Balanced Notional Defined Contribution Schemes:

A new "geist" in old bottles?

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NDC schemes are not in automatic financial equilibrium without a balancing mechanism, since they can cope with increasing longevity but not shrinking workforces resulting from decreasing fertility. The need for additional mechanisms to keep the schemes in balance is resulting in the adoption of new regulatory mechanisms. This paper tries to trace the principal effects of such balancing mechanisms on a typical European country called Demoland. *The analysis heavily draws on the Swedish method of balancing NDCs to analyse the principal effects of a balanced NDC approach in a stylized typical European demographic and economic context. The paper argues that the balanced NDC approach limits the policy space policy makers to find a fair sharing of the financial burden associated with demographic developments between generations. The limitation of the policy space leads to the fact that the financial consolidation of the NDC pension schemes will be done at a high cost to pensioners in a typical European context. It also symbolizes a fundamental shift in the way PAYG pension schemes are functioning, away from a solidarity-based way of coping with emerging new demographic, economic, social and resulting financial burdens to an individualistic approach with uncertain long-term consequences for the future standard of living of pensioners.*

1. Introduction

Social policies like all other fields of policy are subject to fashion. Fashion cycles in social policy are much longer than in the garment industry but they are a manifestation of the prevalent *zeitgeist*. Less than a decade ago a new fashion appeared in pension policy: Notional Defined Contribution (NDC) schemes. Invented in Sweden and Italy, first applied in Latvia and later introduced in Poland, Italy and Sweden, they have meanwhile been heralded by the World Bank[2] as a cornerstone of a possible long-term pan-European pension model.

When analysing the NDC method (as it was then known) of calculating pensions the author concluded in 1999[3] that

a) the schemes are not in automatic financial equilibrium without a balancing mechanism, since they can cope with increasing longevity but not shrinking workforces resulting from decreasing fertility,

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b) the NDC formula itself was new wine in old bottles as similar financial effects could be obtained by a PAYG Defined Benefit (DB) scheme with a career average pension formula and actuarial reductions and increments to compensate for early respectively late retirements.

Due to the fact that they are not in automatic financial equilibrium the *NDC* schemes are now turning into *balanced NDC* schemes. The need for additional mechanisms to keep the schemes in balance is resulting in the adoption of new regulatory mechanisms. Consequently the principal effects of NDC reforms on pensioners and contributors have changed. This paper tries to trace the principal effects of such balancing mechanisms on a typical European country called *Demoland*. The analysis heavily draws on the Swedish method of balancing NDCs – but does not set out to criticize the specific Swedish pension reform. It cannot and does not set out to replicate the numerous and more sophisticated model calculations that were prepared by the Swedish authorities in recent years. It simply uses the defining elements of the Swedish balancing mechanism – which is the first fully developed and fully documented mechanism – to analyse the principal effects of a balanced NDC approach in a stylized typical European demographic and economic context.

The paper argues that the balanced NDC approach, which aims at consolidating the finances of PAYG pensions, may do so at high cost to pensioners in a typical European context. It also symbolizes a fundamental shift in the way PAYG pension schemes are functioning, away from a solidarity- based way of coping with emerging new demographic, economic, social and resulting financial burdens to an individualistic approach. That approach also limits the policy space for politicians to distribute future financial burdens triggered by old age security systems between the active and inactive generations. Balanced NDC schemes reflect a new "zeitgeist".

2. Conceptual and definitional basics

Pension schemes are basically a set of rules that determine the share of total consumption that a society allocates to the elderly.

On the surface one can finance that share of national consumption either – as we have traditionally done Europe – from the current income of active workers or – alternatively – by forcing each generation to accumulate financial or tangible assets and to sell them to the next generation (i.e. saving and dis-saving). By now, however, it should be common knowledge that nations cannot – or only to a very limited extent – stockpile (or save) goods for future consumption[4]. Even if generations save for their retirement, the consumption of the elderly has to be financed from the income generated by the active population. The proceeds that future pensioners need to derive from their savings to finance their day-to-day consumption depends critically on what share of their income the next generation wants to use to buy assets from the pensioner generation, i.e. what share of GDP future generations of actives want to share with the elderly. If the number of actives decreases in an ageing society, the rate of return on capital stocks are likely to diminish and asset prices are also likely to fall as the demand for assets will most likely decline. Pension levels can be expected to fall likewise. Even the World Bank in its recent pension policy paper adheres to this thinking[5]. Nonetheless, a greater reliance on fully funded components in national pension systems is widely recommended by the World Bank an others. However, a complete changeover from a PAYG pension scheme to a fully funded one would create substantial transitional financing problems for governments.

In this context Notional Defined Contribution (NDC) schemes were invented as a close proxy to "real" fully funded defined contribution (DC) schemes. The basic philosophy of

NDC schemes is simple. They mimic (Barr 2004) the principle of fully funded defined contribution schemes without requiring actual resources to finance transition cost. The contributions of individuals are credited to a fictitious account. That "account" is actually nothing more than a record of contributions paid and fictitiously credited interest on these contributions. At retirement pension amounts are determined by dividing the fictitious or "notional" balance of the "account" by an annuity factor (or "divisor"). That factor or divisor is actuarially calculated –like in any private pension insurance scheme – based on the remaining life expectancy and an assumed interest rate as well as the assumed rate of future pension indexation. If the interest rate used for credits to the accounts and the rate used for the calculation of the annuity factor were equal[6] then such NDC schemes can be defined as "*pure* " NDC schemes. They fully simulate real DC schemes with respect to the pension calculation[7]. Pensions of different cohorts would thus under *ceteris paribus* conditions automatically vary in line with their expected average life expectancy at the time of pension award. The contribution rate would be more stable than in a classical PAYG scheme.

From the first appearance of the NDC models governments have diverged from the pure emulation of real DC schemes – necessary, in order to "balance the books". Existing NDC schemes vary according to the interest rates they apply to the fictitious savings and the interest rate used when calculating the annuity factor. If one assumes that the interest rate to calculate the annuity factor is equal to the future rate of pension indexation, then the annuity factor is equal to life expectancy at retirement age. This is the case in Poland, for example. Poland adjusts pensions in payment with the rate of inflation plus 20% of real wage growth. Because of this numerical equivalence between life expectancy and the annuity factor, that rate (inflation plus 20% of real wage growth) is implicitly equal to the assumed interest rate for the calculation of the annuity factor. Savings, on the other hand, are credited with an interest rate that is equal to 75% of the total wage sum.[8] The effect is that initial pensions are held down and the average replacement rate of pensions in payment drops over time. In Sweden, the interest rate applied to savings "in normal times" is equal to the increase in average wages. Pensions in payment are indexed with average wage increase minus 1.6%-points. The latter means that the implicit effective interest rate applied to savings is equal to 1.6%[9,10]. This is generally lower than the rate of change of wages which means that (due to the smaller denominator in the present value calculations) initial pensions are relatively high but would then face a declining replacement rate during an individual's pension life.

A crucial difference between real DC and notional DC concepts remains. Real DC schemes are – if all goes according to plan (and according to actuarial calculations) – in automatic financial equilibrium since the present value of all pensions to be received by an individual would – at least in theory and on average – match the amount of his/her fictitious savings. Collectively this would mean that at any given point in time the present value of all liabilities (i.e. the present value of all pensions in payment and all pension rights earned by still-active insured persons) would be equal to the total value of all balances in the individual pension accounts. This allows for substantial flexibility with respect to retirement ages. People would just get out what they put in – regardless of when they retire. Pure NDC schemes on the other hand are not in automatic equilibrium. It is obvious that the actuarial pension formula alone only isolates NDC schemes against the risk of longevity. It does not isolate NDC schemes against the risk of shrinking contribution cohorts due *inter alia* to decreasing fertility rates. Achieving an automatic equilibrium – which is here equated with maintaining a constant contribution rate – systematically requires an additional balancing mechanism –a "crutch" to substitute the *expenditure and income balancing power of money* – of which there is none or relatively little (in form of contingency buffer funds) in the NDC scheme. The need for additional balancing between income and expenditures turns *pure NDC* schemes into *balanced NDC schemes*.

In Sweden this is achieved through additional corrections to the interest rates credited to savings and the adjustment of rates of pension in payment as introduced in 2001. In some cases the indexing of savings or pensions to the rate of change of the wage sum is regarded as a perfect balancing mechanism. This would go some way towards balancing income and expenditure but is not always mathematically correct (and counter examples exist[11]) and does not generally abolish the need for an additional balancing mechanism.

3. The effects of maintaining financial equilibrium in balanced NDC schemes

3.1 Financial equilibrium and policy spaces in PAYG schemes

NDC schemes remain PAYG or partially funded pension schemes – which determines the nature of their financial equilibrium. If one abstracts from the possible existence of a contingency buffer fund (thus leaving the "pure" Swedish case) and ignores administrative cost, they have to comply with the basic formula:

(1) $CR_t * AW_t * CONS_t = AP_t * PENS_t$

i.e. the product of the average wage (AW), the contribution rate (CR) and the number of contributors (CONS) has to be equal with the product of the number of pensioners (PENS) and the average amount of pensions (AP) in any given period t. This can conveniently be written as:

(2) $CR_t = (AP_t/AW_t) * (PENS_t/CONS_t)$

meaning that the PAYG contribution rate is the product of the *financial ratio* (the ratio of the average pension to the average wage AP/AW) and the *demographic ratio* (the ratio of the number of pensioners to the number of contributors PENS/CONS).

An emerging financial dis-equilibrium would be signalled in this "pure" PAYG world by increasing deviations of necessary contribution rates from actually charged contribution rates. A standard DB PAYG pension scheme as an institution can use at least three policy instruments to react to that situation: i.e. modifying pension levels, pension age and contribution rate. The pure NDC scheme gives up one or two of those (i.e. the pension level, and with some limitation the pension age) but leaves the contribution rates – even if this is not always explicitly admitted (see Palmer (2003)) – to accommodate financial pressures that results from factors other than longevity. A balanced scheme changes that situation.

If – as in the case of a balanced NDC scheme – the contribution rate is fixed and the demographic ratio is outside the direct control of policy makers, the number of contributors is determined by the economy and the size of the cohorts in active age by the demographic environment, and the number of the pensioners is determined by people's retirement preferences (with some limitation through the setting of a minimum retirement age), then logically the schemes can only be kept in financial balance if the financial ratio can be modified. With the exception of a ceiling on contributors' earnings, the average insurable wage can also not be influenced by policy decision, thus – in principle – the only policy instrument that can be used in an NDC scheme to maintain its financial equilibrium and to bring a deviating scheme back into equilibrium is to modify the

level of pensions. In the prevailing demographic situation in Europe, this will mean in most cases reducing the level of pensions[12]. The balanced NDC scheme thus deliberately and severely limits the policy space for policymakers[13].

3.2 Maintaining financial equilibrium in pure NDC schemes

If a financial imbalance is due to increasing longevity then the pure NDC mechanism copes with it through the reduction of new pensions at each single retirement age – except possibly for some time lag problems. Individuals can counter this by retiring later – if they have the freedom to do so. Alternatively they can choose other means of individual social risk management. They can choose to retire at the time planned but draw a pension later. They might bridge the time gap by using other transfer payments – if accessible – or "buy" additional periods of leisure out of private savings – if they have the means to do so. There are various ways of individually managing the longevity risk. However, these options generally favour the better off and the better informed. Less well off people might prefer to take pension later and yet might be subject to pressures to retire earlier than planned. What is meant as an incentive for change in retirement behaviour might just turn into a straight reduction of current income for the less fortunate.

If, however, the financial imbalance occurs due to a contracting volume of contribution income, then a pure NDC scheme would have to resort to increasing retirement age or increasing contribution rates, although the latter measure has it's own disadvantages. Each increase of the contribution rate to balance *current* accounts, creates new future pension rights that may very well cause new disequilibria problems in the future (Scherman 2003). The only way to avoid this would be to split the contribution into a share that is credited to the individual accounts and one that is credited to the contingency buffer fund without affecting pension amounts. In any case, raising retirement age or increasing the contribution rate are measures that could be applied in any other PAYG scheme – without the special disadvantages that are associated with increasing contributions in an NDC scheme.

3.3 Maintaining financial equilibrium in balanced NDC schemes and its likely effects

If the scheme were to maintain automatic financial equilibrium with a constant contribution rate, other measures would be needed to cope with the financial imbalance from a contracting contribution base, for example, by introducing a balancing mechanism. This section establishes the possible effects of such a balancing mechanism. Indeed, the politically tenable options for the actual design of such balancing mechanisms are limited. Rather than reducing the value of actual savings and pensions in payment, the rate of increase of both would probably be slowed down, i.e. the annual adjustments of pensions and the interest rate credited to pension savings would be reduced by applying a certain reduction factor to the "normally" applicable rates of increase and interest. Such is the example of Sweden, and this mechanism is used here as a concrete example to analyse the potential effects of such a balancing mechanism on the long-term replacement rates of pensions. A brief introduction of the mechanism is therefore in order. Other NDC countries such as Latvia, Poland and Italy have not yet introduced such explicit automatic stabilisers[14] although the necessity is acknowledged.[15] Interestingly two of the older classical PAYG DB schemes (i.e. the statutory pension scheme in Germany and the earnings related pension component in Japan) have introduced so-called explicit demographic factors[16] or sustainability factors[17] that aim explicitly at the financial stabilization of the schemes.

A prominent example: The mechanics of the Swedish balancing mechanism

The Swedish method to determine the balancing factor is new. Its full mathematical description can be found in *The Social Insurance Office* (2004, pp. 71-73). Essentially, the balancing formula is a rule-of-thumb simplification of an actuarial present value calculation. Instead of calculating the ratio of the expected present value of all pension liabilities (acquired pension rights and pensions in payment) and the sum of the present value of all future contribution income plus the value of the initial reserve, the formula used here estimates pension liabilities and contribution assets by using rules of thumb that do not require any projections.[18] The ratio of assets and liabilities provides a balancing factor. If that factor is smaller than unity, interest rates credited to the retirement savings in the individual accounts and the rate of adjustment of pension have to be reduced compared to the normal rates of interest and adjustment of pensions by multiplying the normal rate with the balancing factor.

The balancing factor (which we assume in a normal stylized European case will be smaller than 1, i.e. the ratio of the contribution assets and the pension liability is smaller than unity due to the above mentioned upward trend of the demographic ratio in Europe during the next decades) will be applied to the normal rate of pensions and savings indexation. In Sweden this would mean that if the balancing factor is, for example, 0.99 (i.e. that the contribution assets – including the value of the buffer fund if any – are 1% smaller than the pension liabilities) and if the normal wage increase shows a value of 3%, then savings are only credited with an interest rate of 1.97% (.99*1.03=1.097) and pensions are adjusted only by 0.4% (0.99 * (1.03/1.016) = 1.004)[19] instead of the normal rate of 1.4% (1.03/1.016=1.0138). The new rate of 1.97% is called the "internal rate" of return of the pension scheme[20]. If the balancing ratio recovers, pensions and balances are adjusted at a higher rate than the normal until they regain the index level they would have had reached without the temporary reductions due to the activation of the balance level in the first place.

Effects of the balancing mechanism on pension levels

In the latter case pension levels are restored but annual losses during the years with less than normal adjustment are not compensated. The present value of pensions in payment will thus always be reduced whenever the balancing mechanism is activated. By contrast, and depending on when during the contribution life of an insured person reduced interest rates for account balances are triggered through the balancing mechanism and the consequential recovery is activated – he/she might actually benefit from the balancing procedure if the same "recovery rates of adjustment" are applied to the account balances and pensions. This is an obvious effect of the asymmetric adjustment of pensions and balances[21]. While bringing pensions back onto the normal indexing track, the value of the accounts might be overcompensated for the loss. The following Box 1 illustrates this effect by an example. The "cost" of short-term shocks in the system is thus most likely entirely borne by pensioner generations.

The worrying fact is that the overcompensation of the active generation's savings balances might trigger another activation of the balancing mechanism which could then hit the loosing pension generation again. If the period of below unity balancing factors is not followed by a recovery period of positive factors due to a systemic deterioration of the demographic situation or a general contraction of the economy then future generations of pensions will also lose pension income but to a lesser extent than the pensioner generation during whose pension period the necessary down-

Box 1: The Swedish-type balancing mechanism, pension levels and retirement savings under short-term shock conditions.

The following graphs describe a simple example. Cohort II is starting to contribute in year one an amount of 10 currency units (CUs). It contributes for forty years. Contributions are increasing by 3% per annum. Cohort I starts to receive a pension in the same year when cohort II starts contributing. It receives a pension of 70 CU. In the base case in a normal situation annual retirement savings are credited with an interest of 3% and pensions by 1.4% (i.e. 3.0 – 1.6% = 1.4%) which would simulate the Swedish case. In a second scenario the internal rate of return is reduced due to a triggering of the balancing mechanism to 1.97% for a duration of 10 years. This simulates a period of a limited economic shock, which could be triggered by increased unemployment, for example. Retirement savings are thus credited with an interest rate of 1.97% while pensions are increasing in nominal value only by 0.4% p.a. The loss in pension level is subsequently recovered through a faster adjustment of pensions (which automatically also benefit the balances on the savings accounts) for seven years.

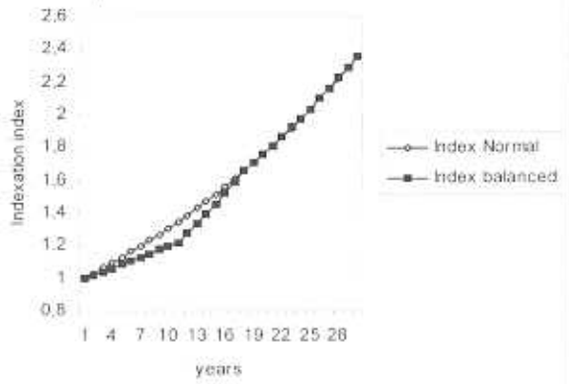
Box Figure 1 shows how the adjustment index recovers over the years.

Box Figure 2 shows the parallel picture for recovering pension levels.

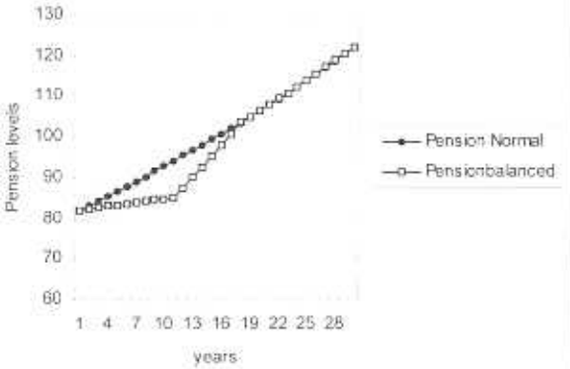
Box Figure 3 shows that retirement savings under the recovery scenario are overcompensated, if the systematic difference between savings and pension indexation is maintained.

The differential effect of the situation on pension levels and retirement savings is obvious. The pensions of *cohort I* lose about 3.1% of their present value while the retirement savings of *cohort II* will gain about 2.3%. If no further balancing periods are triggered then even in this relatively unspectacular example the pensions of *cohort II* are about 5.5% higher that those of *cohort I*.

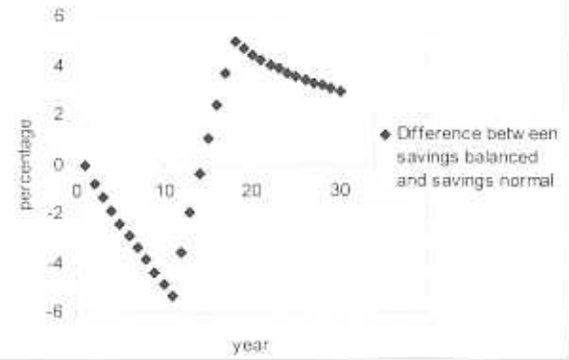
Box Figure 1: An example of the effect of a balancing mechanism on the pension indexation index.



Box Figure 2: An example of the effect of a balancing mechanism on pension levels



Box Figure 3: An example of the effect of a balancing mechanism on the level of retirement savings.



ward adjustment of pension levels occurs.[22]

If there is a long sequence of consecutive below unity balancing ratios without recovery over long periods or even decades then retirement savings will suffer (and hence future pension levels) a greater loss than pensions in payment. This, in a European context, is the much more likely scenario.

A mental exercise helps to understand the potential dimension of the cumulative effect of successive balancing on pension levels. In 2005 a country – that we may call *Demoland* – has a contribution rate of 16% and a demographic ratio of 0.33 (i.e. there would be 33 old age pensioners for 100 contributors). This demographic ratio of 0.33 could be typical in any ageing European country[23] if all people were retiring at age 65 and 90% of the people in active age groups were employed and contributing. According to our formula (2) this would then yield a financial ratio (or an average replacement rate of pensions) of 0.485 (i.e. the average pension would amount to 48.5% of the average insurable wage). If the demographic situation in the model country were to develop as the UN projections forecast for our model country *Demoland* indicate, then the demographic ratio (without a change of retirement age) would increase to 0.57 in 2050. To keep the contribution rate stable we would need to bring the average replacement rate down to 28.1%.[24, 25]

The automatic downward adjustment of the level of new pensions in line with increasing life expectancy (due to the annual adjustment of the annuity factor or divisor) would go some way towards achieving that "objective". But it would fall far short of target. In 2005, all (old age) pensioners have been born before 1940. The pensioners of 2050 will have been borne roughly between 1960 and 1985. According to Settergren (2003, table on page 104) in Sweden the latter group would experience on average a reduction of their pension by about 10% due to increased longevity compared to the cohorts born before 1960. Due to the identity of the demographic structure and development of Sweden and *Demoland*, we can use these factors here. The order of magnitude of the reduction is most likely not atypical for other European countries. Meaning that the average replacement rate would decrease to 43.7%. This is the effect of the pure NDC automatism triggered through increases of the NDC divisor (or annuity factor). If *Demoland* were to follow a strict balancing policy (i.e. maintaining a constant contribution rate), then pension levels would be forced down over time through the balancing mechanism by another 36%. This roughly means that only about 24% of the total consolidation need would come from the longevity effect on the pension levels and 76% through the balancing mechanism. This is roughly equivalent to the permanent use of a balancing ratio of 0.99 for about 45 years. Using the jargon of the World Bank, roughly three quarters of the "implicit pension debt" that the system is incurring at a constant contribution rate of 16% would be cancelled by reductions in pension levels while one quarter could be cancelled by the increase of retirement age (if retirees prefer later retirement to an equivalent reduction of pensions).

If a contingency buffer fund is available (which in Sweden at the end of 2003 stood at 370% of annual expenditure), it could be used to mitigate against the fall in replacement rates over the decades. However, one has to note that – in our example – in the year 2050 alone the income from the buffer fund needed to fully stabilize the replacement rate would amount to 12% of the total wage or about 43% of annual expenditure. Much more exact actuarial calculations and projections are needed to confirm this order of magnitude but there is reason enough to believe that even the existence of a sizeable buffer fund could not prevent a dramatic drop in replacement rates in balanced NDC schemes operating in a typical European demographic environment. The problem of

declining replacement rates would, of course, be much bigger and surface much earlier in countries without such buffer funds that might currently be contemplating an NDC-type reform.

But back to our case without a buffer fund. If people were far-sighted enough and were compensating prospective reductions of the replacement rate by higher retirement ages they would have to increase the average rate of retirement age from 65 to about 73 years in 2050[26]. Many more people than today would never experience retirement. In addition, prospective later retirement is highly unlikely as there is no way that people would be able to forecast the long-term decline of replacement rates years or even a decade before they plan to retire.

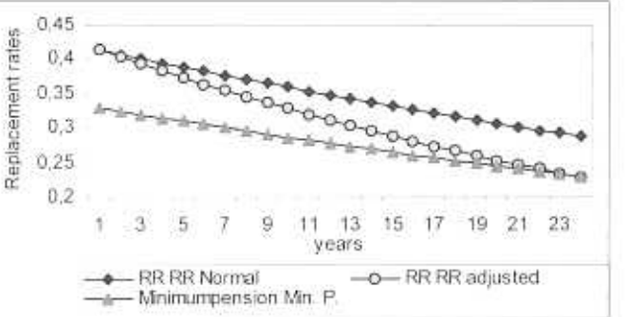
The effect on individual cohorts would be rather dramatic. The following graph shows the effect of the continuous application of a balancing factor of 0.99 on the average replacement rate of a cohort of pensioners in *Demoland* that starts out with a replacement rate of 41% (earned after 40 years of pension savings at a rate of 16% of an average income which has increased by a nominal rate of 3% throughout the savings period)[27,28]. The top line describes the "normal" decline of the replacement rate due to the asymmetric adjustment of pensions vis-à-vis the interest earned on the fictitious retirement savings. The second line describes the effects of a continuously applied balancing ratio of 0.99, and the last line describes the development of the replacement rate of a minimum pension which was set at 33% of the average wage in the start year and is consequently only adjusted for inflation.[29,30] That amount could be interpreted as a relative poverty line. The figure shows that at a contribution rate of 16% and an average nominal wage increase of 3% and a sequence of balancing ratios triggered by a demographic development, the application of the balancing ratio would bring the pension level of the standard beneficiaries in this cohort down to the poverty level[31]. Most of the drop in replacement rates would occur after retirement, so that pensioners would no longer have the option to compensate replacement rate losses through increasing retirement age.

Incidentally, the replacement rate in the above example – after 30 years of contributions – would only be in the order of 31%[32]. Even if that were to be increased by proceeds from the real DC component which the reformed systems have also introduced as second pillar the overall replacement rates would most likely fall short of 40%. This raises the interesting question if – and for how long – some of the European NDC schemes will be able to meet the standards of the ILO convention (No. 102 of 1952) on minimum standards in Social Security or the European code of Social Security (1964). Actual replacement rates depend, of course, critically on the level of the contribution rates. As long as these are locked in at the present levels, some of the present European NDC schemes might be heading for legal complications. The issue justifies an in-depth actuarial analysis which is far beyond the scope of this short paper.

In Sweden, the existence of a buffer fund and liabilities stemming from the old ATP system provide for temporary deviations from the principal development.[33] Without the buffer fund (in 2003 equal to 10.6% of contribution assets[34]) the balancing ratio would already be smaller than one and the decline of the replacement rates would be accelerated due to the application of the balancing factor. In addition, pension liabilities are still dominated by the old ATP burden which are based on generally higher pension levels that will be reached under the new system, thus the transition to lower replacement rate rates is slowed down.

However, the above figures show the principal trends that balanced NDC schemes are most likely to face. The balancing of the books will be at the cost of dramatic reductions in

Figure 1: Simulation of the effect of the balancing mechanism on the pension replacement rate of a standard pension recipient during the period of pension receipt in Demoland.



pension levels. As it looks, pensioners can only compensate about one quarter of such losses through postponing retirement in line with longevity gains. Three quarters of these losses would most likely occur after they have retired, unless they (i.e. the generation of the 20 to 45 year-olds of today) would be wise and healthy enough – with little advance information on post retirement reductions in pension levels to push retirement far beyond the age of 70 and beyond longevity gains.

Possible system side effects

Balanced NDC reforms set out to keep the contribution rate to the NDC tier of the overall national pension system constant. With the help of a balancing mechanism that objective can be achieved. However, the NDC scheme generally is only the first tier in the pension system. The second tier in all recent European reforms is a real DC scheme. According to the calculations of the Swedish Social Insurance Office[35] the overall replacement rates for an average pensioner at age 65 are expected to drop from roughly 65% for those born in the early 1940s to about 51% in the medium variant and to 47.5% in the pessimistic variant. In order to avoid such drops in the replacement rate present contributors would have to increase their savings in the second tier schemes or in a voluntary third tier by 150% to 200%. Similar orders of magnitude would apply to our Demoland case. This means that overall contributions to the pension system as a whole would have to go up in order to maintain present replacement rate levels. Governments might need to legislate hikes in the second pillar if too many people fall under the guaranteed minimum pension levels (which are an integral part of most pension reforms). This means that while the NDC scheme might be able to maintain a constant contribution rate, the pension system as a whole might not.

Possible social budget side effects

As Hagemejer (2004) points out, the reduction of pension levels will most likely trigger in turn compensation strategies of future pensioners. They will delay the date of pension application to recoup some of the losses inflicted on them by the NDC pension formula and the balancing mechanism. However, that does not mean that they will delay actual retirement from the labour market, they may well try to use other transfer payments as a substitute for pensions to bridge the gap between desired and affordable retirement age, such as social assistance, unemployment benefits and disability benefits. This option could at least defer the age of entry into pension receipt until the age of 65 (after that age, in most countries no alternative transfers are payable). Part of the retirement cost might thus be shifted to alternative transfer mechanisms. If the benefits under these schemes are relatively generous and pension contributions are paid by the state during the receipt of these benefits the incentives for behavioural adjustments of this sort are sub-

stantial. If average levels are still declining then the state may have to "remedy" some of the effects through the financing of an over-proportional share of total pension expenditure through the guaranteed minimum pension. The NDC scheme and the balancing mechanism might thus consolidate the finances of the old age pension schemes without necessarily achieving a consolidation of the overall level of social transfers. In other words, while the pension scheme might be in financial equilibrium the social budget of the nation as a whole might not.

In view of the above principal problems of the "balanced NDC" one might query why policy makers chose a relatively complex and new system to consolidate pension systems. One possible reason is that it was the only way to consolidate these systems. The following section rejects that hypothesis.

4. Are NDC reforms necessary?

Let us assume, contrary to the previous examples, that there exists a simplified PAYG pension scheme in *Demoland*. People retire at age 60 with an average replacement rate of 50% of average earnings. We assume that all people presently making use of de-facto early retirement through the use of alternative transfer benefits such as social assistance, unemployment benefits and invalidity pensions are included in the old age system. Society ages rapidly. The objective of the consolidation mechanism is to keep the contribution rate constant or in a narrow range around the present starting rate of 23.5% (which is the product of a financial ratio of 0.5 and a demographic ratio of 0.47) in the start year 2000. According to experience a contribution rate of between 20% and 25% seems to be a realistic order of magnitude for a PAYG pension scheme operating in a typical European demographic environment[36].

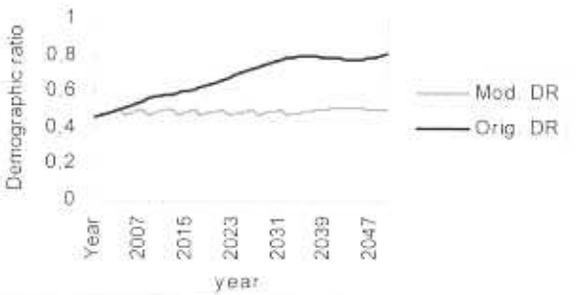
There are various ways to keep the contribution rate in check. One is described by a simple modification of formula (2), i.e.:

$$(3)\ 0.235 = (PENS_t / CONS_t) * 0.5$$

This means that we would want to keep the contribution rate and the replacement rate constant implying that we have decided not to burden the active generation further. We also do not want to reduce the relative standard of living of the pensioner generation (symbolized through keeping the replacement rate constant at 50%).

This can only be done by increasing retirement age. In *Demoland* we do this in steps of one year. To roughly maintain therefore the equilibrium of formula (3) we must raise retirement age seven times between 2000 and 2035, which means that the effective retirement age will increase by about 7 years. The model triggers an increase of the retirement age by one year each time the demographic ratio (DR) exceeds 0.5. The effect of the measure on the development of the demographic ratio is demonstrated in Figure 2.

Figure 2: The development of the demographic ratio of Demoland *2000-2050 with and without successive increases of retirement ages*



However, the increase of the *de facto* retirement age over 3.5 decades by seven years may not be feasible politically. There is another option. One could simply abolish the automatic adjustment of pensions in line with wages (i.e. waving the condition that the replacement rate stays constant). It is assumed here that wages will increase by 3% p.a. and pensions by 1.6% less – simulating an annual indexation of pensions in line with prices. The following figure shows the PAYG contribution rates from the year 2000 onwards

a) under status quo conditions without consolidation (curve PAYG-status quo),

b) under consolidation exclusively through the increase of retirement ages (curve PAYG CR –RA) and

c) under consolidation by replacing wage indexation by price indexation (curve PAYGCR-MODIN).

What the graph shows is that both consolidation measures could have "balanced the books". However, a mono-dimensional approach using just one of these tools would most likely not be acceptable (for example, an exclusive consolidation through pension adjustments would lead to a dramatic halving of the initial average replacement rate). A pragmatic combination of the two consolidation measures and a moderate increase of the contribution rate could help to broker a fairer sharing of the consolidation burden between actives and pensioners.

So the answer to the above question as to whether a balanced NDC reform (probably with a second-tier DC scheme) would be necessary to maintain the relative stability of contribution rates from a financial and technical point of view? Clearly not. There is enough reason to believe that classical instruments could have achieved the same effect.

A careful balance of the use of the three main policy instruments: reducing pension levels, increasing pension age and increasing the contribution rate would have

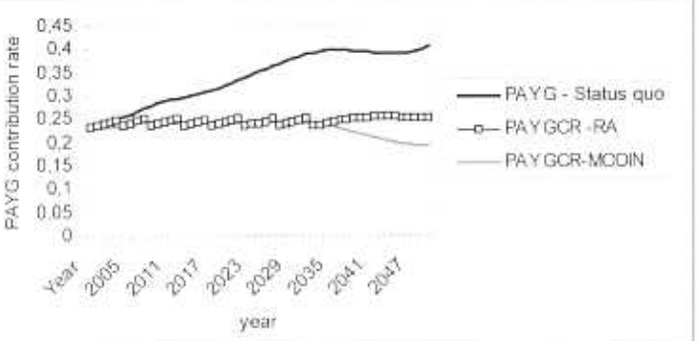
a) balanced "the books",

b) probably created a different inter-generational sharing of the consolidation burden, and

c) also probably created positive economic side effects.

With respect to the latter point, it should be noted that the financing of pension schemes is only one problem that the ageing of European societies will have to cope with. The more central problem will be the negative or low economic growth rates that could potentially be triggered by a contraction of the labour force. European economies might need a much steeper and/or earlier increase of retirement ages – once some of them will have come out of the present unemployment trough – than can possibly be triggered through the longevity-based decreases in pension levels. A further exploration of the subject is outside the scope

Figure 3: Projected PAYG contribution rates in Demoland *under status quo, increasing retirement ages and a modified pension adjustment, 2000-2050.*



of this paper but has been done elsewhere.[37]

It is obvious that the traditional bundle of policy measures opens a much wider and more flexible policy space for decision-makers than the balanced NDC approach. So the question remains why this approach was chosen in some countries and why is it promoted by institutions like the World Bank? The following sections tries to find an explanation.

5. Why then NDC reforms?

On the surface of national and international policy debates the prevailing objective of pension reforms these days seems to be the maintenance of financial equilibrium or – better – guaranteeing long-term financial sustainability and stability. However, there may also be hidden political agendas which may have to do with the huge amounts of monies that will be passing through financial institutions (banks, pension funds and insurance companies) when public social security schemes are wholly or partially privatized.[38] This again – fascinating as the topic may be – is not the subject of this paper, but the observations may help to make the case that there may be non-apparent explanations for some pension and social policy reforms.

Financial consolidation generally means in the context of an ageing society that expenditure or prospective expenditure has to be brought in line with prospective income. In a genuinely fully funded DC scheme this is automatically the case. The scheme simply does not pay out more than what has been saved on an individual cohort basis and if the management of the reserves is functioning properly and the actuarial annuity calculations are sufficiently risk averse then the schemes should be in automatic equilibrium. It is perceived to give "people their money back" which in turn is increasingly being seen as fair from an intergenerational and inter-personal point of view. NDC schemes suggest to the general public that they operate in the same fashion as real DC schemes, i.e. that people "will get out what they put in".[39] And if that should not be the case (as it will most likely not, as we have seen) then what they will get out is at least as closely related to their personal inputs as possible.

This is an essentially individualistic consolidation approach – which appears to constitute one part of the paradigmatic foundation of the approach.[40] The overall financial consolidation of the combined NDC and DC two-tier systems forces individuals to develop individual retirement strategies. If future pensioners want to safeguard their pension levels they have to adjust their individual retirement age upwards or must begin to increase their DC savings from an early age on. The development of the right individual strategy is subject to substantial uncertainty about future demographic and economic developments all compounded by information uncertainties (e.g. about the potential size of the future reduction of NDC pension levels). The old PAYG DB approach was based on collective societal responsibility which guaranteed an adequate level of consumption for the elderly and a collective shouldering of risks and uncertainties. These responsibilities are now being delegated from societies to the individual. That reflects a new *Zeitgeist*.

6. By way of conclusion: New "geist" in new bottles?

When analysing the mechanics of a balanced NDC reform some technical findings stand out:

1) The system can – in theory – most likely put a pension system into long-term financial, equilibrium – provided the downward pension adjustments will be tolerated by the population in future.

2) While the pension system might be in financial equilibrium the social budget of the country as a whole might not. The size of the potential shifting of expenditure from the pension system to other social transfer schemes is unknown, but – if present practice of early retirement through other transfer schemes in Europe is anything to go by – then the risk is substantial.

3) The burden of the financial consolidation under balanced NDC schemes will be overwhelmingly borne by pensioners during the next three decades. Losses of pension levels through a balancing mechanism in first-tier NDC schemes are not likely to be compensated through pension earned in second-tier real DC schemes – without substantial increases in their contribution rates.

4) The balanced NDC approach needlessly limits the policy space. The balanced NDC reforms are not necessary to consolidate the financial equilibrium of the national pension system. Financial equilibrium can be maintained by classical means using a combination of the policy instruments: raising retirement age, reducing pension levels and increasing contribution rates.

5) Policy space can be regained in NDC schemes if a certain increase of the contribution rate were permitted without triggering benefit longer-term increases. This could be done by splitting the contribution rate into an individual component (that would determine the amounts "saved" in individual accounts) and an solidarity component (that would be paid into a general buffer fund to help cope with a part of the increasing demographic burden). The individual component could be kept constant and the solidarity component could be allowed to fluctuate within limits. A new balancing mechanism could try to distribute inevitable consolidation burdens fairly between active contributors and pensioners.[41]

The obvious reason to use the NDC approach or better the combined NDC/DC approach was to achieve a fundamental paradigm change in the method of consolidation. The consolidation is perceived as being "fair" in the sense that contributors perceive that they "get out" what they "pay in". Individual equity reigns over societal responsibility.

In that respect I have to revise my findings of 1999 referring to the unbalanced NDC approach. If one includes a balancing mechanism – prescribing constant contribution rates for the active population – NDC reform embodies a fundamental shift in the meaning of solidarity. In that sense, there is a new spirit (a new *Zeitgeist*) in the old PAYG bottle. In German the word for ghost and spirit is identical (i.e. *geist*). It appears likely, that once uncorked, the new "zeitgeist" of the brave new balanced pension world will haunt us all – during our retirement.

Notes

[1] The author is grateful for the detailed review of the text by *Karuna Pal, Karl Gustaf Scherman* and *Diane Vergnaud* and constructive comments received from *Warren McGillivray, Florian Léger* and *Robert L. Brown*. Factual errors and errors of judgment, however, remain the responsibility of the author. Views expressed in this paper are private and those of the author and do not commit the International Labour Office.

[2] Holzmann (2003), p. 15.

[3] See Cichon (1999).

[4] See inter alia Barr (2000) and Brown (2002).

[5] See Holzmann and Hinz (World bank, 2005), p. 70.

[6] Except for annual deviations of interest rates (used to credit interest to the accounts of actives) from assumed long-term average interest rates (needed to calculate annuities).

[7] This definition is independent of the annual indexation of pensions as long as the indexation follows an established rule.

[8] See ILO(Fultz, 2002), pp. 124 and 125.

[9] See Scherman (1999), p. 21.

[10] Also The Social Insurance Office, p.36.

[11] Palmer (2003), p.13 claims that "the NDC scheme is in principle stable, if the figure for life expectancy used in computing the NDC annuities is on average correctly estimated, and if the rate of return in the account scheme follows the rate of growth of the contribution base. In addition, reserves in the demographic buffer fund would need to earn a rate of return also equivalent to the rate of growth of the contribution base. These conditions are both necessary and sufficient ...". Indeed they are not, as the following example shows – the example refers to a case with buffer fund zero, but could easily be generalized. Take, for example, a cohort that experiences an atypical increase in their savings, say, 10 years before their retirement due to an atypical increase in employment (causing the wage sum to increase). At that time pensions in payment are increasing in line with the wage sum keeping the contribution rate constant. When the cohort with the high employment phase retires total expenditure will increase faster than the sum of wages due to the higher pension level of the entering cohort, causing at least a temporary increase in the contribution rate even though savings and pensions in payment continue to increase in parallel with the rate of change of the wage sum.

[12] This can only be avoided if people postpone retirement fast enough to counteract the emerging imbalance. However, that can be regarded as rather unlikely as long as pensions do not decline. According to the NDC formula, initial pensions at time of award are immune to shrinking active populations as long as retirement savings are not indexed by wage sums. Even in times of shrinking workforces pensioners would thus not have any incentive to retire later than the individually preferred time. Retirement behaviour could actually be pro-cyclical. In times when employment shrinks for economic reasons, older workers may be forced to retire earlier rather than later, to contribute to the clearance of the labour market.

[13] Brooks and Weaver (2005) describe this state of affairs as being "lashed to the Mast" (i.e. a stable contribution rate) to avoid following the siren's call (i.e. political calls for more leniency when combating old age poverty or a different distribution of future financial burdens between contributors and pensioners).

[14] Lequiller (2004), p.11.

[15] Franco and Sartor (2003) state for Italy: "Stability of the equilibrium contribution rate therefore requires either the presence of built-in stabilisers, such as those incorporated into the Swedish system ... or periodic ad hoc adjustments to the changed scenario." (p. 9)

[16] In the case of Japan there are two explicit demographic factors. One reduces pension levels to take account shrinking active contributor cohorts, the second corrects pension levels for increased life expectancy. Both factors take the form of constant average long term reduction factors applied till 2023/2025 (Takayama 2004).

[17] In Germany a so-called *Nachhaltigkeitsfaktor* was introduced and is to be applied as of 1 July 2005. It corrects annual pension indexation by a factor that reflects the change in the relationship between "full" pensioners and "full" contributors thus incorporating the effect of shrinking contributor cohorts and an increasing longevity. The factor also incorporates a parameter that allows for consolidation burdens to be shared between pensioners and contributors (von Broekel, 2005).

[18] This means that the procedure is applied without the longer-term view into the future. The necessity to apply the factor annually embodies a further limitation of policy space for decisions-makers. If a classical actuarial procedure for the determination of the balancing factor were used then one would calculate the ratio between the present value of all future pension expenditure and the present value of all future contribution income. If – in case of a temporary contraction of the contribution base – the long-term equilibrium is expected to return to normal or one could stretch policy measures over a certain time period this might make adjustments more acceptable to the pensioners and contributors. Of corse, the actuarial approach would require a set of assumptions on future demographic and economic developments which might make the system vulnerable to political interference. However, the actual number and nature of assumptions that enter implicitly into the asset and liability approach that is used by the Swedish system is actually similar to those which are explicitly employed by the actuarial approach. The implicit approach, for example, assumes stable demographic development. A no less stringent assumption than any other actuarial assumption.

[19] See also *The National Social Insurance Board* (2004), p.35.

[20] For an interesting analysis of the nature of the internal rate of return one might wish to consult Settergren and Mikula (2005)

[21] The asymmetry stems from two effects. First, the rates of indexing of savings and pension are different by definition; secondly these different rates are applied to mathematically different aggregates, i.e. a flow variable (the pensions) on the one hand and a stock variable (savings) on the other hand.

[22] Aware of this situation, the designers of the balancing mechanism hesitate to remedy it for fear – understandably – of overcomplicating the mechanism (O. Settergren, in personal communication, 1 February 2005).

[23] For the purpose of these calculations, the demographic structure and development as given and forecasted by the UN population projections (median variant) for Sweden were used.

[24] According to formula (2): 0.16/0.57 =0.2807.

[25] This may seem to be exaggerated, but in the Swedish case (in the pessimistic scenario) PAYG pension replacement rate for new pensioners at age 65 would fall roughly from 65% to 40% from today until 2055, i.e. a drop of 38% in relative terms, whereas the rough calculations here envisage a fall of 42%. In the base scenario of the Swedish calculations the drop in the replacement rates would only be in the order of 35% (figures were estimated from graphs and have thus some margin of uncertainty), see The Social Insurance Office (2004), pp.47 and 48. The fact that initial replacement rates are higher stems from the levels inherited from the old system. The fact that the drop in replacement rates is slightly less than the ones predicted here is probably due to a more optimistic demographic scenario but is also certainly due to the fact that the Swedish rate applies to new pension awards (rather than all pensions in payment) whose replacement rates tend to fall throughout the individual periods of pension receipt.

[26] This is probably a conservative estimate as it is based on a simple extension of Settergren's table (2003, p 104). The extension ignores the effect of increased mortality between age 65 and 73.

[27] The assumptions describing the example are identical with those assumed for the example in box 1.

[28] The replacement rate may appear low but that is as shown by the actuarial calculations. In Sweden, a standard member of the cohort may earn another 5 to 7% replacement rate from the funded tier.

[29] This is the case in Sweden (see Scherman 2004, p. 309)

[30] The 33% roughly reflects the present level of the minimum pension guarantee in Sweden.

[31] Even at – in relative terms – a declining poverty line.

[32] At a value of 15.7 for the annuity factor, i.e. the 2005 rate.

[33] Again, the existence of the buffer fund will delay the violation of the 40% level but it will – most likely – given demographic developments not postpone it forever.

[34] See *The Social Insurance Office* (2004), p.8.

[35] See *The Social Insurance Office* (2004), p.47/48, average replacement rate calculations for the base scenario and pessimistic scenario displayed in graphs.

[36] To maintain a replacement rate of 50% and a retirement age of 60 the Swedish pension system would also require an overall contribution rate of over 20%.

[37] For a more detailed analysis of the potential effects see Cichon et al. (2003)

[38] All of these institutions will take a "cut" for handling the savings of individuals and turning them into annuities. These "cuts" can be substantial and reach easily up to more than 25% of contributions and hence savings (Thompson 1998, pp 106,107).

[39] See Takayama (2005, p.10).

[40] Another part may be that dropping replacement rates under the NDC tier might force up the voluntary levels of savings in real DC pillars.

[41] The new German *Nachhaltigkeitsfaktor* envisages a sharing of the burden between contributors and pensioners. The exact numerical sharing of that burden can be corrected in future. The effects of the factor is discussed in some detail by Borsch-Supan et al. (2003), pp. 15 -18.

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