

## Notional defined contribution pensions: What they can do, and what they can't\*

by Nicholas Barr



Nicholas Barr  
N.Barr@lse.ac.uk

*The paper assesses notional defined-contribution (NDC) pensions from the perspective of welfare economics in terms of three set of questions: is the particular feature an advantage; if so, is the advantage specific to NDC or could it be achieved by other arrangements; and is the advantage one of policy design or of political reality? The paper offers a number of conclusions: many of the claimed advantages are not the sole property of NDCs, but could be achieved by other designs; second, NDC is not a theoretically dominant policy, and hence cannot be asserted as innately superior to other approaches; third, the approach does not address the fundamental problem of pension finance – the fact that earliest pensionable age is not related to life expectancy.*

### I. The backdrop

This paper assesses notional defined-contribution (NDC) pensions from the perspective of welfare economics. It seeks to abstract from the specifics of national systems, concentrating instead on generic advantages and disadvantages.

The proper starting point – too often overlooked – is to consider the objectives of pensions. The second part of the paper then establishes the simple economics of pensions and develops criteria in terms of which to assess NDCs. The third part assesses NDC pensions

in terms of policy design. The final section offers some conclusions.

#### **The objectives of pension schemes**

From the viewpoint of the individual, pensions have two purposes:

- *Consumption smoothing* over the life cycle, and
- *Insurance*, notably in respect of the longevity risk.

Government policy can have additional objectives.

- *Poverty relief* is necessary for a person who is poor over his or her lifetime as a whole and, in practice, also for someone who is temporarily poor.

\* This paper is a revised version of my chapter in Holzmann and Palmer (forthcoming).

I am grateful for helpful comments from participants at a seminar in Sandhamn in September 2003, and from Peter Diamond and K. G. Scherman. Errors are my responsibility.

**Nicholas Barr** is Professor of Public Economics, European Institute, London School of Economics.

- *Distributional objectives.* Government may also have broader distributional objectives. It may wish to protect the pension rights of people with caring responsibilities; and it may wish to subsidise the consumption smoothing of people whose earnings are only slightly above the poverty line.

The four functions listed above are the primary objectives of pensions. There is also an important constraint – *sustainability* – which recurs in the discussion below.

### **NDC and the design of state pensions**

THE CORE IDEA OF NDC PENSIONS is to separate the state Pay-As-You-Go (PAYG) scheme into two elements: a strictly actuarial element (NDC), operating on a PAYG basis, but mimicking a funded defined-contribution scheme, and a redistributive element financed from general taxation.<sup>1</sup>

The actuarial element is calculated generically as follows.

- A contribution of  $x\%$  of a person's earnings is credited to a notional individual account, i.e. the state 'pretends' that there is an accumulation of financial assets.
- The cumulative contents of the account are credited periodically with a notional interest rate.
- At retirement the notional account is converted into an annuity.

Thus NDC pensions mimic conventional (i.e. funded) defined-contribution schemes by paying an income stream whose present value over the person's expected remaining lifetime equals his/her accumulation at retirement.

QUESTIONS ABOUT THE DESIGN OF STATE PENSIONS. Policy makers face three strategic questions about the design of any state pension: how large should it be; how redistributive from richer to poorer; and should benefits be defined-contribution or defined-benefit, and if the latter of which variety (a topic taken up shortly)?

Policy makers also face questions specific to the design of NDC pensions.

*Question 1:* the minimum pension. Is any minimum pension (*a*) paid in addition to the NDC pension, or does it take the form of a guarantee which comes into play only if the NDC pension falls below a pre-determined minimum level. If the former, is the guarantee (*b*) flat-rate or with an earnings-related element, (*c*) is it minimal or larger, and (*d*) is the minimum indexed to changes in prices (in which case the replacement rate offered by the minimum will fall over time), or to changes in earnings?<sup>2</sup>

*Question 2:* is there a maximum pension?

*Question 3:* minimum pensionable age. Is the lowest pensionable age (*a*) unconstrained (i.e. a person can retire whenever he or she wishes), with full actuarial adjustment of the pension to a person's age at retirement, or is there (*b*) a legally-defined minimum age (i.e. the state pension will not be paid until a person reaches a specified age), with actuarial adjustment for retirement at a later age, and/or (*c*) a minimum age that rises according to some explicit relationship with life expectancy?

*Question 4:* the accrual rate. Is the accrual rate during working life based on (*a*) earnings growth per worker (in which case the accrual rate is unaffected by unemployment), or (*b*) earnings growth in aggregate, hence lower in years when unemployment is higher? Separately is the pension formula adjusted for (*c*) life expectancy? Several NDC schemes have an accrual rate equal to

$$\begin{aligned} & \text{rate of growth of the contributions base} = \\ & = \text{productivity growth} + \text{employment growth} \end{aligned}$$

Most schemes include adjustment for life expectancy.

*Question 5:* indexation. Is the annuity, once in payment, adjusted annually in line with changes in (*a*) prices, or (*b*) wages?

*Question 6:* the past. How are the rights of earlier generations of pensioners dealt with? Since NDCs are organised on a PAYG basis, in a formal sense today's contributions still pay for the pensions of today's pensioners. However, policy makers should be clear that the claim that well-designed NDC pensions automatically balance, does not apply to previous pension claims.

*Question 7:* the future. How are imbalances dealt with? Is there (a) an automatic mechanism, motivated by a desire to protect the system from discretionary changes, or (b) is there no such mechanism, leaving adjustments to decisions by politicians as events unfold?<sup>3</sup>

DEFINED-CONTRIBUTION AND DEFINED-BENEFIT PENSIONS: A BRIEF COMPARISON. In a defined contribution (DC) scheme, a person's pension is an annuity whose size, given life expectancy, etc., is determined only by the size of his lifetime pension accumulation, thus facing the individual with the risk that his pension portfolio might perform badly. Under a defined benefit (DB) scheme, often run at an occupational level, a person's pension is based on his wage and length of service. Thus his annuity is, in effect, wage indexed until retirement, and the risk of varying rates of return to pension assets falls on the employer, and hence on some combination of the industry's current workers (through effects on wage rates), its shareholders and the taxpayer (through effects on profits), its customers (through effects on prices) and/or its past or future workers, if the company uses surpluses from some periods to boost pensions in others.

DC and DB schemes are usually characterised as polar extremes, a strictly actuarial DC scheme being compared with a final salary DB scheme. The reality, as Diamond (2002, pp. 55-7) points out, is more subtle. Suppose

a person's earnings in a particular year are 70 per cent of average earnings in that year; call that variable  $x$ . Call the average value of  $x$  over  $n$  years,  $\bar{x}$ , which is thus a measure of the person's earnings each year, indexed by the rate of wage growth.  $\bar{x}$  is the earnings base on which a person's pension in a DB scheme is determined. If  $n$  relates to earnings in a person's last year before retirement, we have a final-salary scheme, whereas if  $n$  spans an entire working life, we have a DB scheme with pensions based on lifetime contributions, compounded each year by the rate of wage growth. In a funded DC scheme, annual contributions are compounded by the return on assets (for short, the interest rate) over a person's working life. If the rate of interest and the rate of wage growth are similar, the difference between DC and a DB scheme with a long averaging period is minor; and the difference is even smaller if the comparison is between a lifetime DB scheme and an NDC scheme with an accrual rate equal to wage growth.

## 2. Assessment criteria

THE SIMPLE ECONOMICS OF PENSIONS. The economics of pensions can be confusing because it tends to focus on financial aspects such as analysis of portfolios of financial assets. I shall try to simplify matters by concentrating on the essential economic issues, i.e. the production and consumption of goods and services.

There are two (and only two) ways of seeking security in old age (Barr, 2001, Ch. 6). It is possible, first, to *store current production* by storing part of current output for future use. Though this is the only way Robinson Crusoe could guarantee consumption in retirement, the method in practice has major inefficiencies: it is costly; it does not deal with uncertainty, e.g. about how one's tastes or constraints might change; and it cannot be applied

to services deriving from human capital, medical services being a particularly important example. With few exceptions, organising pensions by storing current production on a large scale is therefore a non-starter.

The alternative is for individuals to exchange current production for a *claim on future production*. There are two generic ways I could do this: by saving part of my wages each week I could build up a pile of *money* which I would exchange for goods produced by younger people after my retirement; or I could obtain a *promise* – from my children, or from government – that I would be given goods produced by others after my retirement. The two most common ways of organising pensions broadly parallel these two sorts of claim on future output. Funded schemes are based on accumulations of financial assets, PAYG schemes on promises.

Given the deficiencies of storing current production, the *only* way forward is through claims on future production. Thus the central variable is the level of output after I have retired. The point is central: pensioners are not interested in money (i.e. coloured bits of paper with portraits of national heroes on them), but in consumption – food, clothing, heating, medical services, seats at football matches and the opera, and so on. Money is irrelevant unless the production is there for pensioners to buy.

THE RESULTING PROPOSITIONS. The discussion thus far suggests a series of propositions against which an NDC (or any other) pension scheme should be assessed.

*Proposition 1:* from the point of view of sustainability, the central variable is the level of national output, not the specific method by which pensions are financed.

*Proposition 2:* the design of the state scheme matters; if the state scheme is unsustainable, the *only* solution is to fix the state scheme.

*Proposition 3:* insurance, consumption smoothing and poverty relief are all important.

### 3. Assessing NDC pensions

In assessing the NDC approach, it is helpful to distinguish different questions.

- Is the particular feature an advantage?
- Is the advantage inherent in NDC or could it be achieved by other arrangements?
- Is the advantage one of policy design or of political reality?

This section asks these questions in considering in turn the claimed advantages of the NDC approach, equivocal aspects, and disadvantages.

#### Advantages

A number of advantages are claimed for NDC schemes.

THEY FACILITATE DESIRABLE DESIGN FEATURES. The first, a flexible retirement age, is welfare-improving because it increases individual choice over consumption smoothing. This advantage, however, is not exclusive to NDC. In terms of the retirement decision, what is needed is an actuarial relationship between contributions and pensions at the margin, but not necessarily across the entire contributions record.<sup>4</sup> Thus flexibility does not rule out the possibility of establishing a minimum pensionable age, the desirability of which is discussed in the concluding section.

A flexible combination of work and retirement, a second advantage, also increases individual choice, both between work and leisure and over income in retirement (since a person can increase his/her pension by working longer). Again, however, this is possible with other pension arrangements, for example a state scheme offering defined benefits from the age of 65 but with actuarial adjustment for

delayed retirement and options for combining work with pension.

A third desirable design feature is automatic adjustment to rising life expectancy. Given the pleasing increase in life expectancy, this feature is essential for long-run sustainability. But it could equally be a feature of other pension arrangements, for example if the age at which full pension is first payable rises with life expectancy. If NDC pensions have an advantage in this respect it is that the politics of adjustment might be easier, rather than something that is possible only with NDCs.

ENHANCE THE ABILITY TO COPE WITH RISK AND UNCERTAINTY. Risk and uncertainty lower the welfare of risk-averse individuals (proof: the amount that people spend voluntarily on insurance). Thus consumption smoothing is more efficient if people can protect themselves from excessive risk and uncertainty. The distinction is important: with risk, the probability of the insured event is known, with uncertainty, it is not. Risks can be covered by actuarial insurance; with uncertainty, in contrast, ignorance of the underlying probability distribution makes it difficult or impossible to assess an actuarial premium, hence uncertainties are generally covered badly, if at all, by actuarial insurance.<sup>5</sup> In the case of pensions, estimates of life expectancy have a sufficiently small variance to make annuities possible; with inflation, in contrast, the variance of future rates is so high that fully inflation-proofed private pensions are hard to come by and expensive. In short, it is no accident that it is possible to buy life insurance but not inflation insurance (for fuller discussion, see Barr, 2004, Ch. 9).

What risks and uncertainties face pensioners? All pension schemes face macroeconomic shocks, demographic shocks, and political risks. Private, funded schemes face further risks:

- Management risk can arise through incompetence or fraud, which imperfectly-informed consumers generally cannot monitor effectively.
- Investment risk: pension accumulations held in the stock market are vulnerable to stock-market fluctuations. In the extreme, if a person is required to retire on his or her sixty-fifth birthday, there is a lottery element in the value of his or her pension accumulation.
- Annuities market risk: for a given accumulation, the value of an annuity depends on remaining life expectancy and on the rate of return the insurance company can expect over those years. Both variables face both risk and significant uncertainty.

NDC pensions reduce the risks facing pensioners, first, by avoiding some of the risks that private pensions face. They reduce management risk, though they do not eliminate it: NDCs are administratively demanding because every cent of every contribution counts towards a person's pension, hence not a cent should be lost. NDCs also avoid investment risk. They may also reduce annuities market risk, not least because, with a single, nationwide annuities pool, the law of large numbers will reduce the variance facing the insurer (i.e. the state). These reductions in risk are unambiguous advantages. However, the advantage is generic to state-run PAYG schemes generally, rather than to NDC schemes specifically.

The NDC approach can reduce risk, second, because it makes less stringent demands on private-sector capacity. Private pensions make considerable institutional capacity demands on both public and private sectors. The latter will be absent in poorer countries; and even where it is present, private pensions may not be the most welfare-enhancing use for scarce private-sector skills, which might better be used in building up productive capacity. As noted, NDC pensions make significant de-

mands on public-sector capacity; however, they make no demands on the private sector. Once more, however, that advantage belongs to all state pensions, and is not exclusive to NDC.

A third advantage is that NDCs can cope with uncertainty, not just risk. With social insurance, the contract is not fully specified and, precisely for that reason, social insurance can adjust to changing conditions and unforeseen contingencies. Atkinson (1995, p. 210) points out that 'the set of contingencies over which people formed probabilities years ago may have excluded the breakdown of the extended family, or the development of modern medicine, simply because they were inconceivable'. Thus social insurance, in sharp contrast with actuarial insurance, can address not only *risk* but also *uncertainty*.

NDC pensions thus have the potential to ameliorate uncertainty in ways that private schemes do not: the ability to pay fully indexed pensions once a person has retired is one example; another is the capacity to protect the pension rights of people with caring responsibilities (which is not an insurable risk). This is a highly significant advantage. Again, however, it is an advantage that resides in social insurance generally, rather than NDC in particular. Indeed, it can be argued that in this respect NDC pensions do less well than defined-benefit PAYG pensions: the fact that NDC pensions have a tightly-defined benefit formula eliminates, or at least reduces, the ability to pool risks, both across cohorts and between pensioners and non-pensioners. This question is taken up below.

**ASSIST SUSTAINABILITY.** If an NDC scheme is genuinely actuarial, then future expenditure is by definition equal to revenues, so that the scheme – again by definition – is sustainable. This feature, however, is not exclusive to NDC. Consider a balanced PAYG scheme, where:

$$sWL = PN \quad (1)$$

where

$s$  = the PAYG social security contribution rate

$W$  = the average real wage

$L$  = the number of workers

$P$  = the average real pension

$N$  = the number of pensioners.

If the Social Security Act specifies a pension formula in which

$$P = sWL/N$$

again expenditure = revenue by definition.

In principle, therefore, sustainability is not specific to the NDC mechanism, though it may be that the politics are easier with NDC.

**ENHANCE TRANSPARENCY.** The argument is that NDC pensions have explicit rules and therefore that the system is transparent in two ways: individuals know the basis on which their pension will be calculated; and any attempts by government to alter the scheme are visible. These features are important, but not exclusive to NDC. The UK system prior to 1975, was highly transparent, with a flat-rate contribution for all workers giving entitlement to a flat-rate benefit. Another example of transparency is a PAYG scheme with defined benefits, but with retirement age explicitly related to life expectancy, greatly reducing the need for other parametric change. Thirdly a final salary scheme is also transparent to the recipient, and attempts by government to change the benefit *very* visible.

**REDUCE INCENTIVES TO FRAUD.** In an NDC scheme, like all PAYG schemes, the only pot of money is the current year's contributions, i.e. the *flow* of contributions, not the stock. Thus there are few assets that either the state or private actors can pillage. Separately, if the state wants to increase the taxation of pen-

sions, it can do so only on benefits in payment, not on the fund, since there is no fund. Both features, once more, are inherent in PAYG rather than in NDC.

In conclusion, the advantages of the NDC approach are more often generic to social insurance than exclusive to the specific design of NDCs.

### **Equivocal aspects**

This section discusses features of NDC which are advantages or disadvantages, depending on a person's views about theory, about empirical facts, or about values.

NON-DISTORTIONARY. Labour market distortions can (a) affect retirement decisions and (b) influence labour supply decisions earlier in life. On the former, key questions are whether pensions are related to individual contributions *at the margin* and whether contributors and beneficiaries perceive this to be so. The argument is important. An alternative is a pension formula which is redistributive in that worker A, with twice the earnings of worker B over his working life, gets a pension which is higher than B's, but less than twice as high. However, if either A or B retires early, his pension would be actuarially reduced relative to the pension he would have received at age 65.

In contrast, earlier labour market decisions depend not only on the marginal relationship between contributions and benefits, but also on the effect of an increase in earnings on the total pensions package. In this case, labour market distortions may be reduced where contributions bear a *fully* actuarial relationship to benefits.

Thus on the face of it NDC schemes, being fully actuarial, minimise labour-market distortions both during working life and over the retirement decision, and in this respect appear to be superior to defined-benefit schemes.

Two questions follow: do fully actuarial benefits indeed minimise labour market distortions; and, if so, is the result optimal, i.e. in a second-best world, is minimising (as opposed to limiting) distortions the correct aim?

On the first, the non-distortionary nature of actuarial benefits should not be overstated. It is true that badly-designed state pensions cause major distortions (see Gruber and Wise 2002); however, state schemes, whether NDC or DB, avoid one important distortion – the labour-immobility problem caused by private DB schemes. Secondly, a DB scheme with a long averaging period is less distortionary than one with a short period. As discussed earlier, a DB scheme with averaging over a full career and an NDC scheme with an accrual rate equal to the rate of wage growth are very similar.

On the second question, though reducing distortions is desirable, it is only part of the story. The argument implicitly assumes that all that matters is labour supply – whereas what really matters is economic welfare. It may be that a defined-benefit scheme reduces labour supply at the margin; but if the loss of utility from lower output is more than offset by the utility gain from greater certainty, then defined-benefit arrangements may be welfare improving despite reduced labour supply. At a minimum, the welfare gains from greater certainty should be set against any costs of reduced labour supply. For these and other reasons, discussed shortly, fully actuarial benefits are not optimal in a second-best world.

Thus the argument that NDC pensions reduce distortions is far from definitive. If the argument is true, secondly, it is true also of other schemes in which contributions bear an actuarial relationship to contributions, for example a scheme with flat-rate contributions and flat-rate benefits, as in the UK between 1948 and 1975. The desirability, or otherwise, of actuarial benefits is taken up in the next section.

**EQUITABLE.** The argument that actuarial benefits are equitable rests on the belief that redistribution should apply only to poverty relief and to credits in specific instances such as caring for small children. A contrary view is that the state pension should include redistributive assistance to consumption smoothing as well as for poverty relief. Thus NDC pensions do not have a unique claim to equity. They are inequitable if policy makers or the electorate believe that social insurance has a redistributive role broader than poverty relief.

**TIE THE HANDS OF GOVERNMENT.** The proposition is that NDC pensions, being actuarially based, constrain the government's freedom of action. The point is fundamental. In a defined-benefit scheme an imbalance can be addressed by (a) raising contributions, (b) raising pensionable age, (c) reducing pensions, or any combination. In an NDC scheme, because benefits are actuarial, raising contributions increases pension rights, and thus cannot address the imbalance; for the same reason, raising pensionable age does nothing to address the imbalance. Policy options are therefore severely constrained, raising two sets of questions.

*Issue 1:* does NDC really tie the government's hands? In theory the contract is fixed; but government could change the contract.

*Issue 2:* is tying the government's hands welfare-improving? At its core, this is an empirical question about the competence and motivation of government, about which people may take different views, and about which conclusions might be different for different countries. Some writers are sceptical about government, arguing that in defined-benefit PAYG state schemes, politicians will trade long-run sustainability for short-run political gain. Such writers argue that the inflexibility of NDC is deliberate and one of the great advantages of the approach. The counter-

argument is that a *disadvantage* of NDC is that it reduces policy flexibility by adopting a fully-specified contract, and thus forgoes options for enhancing consumption smoothing by reducing the uncertainty faced by the individual.

If tying the hands of government is an advantage, is it possible only with NDC pensions? In principle the answer is no: NDC schemes are based on a Social Security Law just like other PAYG schemes. It is true, however, that it might be harder politically to change NDC.

### **Disadvantages**

**INEFFICIENT.** A central objective of pensions is to offer people a mechanism which allows them to make efficient choices about the time path of their consumption. Such a system should minimise distortions.

On the face of it, this suggests that a strictly actuarial system would be efficient. As Gora and Palmer (2003) write:

'In the NDC and FDC [funded defined-contribution] framework there is no redistributive ambition, other than redistribution over the individual's own lifecycle from working years to years of retirement. Instead, the government's redistributive policy ... is financed through explicit taxes from general revenues.' (p.15)

'In this way, insurance and its source of financing and social policy and its means of financing are kept separate, enhancing transparency.' (*ibid.*, p. 16).

A number of questions arise. First, why would it be efficient to have both first- and second-tier pensions organised on a DC basis?

More fundamentally, though a strictly actuarial scheme may be efficient in a first-best world, policy design needs to cope with a series of technical problems.

People can be myopic and/or imperfectly



informed, giving a justification for compulsion. The problem is a major one. New (1999) makes the useful distinction between an information problem and an information-processing problem. An information problem is best resolved by providing the necessary information (for example, car magazines), after which individuals make their own choices. With an information-processing problem, in contrast, the problem is too complex for people to make efficient choices even if the relevant information is provided. The problem can arise (a) where the time horizon is long, as with pensions, (b) where the good or service involves complex probabilities, including, for example, life expectancy, or (c) where the information is inherently complex, as with complicated pension products.

A second problem is missing markets. For example, the market for indexed contracts is, to say the least, thin. It can be argued that this results from a different information problem – the unknowability of future rates of inflation.

A third deviation from first-best are distortions such as progressive taxation. Peter Diamond argues that in the comparison between defined contribution and defined benefit schemes, 'there is no simple dominance of one over the other in the presence of other labor market distortions' (2002, p. 57). Assuming that the rate of interest exceeds the rate of wage growth over the longer term, he goes on:

'Indeed, with a progressive annual income tax and age-earnings profiles that are generally increasing in real terms, the marginal income tax rate is rising with age, on average. Thus, a well-designed DB system may well have better labor market outcomes since the overall tax burden, income tax plus net tax from social security, will vary less over the life-cycle. That is, income taxes are lower on the young and net social security taxes are higher. Therefore, without a detailed calculation, one

cannot reach an efficiency conclusion. In any case the difference is likely to be much smaller than the difference between DB systems with long and short averaging periods' (*ibid.*).

Formulating the issue as an optimal taxation problem would make it clear that in a second-best world a strictly actuarial scheme is not, in general, optimal.

SUB-OPTIMAL IN WELFARE TERMS. Consumption smoothing is only one objective of pensions; others include reducing the risk people face (implicit in both the consumption smoothing and insurance objectives), poverty relief, and distributional objectives (which may include subsidising the consumption smoothing activities of people only slightly above the poverty line). A strict adherence to actuarial benefits may provide consumption smoothing, but ignores the other objectives. It is true that non-actuarial schemes such as defined-benefit pensions may also create distortions, but these should be weighed against the possible advantages of such schemes; these include (a) greater certainty for the worker (a *major* goal of consumption smoothing), (b) policy flexibility and (c) equity advantages, though recognising that people will take very different views about the latter two.

Proponents of NDC pensions counter by arguing that the NDC pension provides consumption smoothing and that other instruments provide poverty relief and promote distributional goals. But going back to a point I learned many years ago as a graduate student, if we have three targets we need three instruments, but in a second-best world the optimal solution is normally *not* a one:one relationship between each instrument and a particular target. The NDC argument is tidy in this respect and, on that account, rather appealing. But that does not make it right. Indeed, the optimal tax formulation of the problem makes it clear that it is generally wrong.

#### 4. Conclusions

THE HISTORY OF IDEAS. Góra and Palmer (2003) talk about the need to 'create new concepts' (p. 2) and about the 'design of a new vehicle for efficient accumulation over the life cycle' (p. 27). Palmer's work has mapped out the idea – in terms both of policy and implementation – much more fully than previously. This is a considerable advance. NDC reminds us that state PAYG pensions can be as much or as little actuarial as we want, in other words, that social insurance is not *necessarily* redistributive. Thus NDC reminds us of an important but often forgotten truth, but is not itself new. As I wrote in 1987 (and others had doubtless written before), '[Redistribution] is not *inevitable*, since a PAYG scheme could be organised to pay actuarial benefits' (Barr, 1987, p. 222, emphasis in original).

CONCLUSION 1: NDC IS NOT A THEORETICALLY DOMINANT POLICY. NDC is *a* design, not *the* design. A strictly actuarial scheme is a theoretical optimum only in a world that (*a*) is first-best and (*b*) where policy makers are indifferent about distributional matters.

It is, of course, entirely coherent and defensible to advocate NDC pensions. But since they are not a theoretically dominant policy, there are other coherent and defensible policies – for example a pension design that includes redistribution not just for poverty relief but also for consumption smoothing. In short, there is room for different views about preferred pension design.

On what basis should different policies be assessed? To a great extent, policy design will depend on the answers to the following questions:

- *Question 1.* Is policy flexibility an advantage or disadvantage? Answers will clearly differ from person to person and by country, depending on views about the effectiveness and probity of government.

- *Question 2.* Is a wholly actuarial system (e.g. NDC first tier + funded DC second tier) efficient? As discussed earlier, the answer is generally no; but the extent of welfare loss will depend, inter alia, on the extent of risk aversion in the population (the welfare gains from greater certainty being higher the greater the degree of risk aversion).
- *Question 3.* Are actuarial benefits equitable? The answer depends on a value judgement about whether redistribution should be more extensive than poverty relief.
- *Question 4.* Would NDC be more sustainable than a defined-benefit scheme? This is a practical question. It should not be answered by comparing current defined-benefit schemes, with accumulated imperfections, with a perfect, pristine NDC scheme. The answer is probably more political than economic.

CONCLUSION 2: IT DEPENDS WHAT YOU MEAN BY NDC. NDC can take many guises. Two polar cases are particularly relevant.

*Case 1.* The pension system is NDC plus a minimal guarantee. Such a system comes close to being strictly actuarial, and thus provides insurance in respect of the longevity risk and consumption smoothing, but only minimal poverty relief and vertical redistribution. This approach can be criticised as inefficient and, depending on viewpoint, inequitable.

*Case 2.* The pension system has two elements: a tax-funded element, either flat rate or with an earnings-related component, and an NDC element. The latter may include tax-funded credits, e.g. to recognise caring activities. This arrangement offers poverty relief, insurance and consumption smoothing. If the tax-funded element has an earnings-related component there is a redistributive element in consumption smoothing. This latter construct

contains a richer array of policy options. But in this case the NDC pension is not the first tier, but the second – we have a pension system with a tax-funded first tier and an NDC second tier. NDC is no longer *the* pension, but an element in a wider system. It is perhaps here that its true potential role is most apparent, not as a single, dominant policy, but as an important element in a portfolio of policies.

**CONCLUSION 3: NDC PENSIONS DO NOT ADDRESS THE CENTRAL FUNDING ISSUE.** NDC per se does nothing to solve long-term unsustainability. All pension schemes in all countries currently face the root problem of a retirement age of 60 or 65 which remains largely fixed as life expectancy rises. Rising life expectancy is a great joy – the problem is the fixed retirement age. NDC addresses the problem in a formal sense by reducing the accrual rate, but unless people retire later this approach on its own risks pensioner poverty – that is, sustainability is in conflict with sound social policy. In the absence of any constraints, the endogenous variable is not the minimum permissible age of retirement but the size of the pension. In a world of rationality and perfect information this would not be a problem; but if people have a personal discount rate higher than the discount rate used for actuarial adjustment of the pension, they will tend to retire as soon as possible, with progressively larger actuarial adjustments. In the limit, this pulls everyone down to the minimum pension. A pensionable age that rises over time is an important element in any reform package, whether or not it includes a move to NDC pensions.

A more fully-fledged solution has five elements:

- An initial pensionable age that makes it fiscally feasible to provide a genuinely adequate state pension. In the absence of a normative theory, a pragmatic approach

would be to work out (a) the maximum fiscal envelope for pensions, and (b) the minimum genuinely adequate pension. Together, these determine (c) the maximum number of pensioners that can be supported. That figure combined with the age distribution determines the initial pensionable age.

- Deviations from that pensionable age should be roughly actuarial.
- Over time, the initial pensionable age should increase in line with rising life expectancy in a way that is rational and transparent, so that people know a long time in advance when (in broad terms) they will be able to retire.
- A flexible labour market that allows people to move from full-time work towards full retirement along a phased path of their choosing.
- Public understanding of the simple economics of pensions.

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## Notes

- <sup>1</sup> Pay-As-You-Go pensions are paid (usually by the state) out of current tax revenues. With funded schemes, pensions are paid from a fund built over a period of years from the contributions of their members.
- <sup>2</sup> In Sweden, the minimum guarantee has an earnings-related element to give low earners an incentive to make contributions; since it is indexed to changes in prices, the relative size of the minimum will decline over time.
- <sup>3</sup> The Swedish system incorporates both a method for adjusting liabilities so that they match assets and a buffer fund to cushion against short-run fluctuations (see Scherman 2003, Settergren 2003).
- <sup>4</sup> The question of whether pensions should be actuarial at the margin or across a person's entire contributions record is taken up in more detail in the discussion of equivocal aspects of NDC, below.
- <sup>5</sup> This is not a criticism of actuarial insurance, but of expecting more of the actuarial mechanism than – for technical reasons – it is able to deliver.