulated. Unlike funded DC schemes, the accounts are not credited with interest; rather they are revalued annually in accordance with an index (in Sweden, the rate of increase in average earnings). At retirement, a formula is not applied to the contributor's earnings to calculate a pension as in a typical defined benefit (DB) scheme where average earnings are often used. Instead, when a pension is payable, the notional balance in an individual's NDC accumulation is converted

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into periodic payments by applying an annuity factor which takes into account the expected mortality of the cohort retiring at that time (in Sweden a unisex mortality table is applied). Unlike funded DC schemes, contributions are used to pay current pensions on a pay-as-you-go (PAYG) basis; hence participants' accounts are 'empty', and their accumulations are 'notional'. Since 'defined contributions' appears in the NDC title, the rectitude attributed to *funded* defined contribution schemes, no doubt conferred additional merit to the NDC concept.³ The NDC system avoids the transition cost of paying current (and accrued) pensions which arises if an existing PAYG DB scheme were replaced by a funded DC scheme, since the NDC scheme contributions are used to finance benefits payable under the previous scheme.

The NDC system embodies some advantages proponents attribute to funded DC schemes: a strong link between contributions and benefits; transparency; greater individual responsibility and choice; no redistribution within the scheme.

Public pension scheme reform

Reforms of social security pension schemes are undertaken:

- to ensure that the schemes meet their objectives for their participants which include:
 - income replacement throughout retirement through consumption smoothing over the life cycle,
 - poverty avoidance,⁴
 - income maintenance for disabled persons and dependant survivors,
- to remove perverse incentives and abuses which:
 - have undesirable labour market and/or social implications,
 - increase the cost of the schemes, and
- to ensure the financial sustainability of the

schemes.

In recent years public pension reform has often been precipitated by the third objective, financial sustainability. In some countries the reform has been driven solely by it. Ideally, pension reform should take into account the gamut of a nation's social protection system and ensure that the components are integrated and mutually supportive. This rarely happens, and reforms of public pension schemes can simply shift responsibility and the cost of providing certain elements of social protection to other components of the national system. The current focus is principally on public pension schemes since they constitute massive intergenerational transfers and reliable demographic and financial projections can be made. In the context of population ageing, the future cost of health care can have potentially greater financial implications than public pensions, but health care has not generally received the same attention since cost projections cannot be made with sufficient confidence.

Pensions are transfers of resources from active workers to inactive retired persons at the time the pensions are paid. Amounts paid in pensions, which pensioners then convert into goods and services that they consume, are equal to consumption (and investment) which workers forego. The goods and services which workers and pensioners share must be produced by workers at the time pensions are paid. Under the PAYG system the transfer is direct through taxes or contributions paid by workers. Under a funded system, pensioners liquidate assets which they have accumulated by selling their assets to workers. In both cases workers' consumption is reduced.

Thompson (1998) disaggregates the retirement burden and identifies three basic parametric changes to public DB schemes which can be made in order to maintain the financial sustainability of the schemes.⁵

- increasing the contribution rate,
- cutting pensions (e.g. by reducing the benefit accrual rate, the earnings base for calculating pensions or adjustments to pensions to take into account inflation), and
- reducing the number of pensioners (e.g. by increasing retirement age or modifying conditions for receiving a pension).

The alternatives for straightforward (parametric) modifications to DB schemes are limited. Moreover, simple modifications produce obvious winners and losers, and can lead to ‘reform deadlock’, the inability to achieve a consensus on acceptable reforms.⁶ Increasing the contribution rate is not often an acceptable approach – at least not to the levels expected to be required in the future.⁷

The reform in Sweden

From 1960 until the NDC scheme was implemented in 1999, the Swedish universal basic and the supplementary DB public pension system (ATP) provided for replacement rates of 60 to 65% of pre-retirement earnings for persons retiring at age 65 after 30 years of service covered by the schemes. The basic pension was payable to persons residing in Sweden for a minimum number of years. For those without any or with a very low earnings related pension, a supplement was paid. The schemes were PAYG financed with a buffer fund to smooth short-term variations in income and expenditure.⁸

By the mid-1980s, in the face of the rapidly ageing Swedish population and the prospect that future economic growth would not be as robust as in the past, concerns arose over the level of contributions which would be required to sustain the ATP scheme in the future. Other features of the ATP scheme were also considered to be undesirable, for example, the system of indexation and a weak relationship between contributions and bene-

fits. (see Scherman:1999)

The recession in the early 1990s gave impetus to reform of the public pension system and a Parliamentary Working Group comprising representatives of all parties then in the Parliament was appointed. This Group rejected parametric changes, and in 1994 after receiving submissions from various stakeholders, it presented a compromise programme outlining the reform which after refinement was enacted into law in 1998.

The Swedish pension reform seeks to automatically relate benefits under the public pension scheme to changes in life expectancy and the development of the Swedish economy. The intention was to ‘cap’ the contribution rate indefinitely. By specifying automatic procedures (e.g. for indexation, for annuitization and (in 2001) a mechanism to correct financial imbalances), the reform was designed to avoid the need for future public pension legislation and thereby remove the risk of political interference or manipulation.

Retirement age

Among other reform possibilities, raising the retirement age has the greatest potential for reducing the cost of public pension schemes as well as achieving other national social and labour market objectives. In the decade following 1960 when the ATP scheme was established with a normal retirement age of 65, the expectation of life for Swedish females at age 65 was 16.1 years while for males it was 13.9 years. By the late 1990s, the expectation of life at age 65 had increased by about four years for females and by nearly three years for males. By 2030, further increases of two years for females and three years for males are estimated. (Statistics Sweden: 2005) Clearly, if retirement means ceasing gainful economic activity, by the 1990s a normal retirement age of 65 was no longer appropriate and would become increasingly inappropriate in the fu-

ture. With 30 years of service required to qualify for a full pension, persons retiring in the 1960s could look forward to a period of retirement equal to about one-half their service requirement. By 2000 this proportion was approaching two-thirds. Clearly people should work longer, and the normal retirement age of 65 was considered by some to be an inducement to withdraw from the labour market. A broader retirement age issue is whether and how future contracting labour forces will be able to produce the goods and services which are required to maintain living standards for the entire population.

From a purely technical point of view, an increase, or more likely a series of increases, in the normal retirement age could be enacted. Alternatively, retirement age could be related to the expectation of life. Strict actuarial reductions or increases could be applied to ensure that retirement before normal retirement age was (financially) penalized and deferrals of retirement were rewarded. But the winners and losers from such changes are obvious, and in order to be accepted an increase in retirement age must be implemented over a long period.⁹ Instead, the Swedish reform masks the winners and losers and indirectly achieves the desired increase in retirement age.

Clearly, as life expectancy increases, successive cohorts of participants will have to work longer in order to have adequate pensions. At the same time, the reformed system is presented as being less prescriptive by giving participants the choice to retire whenever they choose after age 61. This is somewhat disingenuous since no matter how much one might wish to retire, the choice obviously depends on whether the retirement pension at the chosen time will be adequate. A participant's retirement planning is complicated since the pension depends on the uncertain balance in his/her NDC account at retirement (plus an uncertain pension from the funded DC scheme and probably a benefit from an occupational

pension). Thus, while the NDC system permits persons to retire when they wish after age 61, in order to have adequate pensions they will have to contribute to the scheme for increasingly long periods. Contributions which they continue to make to the scheme will increase their pensions, they will have employment income and the expected retirement period during which they must rely on their pensions will be reduced thereby resulting in larger pensions.

This reform approach achieves the objective of strengthening older workers' participation in the labour force – provided they are able to work and can find employment. This is a desirable result, particularly in countries where dramatic reductions in the labour force are projected. But it requires a change in attitudes and practices and possibly legislation pertaining to the employment of older workers. Perhaps these changes are inevitable in countries where labour forces are projected to contract in the future.

The contribution period

The previous DB scheme's replacement rate of 60 to 65% of pre-retirement earnings after 30 years of service was relatively high. The basis for the calculation of pensions, average earnings during the best 15 years, was considered to lead to inequities, notably between blue-collar workers (whose earnings tend to be more level and often decline late in their careers) and white-collar workers. In DB schemes where the retirement pension is calculated according to a formula which relates an individual's earnings near retirement and the period during which the individual contributed to the scheme, there is also a potential moral hazard since participants may seek to manipulate the timing of their contributions and the earnings used to calculate their pensions in order to reduce their contributions and inflate their pensions.

As in the case of retirement age, from a purely technical point of view, straightforward parametric modifications to the existing scheme could be made. The average earnings over a worker's entire career, adjusted annually by an earnings adjustment factor, could be applied to calculate the pension, and the benefit accrual rate per year of service could be reduced. But, just as in the case of an increase of retirement age, the winners and losers from such changes would immediately be obvious, and there would be resistance to the changes.

In DC schemes the periodic payments depend on the accumulated amount in an individual's account at retirement. It is held that this close link between contributions and benefits treats different segments of the population equitably and should eliminate any moral hazard. In Sweden, lifetime contributions to the NDC scheme are accumulated annually at the rate of increase in average earnings, and at retirement the accumulation in a participant's individual NDC account is converted into a pension. This eliminates both the 30 years of service and the best 15 years average earnings features of the ATP scheme.

Participants face the risk that their NDC account balances will be insufficient to provide them with adequate retirement incomes. Various estimates of individual account balances can be constructed, but there are no generally accepted standards or principles regarding the assumptions which must be made concerning rates of earnings growth and inflation during the contribution period. Projections can be made over contributory working periods of 40 years or so, but few participants will have a full 40 years of contributions. Some participants' contributions will be intermittent, for example, due to periods of non-contributory unemployment. Hence projections of NDC account balances can be deceptive. Even if pension projections demonstrate adequate pensions for a group, they are unlikely

to apply to an individual member of the group. While the NDC approach may indeed be more transparent and fairer, it introduces uncertainty, since unlike in a typical DB scheme participants have no reliable basis for estimating how the pensions they will receive will compare to their pre-retirement earnings.¹⁰

Automatic balancing mechanism

A future increase in the contribution rate was not seen as an option by the Swedish pension reformers; rather their intention was to create a system whereby the total contribution rate, 18.5%, would apply indefinitely. The part of the former ATP scheme buffer fund that was transferred to the NDC scheme will help to maintain the stable contribution rate, as will the reduction in average pensions resulting from the gradual phasing out of ATP scheme pensions. In addition, income of the NDC scheme is increased by transfers from the state.¹¹

The new system, which will gradually come into effect, applies a lifetime approach to the accumulation of pension entitlements and effectively raises the retirement age as longevity increases. But it is a fundamental truth about contributory pension schemes that one can set either contributions or benefits, but not both. If the contribution rate is fixed, then no matter how strict the rules that are applied may be, to maintain financial stability pensions must be susceptible to reduction.

The means whereby the Swedish reform is expected to guarantee financial stability with a constant contribution rate was not part of the original NDC scheme, but through an Automatic Balancing Mechanism that was enacted in 2001.

Provided the life expectancies of successive cohorts of retired persons are estimated with sufficient accuracy, at the times they retire the risk of pensioners' longevity does not affect the stability of the NDC system. The life

expectancy applied to a cohort of pensioners is based on the mortality applicable to the cohort at age 65. Post-retirement gains in life expectancy by pensioners are not taken into account and can affect the financial stability of the scheme.

Both contributions accumulated in notional individual accounts and pensions are indexed annually according to the increase in average earnings (with 1.6% of expected annual pension indexation taken into account in advance in the calculation of the retirement annuity). Since an important factor in estimating the equilibrium internal rate of return in a mature PAYG scheme is the annual increase in the contributory earnings base, the financial stability of a NDC scheme can be affected by a decrease in the number of contributors.

While the buffer fund constituted from reserves of the former DB scheme will moderate some deviations, after the long transition period the principal means of maintaining financial stability is the Automatic Balancing Mechanism which defines a ratio of contribution assets to pension liabilities. Contributors and pensioners both participate in the adjustment which is made if the balancing ratio is less than one, as the indexation of contributions and pensions is reduced until the ratio recovers to one.

The effect on contributors' NDC accumulations depends on when in a contributor's career and for how long the reduced indexation is applied. Unlike traditional DB schemes where pensions are adjusted by increases in wages or prices (or a combination of both), under the Automatic Balancing Mechanism pensioners are directly affected whenever the balancing ratio is less than one. They lose the amount by which the indexation of their pensions is reduced whenever this ratio is less than one. Given the future expected contraction of the labour force, it is possible that pensioners will suffer decreases in their standard of living compared to the rest of the

population. The financial risks due to longevity and a decreasing contributions base are thus borne by NDC scheme participants in their capacities as current and future pensioners.

Aspects of public pension reform

Social security reforms are unpopular. Parametric modifications to public DB schemes are contentious, and it is difficult to reach a consensus on acceptable changes. It is desirable that social security reforms be simple, but few reforms (especially parametric reforms of public pension schemes) meet this criterion. A complicated reform may be socially and economically superior, but it will not be well understood and it will be suspected by those it is designed to benefit. One author has suggested that parametric reforms can be 'social policy by stealth' whereby arcane and complex technical changes are made which few participants recognize or understand. (Battle: 2003)

In a traditional DB scheme contributions are pooled. A participant does not have an individual account, but acquires rights to a pension by virtue of contributions. In most DB schemes, at any time the participant can estimate his/her pension at retirement as a percentage of pre-retirement earnings based on rights which have been acquired and those which are expected to be acquired from future contributions. Much merit is attributed to the transparency of DC schemes where each participant has a (notional or financial) individual account which he/she owns. But while a DC scheme participant knows the balance in the account at any time, he/she cannot confidently estimate the retirement pension as a proportion of his/her pre-retirement earnings.

In the world of public pension reform, it is remarkable that parametric reforms which reduce DB scheme pensions are rejected, while a structural (paradigm) reform which is also

motivated by the need to reduce the cost of the public pensions and consequently also reduces pensions, albeit by uncertain amounts, is accepted. The public may be more readily persuaded to accept a major structural reform such as the introduction of a NDC or funded DC scheme if the reform is simple and the proposed scheme is portrayed as providing uncertain but possibly superior pensions than would result from a complex parametric reform of an existing DB scheme.

Major structural reforms to public pension schemes are phased in over long periods so that the generation approaching retirement is little affected. In Sweden only persons born after 1954 will participate solely in the reformed system, and it will be 2040 before all pensions are based on it (Sunden: 2004). Perhaps the delay in full implementation and the myopic attitude to their retirement pensions which pertains until they near retirement also results in persons generally being unaware of the nature and possible implications of a public pension reform. Alternatively, perhaps they trust the reformers to act in their best interest, and expect the government to remedy the situation should this ultimately prove not to be the case. According to Sunden, the NDC pension reform in Sweden is not widely understood. Anecdotal evidence indicates that this applies to structural public pension reforms elsewhere.

Much is made of the resistance of a NDC scheme to future changes. For example, it is intended that the contribution rate be fixed. Even if it were raised, the increased NDC accumulations would ultimately produce increased pensions.¹² The system of calculating pensions taking into account cohort life expectancy and the indexation of pensions and contributions accumulated in notional individual accounts are well-defined, thereby also apparently insulating the scheme from future legislative action or politically motivated tampering.

But the possibility of adapting public pension schemes to changing circumstances is a strength of the schemes. In countries where civil society has a strong influence on public policy, political risk is not necessarily malign. While reforms of public pension schemes have largely focused on reducing or stabilizing future expenditures in order to make the schemes financially sustainable, the distributional consequences of reforms are important as are the objectives of benefit adequacy and equity and the overall economic well-being of retired persons. If, after a public pension reform it turns out that retirement pensions are generally inadequate, governments will be called upon to supplement pensions from general tax revenues and they will reconsider the reform. Political survival provides strong encouragement for governments to respond to the demands of their increasing aged populations. Indeed, no public pension schemes have remained unchanged for long periods.

There is an extensive literature on how the public pension reform process proceeds through proposals, dissemination, promotion, discussion and finally implementation. (See for example, Müller: 1999.) Involving all stakeholders in public pension reform negotiations runs the risk that despite a manifest need for reform of a public DB scheme, since individual losses are readily identified and resisted, the stakeholders will be unable to reach a consensus on an acceptable reform, thereby resulting in a 'reform deadlock'. Alternatively, a consensus can involve such complicated parametric modifications to a DB scheme that the scheme becomes incomprehensible. In Sweden under strong political leadership, stakeholders made their inputs, and the reform was decided at the political level.

It is a question for political scientists whether in democracies a major national issue such as public pension reform should be decided by responsible and visionary political leaders

who rise above partisan and ideological issues and reach a compromise consensus on the basis of sound technical advice and inputs from stakeholders, or whether a reform should (or can) be framed by stakeholders who are inevitably constrained by parochial perspectives. Clearly, the answer depends on the culture and established political processes in a country.

NDC schemes elsewhere

NDC schemes have been introduced in Italy (1995)¹³, Latvia (1996), Kyrgyzstan (1997), Poland (1999) and Mongolia (2000) and are being considered elsewhere. (See Williamson: 2004) In countries where the existing DB scheme is not susceptible to parametric reforms for political or technical reasons, a NDC scheme is a reasonable and viable alternative. Both NDC and funded DC schemes shift risks to participants, but the volatility and uncertainty of the amount of the initial retirement pension would normally be less in a NDC scheme. Clearly, a NDC scheme is preferable to a funded DC scheme in countries where the prerequisites for a funded scheme are lacking (e.g laws governing the ownership and transfer of property, a domestic capital market, a reliable banking system, a functioning securities exchange and effective regulation of financial institutions).

A NDC scheme requires the national statistical service to develop and maintain reliable earnings statistics and estimates of cohort mortality rates at the higher ages must be made. The Swedish reform, which took nearly a decade from conception to implementation, demonstrates that public pension reform is a long process.

Conclusion

The success of the labour market improvement and benefit abuse prevention measures

which are normally part of a public pension reform will gradually become apparent in the years following the reform. Whether the fundamental objectives of a public pension system – adequate and financially sustainable pensions and an acceptable sharing of goods and services between active workers and retired persons – will not be known until several generations have passed.

Public pension scheme reforms are designed to take into account current and expected future social, economic and demographic conditions. Like any pension reform, a reform which implements the innovative NDC system will inevitably be modified if the system does not perform as intended or if future social, economic and demographic conditions do not unfold as expected.

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Notes

¹ All views expressed in this article are those of the author, and do not necessarily reflect those of the Caledon Institute of Social Policy, the International Social Security Association or the International Labour Office.

² The Swedish pension reform also provided for a funded DC Premium Pension to which 2.5% of the total 18.5% of earnings contributions is allocated. The total pension is thus made up of

benefits from the public NDC and funded DC schemes plus, for most Swedes, a benefit from an occupational scheme. There is a ceiling on contributory earnings for employees. For persons with no or only a small public pension a state supplement is paid. This note deals only with the NDC scheme.

³ The title has created considerable confusion. Alternatives such as 'non-financial DC', 'notional accounts' or 'virtual accounts' have been suggested.

⁴ Poverty avoidance refers to ensuring that potentially vulnerable groups (e.g. elderly women, persons with low lifetime wages) do not fall into poverty during their retirement. Poverty alleviation refers to support for the lifetime poor. Contributory pension schemes can assist in alleviating poverty, but other public measures and resources are normally necessary.

⁵ From Thompson (1998), if
 Y = total income,
 C = aggregate consumption,
 C_p = aggregate consumption of retired persons,
 n = total population, and
 p = number of retired persons (pensioners),
 then,

$$\frac{\text{Number of retirement pensioners}}{\text{Total population}} = p/n;$$
 Average consumption of retired persons
 $= C_p/p,$
 Average consumption of total population
 $= C/n,$ and
 Retired persons living standards ratio

$$= \frac{\text{Average retiree consumption}}{\text{Average total consumption}}$$

$$= (C_p/p) / (C/n).$$
 Hence the Retirement Burden

$$= C_p/Y = C/Y * p/n * [(C_p/p) / (C/n)].$$

⁶ In Japan, since 1980 demographic and economic circumstances have led to reforms to the public DB pension schemes which apply all three basic types of parametric changes. In 1994 retirement age was gradually raised from 60 to 65, and indexation of pensions was based on net wage increases. In 2004, reforms enacted after acrimonious debate gradually increase the contribution rate to Employees' Pension Insurance from 13.58 per cent of covered wages to 18.3 per cent in 2017, and raise the State subsidy to the National Pension Programme which covers resi-

dents from one-third to one-half of the cost in 2009. Demographic factors which take into account declining numbers of contributors and increasing longevity of pensioners will reduce the current replacement rate (from both schemes) of about 60% of net income for a full-career contributor to around 50 per cent by 2023. During this period the real value of pensions in payment will be reduced by applying a demographic factor which lowers the indexation of pensions.

- ⁷ In Canada a consensus was achieved to raise the contribution rate to the Canada Pension Plan which replaces about 25 per cent of the wages of a full-career average-wage contributor from 5.85 to 9.9% of contributory earnings over six years from 1998.
- ⁸ An additional function of the buffer fund was to hold the net savings which were created during the first decades of the ATP scheme since contributions were higher than required on a PAYG basis. These public savings were created in order to offset a possible decrease in private savings that might result from the contributions to the public scheme.
- ⁹ In 1983 the retirement age in the USA was increased from 65 to 67. Persons born in 1937 or earlier maintained the retirement age of 65. Gradual increases were stipulated so that the full increase in the retirement age first applies in 2027 to persons born in 1960 and later. Hence, in 1983 those persons aged 46 or older were unaffected by the change, and those persons who would be fully affected were age 23 or younger.
- ¹⁰ The uncertainty of a NDC accumulation based on average earnings increases (or a similar in-

dex) is less than the investment risk faced by participants in funded DC schemes who face the possibility of unfortunate timings of their contributions and investment returns, and especially the possibility that at the time of their retirement the values of their accounts will be depressed. For the cohort born in 1990, at age 65 the estimated pension from the DC Premium Pension contribution ranges from 7.6 to 13.1% of average income while the NDC range is 40 to 45% of average income. (National Social Insurance Board: 2002)

- ¹¹ For periods during which social insurance benefits are payable and certain other periods (e.g. child care), contributions are paid to the NDC scheme and the funded DC Premier Pension scheme by the Central Government and the beneficiary or by the Central Government alone. (See National Social Insurance Board: (2002), pp. 13-14) Social insurance benefits also gave rise to pension entitlements in the ATP scheme, but no contributions were paid.
- ¹² The AARCO and AGIRC contributory compulsory complementary pension schemes in France apply a 'system of points' which is related to the NDC approach. Each year contributions are used to purchase points which are converted into pensions at retirement according to the value of a point at that time. In order to finance the PAYG system, the actual contribution (taux d'appel) is currently 125% of the contractual contribution (taux contractuel) which is applied to purchase points.
- ¹³ In Italy there is a long lead time until the NDC scheme becomes operative.