

The role of the public and private sectors in ensuring adequate
pensions – theoretical considerations

Nicholas Barr

London School of Economics

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The role of the public and private sectors in ensuring adequate pensions – theoretical considerations¹

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1 The backdrop

After brief discussion of background issues in the opening part of the paper, section 2 sets out the central lessons from economic theory and some of their main implications for policy. Section 3 discusses some examples of good pension design. Section 4 sets out the widening range of options available to countries as their fiscal and institutional capacity increases, and section 5 offers some brief conclusions.

1.1 Objectives of pension systems

Pension systems have multiple objectives. For the individual or family, the major ones are:

- Consumption smoothing, i.e. redistribution from one's younger to one's older self. Pensions should allow a person to transfer consumption from her productive middle years to her retired years, allowing her to choose her preferred time path of consumption over working and retired life.
- Insurance: in a world of certainty, individuals save during working life to finance their retirement. However, people do not know how long they are going to live. Thus a pension based on individual savings faces the person with the risk of outliving those savings. The purpose of annuities is to allow people to insure against that risk. Pensions can also insure against disability, and can protect spouses and young children should a worker die before retirement.

Public policy has additional objectives.

- Poverty relief is necessary where a person's earnings record does not provide an adequate pension.
- Redistribution can be achieved by paying pensions to low earners that are a higher percentage of their previous earnings, thus subsidising the consumption smoothing of lower earners. Since life-long earnings are uncertain, such a system provides some insurance against low earnings. There can also be redistribution towards families, for example paying a higher pension to a married couple than to a single person.

1.2 Principles of analysis

Of the principles of analysis discussed in Barr and Diamond (2008, Ch. 10), three stand out: the need for a holistic approach, the need to consider the redistributive effects of pensions, and the need to frame analysis in what economists call a second-best context.

ANALYSIS REQUIRES A HOLISTIC APPROACH. Pensions have effects on the labour market, economic growth, the distribution of risk, and the distribution of income, including by

¹ This paper draws on writing with Peter Diamond, including Barr and Diamond (2008, 2009, 2010*a, b*)

² Professor of Public Economics, London School of Economics and Political Science, Houghton Street, London WC2A 2AE, UK: T: +44-20-7955-7482; E: N.Barr@lse.ac.uk; <http://econ.lse.ac.uk/staff/nb>.

generation and gender. Analysis needs to consider the pension system as a whole, including its multiple objectives and all parts of the pension system.

It is a mistaken policy, for example, to be obsessed with the need for an actuarial earnings-related pension, given the need for a poverty-relief element elsewhere in the system. What is relevant for analysis is the combined effect of the system as a whole.

ANY PENSION REFORM HAS DISTRIBUTIONAL EFFECTS. Suppose policymakers are establishing a brand new pension system. If they introduce a Pay-As-You-Go (PAYG) system (see definitions in Box 1), the contributions of today's workers pay for the pensions of today's retirees; thus the first generation of retirees receives a pension. If, instead, policymakers introduce fully funded pensions, the contributions of today's workers go into their pension savings accounts; thus the first generation receives little or no pension. The same argument applies in a country that already has a PAYG system: a move toward funding through higher contributions or lower benefits redistributes from current generations to future ones. Thus any choice about how a pension system is financed is inescapably also a choice about the intergenerational distribution of income.

It is mistaken to ignore the fact that any policy choice between PAYG and funding necessarily makes choices about redistribution across generations and thus mistaken to present the gain to pensioners in later generations as a Pareto improvement³, since it comes at the expense of the first generation.

Box 1 Terminology

Pay-as-you-go (PAYG) pensions are paid out of current revenue (usually by the state, from tax revenue) rather than out of an accumulated fund.

Funded pensions are paid from an accumulated fund built up over a period of years out of contributions by or on behalf of its members.

Defined-contribution pensions. In this arrangement a person's pension is determined only by the amount of assets accumulated toward his or her pension. Thus, a pure plan adjusts obligations to match available funds, and so the risk of varying rates of return to pension assets falls on the individual.

Defined-benefit pensions. In this arrangement a person's pension is based on his or her wage history and commonly on length of service. Thus, a pure arrangement adjusts funds to meet anticipated obligations, so the risk of varying rates of return to pension assets falls on the organiser, i.e. the employer or the government.

Notional defined-contribution (NDC) pensions. At their simplest, NDC pensions have two elements: they are organised on a PAYG basis; but they mimic funded individual accounts in that a person's pension is strictly related to his or her lifetime pension contributions. Thus a pure NDC system is PAYG with actuarial benefits. Systems can also incorporate redistribution, e.g. by offering credits for periods spent caring for children, and can be partially funded.

³ A situation is described as Pareto efficient if resources are allocated in such a way that no reallocation can make any individual better off without making at least one other individual worse off. A policy that makes someone better off and nobody worse off is referred to as Pareto improving.

ANALYSIS SHOULD BE FRAMED IN A SECOND-BEST CONTEXT. What economists call first-best analysis is the world of rational economic man and woman. The assumptions of that model include perfect information, rational behaviour, complete markets (e.g. the ability to buy an indexed annuity that pays out at some future date), and no distortionary taxation. As emerges repeatedly in the next section, the market for pensions is characterised by multiple and serious failures of these assumptions, including the following.

- Imperfect information, addressed by the economics of information (for which the 2001 Nobel prize was awarded);
- Non-rational behaviour, addressed by behavioural economics (for which the 2002 Nobel prize was awarded);
- Incomplete markets and incomplete contracts (for which Peter Diamond's work was cited in the 2010 Nobel Prize);
- Distortionary taxation, which is inherent in any system which includes poverty relief, and hence has to redistribute from richer to poorer people (this topic is addressed by the literature on optimal taxation for which the 1996 Nobel prize was awarded).

These failures are relevant not only to the analysis of pensions but to many other markets (Barr, 2012).

It is mistaken to use first-best analysis in a second-best context. First-best analysis is useful as an analytical benchmark, but is a bad basis for policy design.

2 Economic theory and implications for policy

These analytical principles give rise to a series of lessons for policy design. This section discusses the most important, together with their implications for policy: imperfect information and non-rational behaviour are pervasive; output is central; different pension systems share risks differently; transition costs matter; administrative costs matter; and implementation matters. A final conclusion is that though there are sound principles of pension design, there is no single best pension system for all countries.

2.1 Imperfect information and non-rational behaviour are pervasive

IMPERFECT INFORMATION. Individuals are imperfectly informed in several ways. First, they frequently have only a limited understanding of the risks and uncertainties they face, for example about future benefits from different types of pension, or about their longevity.

Second, individuals are generally badly-informed about complex pension products. Many do not understand basic concepts in finance: Orszag and Stiglitz (2001, p. 37) quote the chairman of the U.S. Securities and Exchange Commission as stating that over 50 per cent of Americans did not know the difference between a stock and a bond.⁴ The problem also has distributional implications, since the worst-informed people are disproportionately among the least well off; that is, information poverty and financial poverty are highly correlated.

⁴ Bonds are a loan from the bondholder to the seller, with a specified interest payment and repayment date. Stocks (also called equities or shares) represent ownership of a fraction of the company issuing the shares. The company may pay an annual dividend to stockholders. If the company does well, the value of its stock rises, and stockholders make a capital gain; if goes bankrupt, the value of its stock is based on whatever remains after creditors have been paid. Thus stocks represent a title to ownership, in contrast with bonds, which are a loan.

A further problem is that information is frequently asymmetric, leading to potential problems of mis-selling. It is clear that one of the roots of the financial crisis in the years after 2007 was that the sellers of financial products often had a better idea of their riskiness than the buyers.

NON-RATIONAL BEHAVIOUR arises with pensions in two strategic ways: people may do a bad job of working out their optimal strategy (bounded rationality), or they may know the right strategy but fail to carry it out (bounded will power).

Bounded rationality: sometimes a problem is too complex for a person to make good decisions, even when provided with the necessary information. Such problems are more likely where the time horizon is long, the outcome involves complex probabilities, or the details are inherently complex, all of which characterise most pension products.

Bounded rationality leads to poor choices in a variety of ways.

- Presentation: choices are influenced by the way in which they are presented. The order in which options are set out can make a difference, and choices can be influenced by the number of options a person is given.
- Familiarity: a worker may invest heavily in the stock of his employer. If the firm goes bankrupt, the worker loses both his wage income and much of his pension savings. Such behaviour shows a failure to understand the benefits of diversifying risk.
- Immobilization: complexity and conflicting information can lead to passive behaviour, where people act like a rabbit in a car headlight. More options can result in lower participation. In Sweden, a small fraction of a worker's contribution goes into an individual funded account; the great majority of new workers, able to choose from over 700 pension funds, make no choice at all.

Bounded will-power: many people know that they should save more but do not do so. Evidence suggests that in some circumstances people have a higher discount rate in the short run (i.e. a tendency to instant gratification) and a lower one in the medium term. The problem is that when the future arrives, it becomes the present; hence short-term gratification continues. The resulting problems include:

- Myopia: some workers pay little attention to the future: they may not make careful choices and may be influenced by current inducements when choosing a pension provider, for example entry into a prize draw for a foreign holiday. And many people retire as soon as they are allowed, even if that leaves them (or, later, their surviving spouse) in poverty.
- Procrastination: people agree that they should save more for retirement but delay saving, do not save, or do not save enough, just as people delay losing weight or giving up smoking.
- Inertia: it should not matter whether someone is automatically enrolled in a savings plan or has to take explicit action to join. In practice, automatic enrolment leads to considerably higher participation.

IMPLICATION FOR POLICY: UNCRITICAL ADHERENCE TO CHOICE AND COMPETITION IS MISTAKEN. First-best theory suggests that a system in which workers choose from competing pension providers will (a) maximise each worker's welfare by allowing him to choose a

portfolio that best reflects his time preference and risk aversion, and (b) exert downward pressure on administrative costs.

What we observe is very different, including procrastination, inertia and immobilisation. The analysis above helps to explain these outcomes.

- The costs of choice: as discussed in section 2.5, charges for individual accounts tend to be high and largely a fixed cost per account (managing a small account is not much cheaper than managing a large one), and thus bear most heavily on small accounts and in smaller countries with limited options for economies of scale.
- The benefits of choice: it might be worthwhile to incur those costs if the ability to make choices was beneficial to workers. As discussed, however, problems of imperfect information, bounded-rationality and bounded will-power are serious for complex, long-run contracts such as those for pensions, and all the more in poorer countries where citizens have little financial market experience.

Poor choices by workers should not be surprising. The principles of finance, including the advantages of diversification and the trade-off between risk and return, are not intuitively easy. In addition, the noise in returns makes it difficult to tell whether good outcomes are the result of a manager's skill or of luck.

In addition, there are good reasons for arguing that consumers will not choose well *even if they have the necessary information and skills*. An individual account is an ongoing relationship, so the gain from choosing more effectively (in the form of higher returns and lower charges) in any particular month is small, whereas the transactions costs in terms of time are significant. Thus workers, particularly low earners, for whom the gain in any month is smallest, have little incentive to keep up with the changing details of alternative investments and alternative charges.⁵

In sum, there are good reasons to be sceptical about the gains from individual choice in mandatory accounts. The considerable difficulty in making investment choices even in countries with generations of individual experience in investing should be a major concern in countries with a limited history of individual investment. The major criticism is therefore not of pension providers but of the choice of model.

2.2 Output is central

THE ROLE OF OUTPUT. There are two (and only two) ways of seeking security in old age. One is to store current production for future use. With the exception of housing, this approach is inadequate for most consumption needs: it is expensive; it does not address uncertainty (e.g. about how the saver's tastes might change); and it does not work for services which derive from human capital, notably medical services (for fuller discussion, see Barr, 2012, section 7.2.1).

The second approach is for individuals to exchange production when younger for a claim on future production. There are two broad ways to do so: a worker could save part of his wages so as to accumulate a pile of *assets* which he would exchange for goods produced

⁵ This is true even for the simplest financial arrangements. Banks may offer higher interest rates on new accounts while leaving the terms of existing accounts unchanged, relying on the inertia of existing savers. In some countries regulation restricts the freedom of banks to offer different interest rates in this way.

by younger people after his retirement; or he could obtain a *promise* – from his children, his employer, or government – that he would be given goods produced by younger workers after his retirement. The two main ways of organising pensions broadly parallel these two types of claim. Funded systems are based on accumulations of financial assets, PAYG systems on promises.

A central purpose of pensions is to allow people to continue to consume after they have stopped working. Pensioners are not interested in money *per se*, but in consumption. Thus future output is central. PAYG and funding are simply financial mechanisms for organising claims on that future output. In macroeconomic terms, though there are differences between the two approaches, those differences should not be exaggerated.

The centrality of output remains true in an open economy. In principle, pensioners are not constrained to consumption of domestically-produced goods, but can consume goods produced elsewhere so long as they can organise a claim on those goods. If British workers use some of their savings to buy Australian firms, they can in retirement exchange their share of the firm's output for Australian goods, which they then import to the UK. This approach is useful but not foolproof. It does not work if Australian workers all retire; thus the age structure of the population in the destination of foreign investment matters. In addition, if large numbers of British pensioners exchange Australian dollars for other currencies, the Australian exchange rate might fall, reducing the real value of the pension. Thus the ideal country in which to invest has a young population *and* products one wants to buy *and* political and financial stability *and* is large enough to absorb the savings of other countries with ageing populations. Countries with ageing populations include almost all of the OECD, and many others, including China.

Overlooking the importance of output leads to mistaken, or at least over-simplified, analysis. Two important examples are discussed below.

IMPLICATION FOR POLICY: FUNDING IS NOT AN AUTOMATIC SOLUTION TO DEMOGRAPHIC CHANGE. Though the point was shown to be flawed many years ago (my first paper on the topic was published in 1979; for a recent restatement, see Barr 2002, Myth 1), it is widely believed that funding necessarily assists pension finance in the face of demographic change.

Suppose that a large workforce in period 1 is followed by a smaller one in period 2. In a pure PAYG system, all else constant, contribution revenues decline, creating upward pressure on the contribution rate, downward pressure on the level of pensions, or both.

It is argued that funding can ease the problem: each member of the large workforce in period 1 builds up pension savings; the pension of a representative worker is exactly what can be covered by those savings; if there is a large number of such workers, it is argued that this is not a problem because the average worker accumulates enough to pay for his or her own pension. That argument is correct in terms of *finance* but may not provide workers with the *consumption* they expect. Unless a decline in the number of workers has no effect on output, output will fall, and hence consumption or investment, or both, will fall. Lower rates of return or higher prices deny pensioners the consumption they expected; or mandatory increases in pension savings by workers reduce their consumption by more than they would choose; or the increase in the combined consumption of workers and pensioners is at the expense of investment, and hence puts future growth at risk. As noted, PAYG and funding are both mechanisms for organising claims on future output; since demographic change

generally affects that output, it causes problems for pension systems however their finance is organised (for fuller discussion, see Barr, 2012, section 7.3.2).

Even more clearly, suppose that the birth rate is stable but the life expectancy of pensioners increases. With pure PAYG the resulting increase in the number of pensioners requires a higher contribution rate or lower monthly benefits. With funding and no change in interest rates, the sustainable level of monthly benefits is lower if retirement is longer.

What matters is not financial accumulation but output. If output increases, it becomes easier to meet the claims both of workers and pensioners. The solution to population ageing lies not in funding *per se* but in output growth.

IMPLICATION FOR POLICY: FUNDING DOES NOT NECESSARILY CONTRIBUTE TO OUTPUT GROWTH. There are two potential links between funding and growth, which each needs exploration: funding may increase national saving and/or may improve the effectiveness with which capital markets allocate savings to their most productive investment use.

Whether or not funding increases saving depends on the reaction of private savers and government.

- Workers' responses: if workers are required to contribute an additional \$100 per month to a pension fund, they may partly or wholly offset those savings by reducing their voluntary savings.
- Government responses: if additional mandatory savings go into pension funds, government may borrow more, for example, to pay for PAYG pensions previously financed by workers' contributions which now go into funded accounts.

Thus the introduction of mandatory pension saving may be partly or wholly offset by private or public responses.

Second, does funding improve the effectiveness of financial markets? In two cases the answer is no. In advanced countries with highly-developed financial markets, mandatory pension saving is unlikely to lead to significant improvement. At the other extreme, in countries with very limited capacity, the existing financial infrastructure is weak, making mandatory membership of pension funds highly risky. Between the two extremes is a range of country capacities where there is a possibility of improving capital markets, but also a risk that returns might be low or that government might have to bail out the pension system if private institutions fail. Inadequate markets can yield low returns and are likely to have high administrative costs. But there is also the possibility of gain, since capital markets that work better increase economic efficiency and hence economic growth.

An alternative approach is to encourage voluntary pensions as a stimulus to market development, particularly in a large economy.

Does higher saving increase output? The simplest argument is that a move to funding (a) increases savings, which (b) increases investment, which (c) increases output.

- As just discussed, a move to funding does not necessarily increase national saving.
- The link between higher saving and increased investment is not automatic. Saving, instead, might drive up the prices of assets in limited supply, for example, urban land.

- An increase in investment may not increase output greatly. Inefficient capital markets can lead to a low marginal product of investment, as in the communist countries, where rates of investment were very high, but growth rates low, and in some countries eventually negative.

Thus funding may increase output, but not always or necessarily.

2.3 Different pension systems share risks differently

Pensions help to transfer consumption from the present to the future over a person's lifetime. But the future is an uncertain business, including the risks outlined in Box 2. Different pension systems share these risks differently. It is useful to recognise the different underlying philosophies in different systems. Different pension arrangements are discussed in ascending order of risk sharing.

Box 2 Multiple risks

The future is inherently uncertain, including systemic risks, market risks, and risks connected with individual behaviour.

Systemic risks include macroeconomic turbulence, demographic risk (e.g. longer life expectancy and/or lower fertility), and political risk.

Market risks arise in various ways. Workers face earnings risk connected with labour market and health risks. They also face investment risk: for example, accumulations held in the stock market are vulnerable to market fluctuations. A third risk arises in annuities markets, since a person's annuity at a given age will be affected by the life expectancy of his birth cohort and by the discount rate used by the annuity provider.

A further set of risks relate to individual behaviour. Individuals may make bad choices, for example investing too heavily in equities too close to retirement. Fund managers may be incompetent or fraudulent. In addition, as the financial crisis demonstrated, managers may have different incentives from plan participants (see, for example, Woolley 2010).

FUNDED DEFINED-CONTRIBUTION PLANS. In this arrangement, individual workers set aside a fraction of their earnings to accumulate financial assets. These assets finance retirement either through an annuity or a series of withdrawals. In a pure plan, the risk of fluctuations in the return on assets during working life falls on the individual. If the worker buys an annuity at retirement, he or she faces the risk in pricing the annuities, reflecting both mortality projections and projected future returns. Once the annuity is purchased, risk is generally borne by the annuity provider. If the retiree does not buy an annuity, he or she faces mortality and return risks. In sum, the risks of different outcomes up to retirement fall on the individual, since benefits adjust to what is in a worker's individual account at the time of retirement. Annuitisation shifts risks after retirement to insurers, but still faces the retiree with the risk of the pricing of annuities at the start of retirement.

FUNDED MANDATORY DEFINED-BENEFIT PLANS. In this arrangement, individual workers receive benefits based on their earnings history and length of service. Thus both the return on assets and cohort mortality risks are addressed by adjusting contributions. Since there is a single fund for all benefits, and changes in contribution rates are normally uniform across workers, there is a collective dimension. A plan need not be fully funded at all times – fluctuations in the degree of funding are a device for shifting risks across cohorts. In a pure defined-benefit plan the risk of varying returns falls on the plan sponsor. Where the sponsor

is a firm or industry, the risk of financing higher contributions can be spread across current and future workers via changes in wages, across shareholders through changes in profits, and across customers through changes in the price the firm charges for its products. Thus the risk is shared more broadly than in a defined-contribution plan. If the sponsor is the government, the risks are shifted to current and future taxpayers.

In a pure defined-contribution plan, therefore, benefits adjust to available resources; in a pure defined-benefit plan, resources are adjusted to meet the benefits that have been promised. In practice, firms and governments typically make adjustments both to resources and benefits. A second element is the collective aspect of having a single fund rather than individual accounts. Thus a typical defined-benefit plan shares risk more widely than a typical defined-contribution plan. In addition, a central fund has lower administrative costs and avoids poor decision making by workers, although it is at risk of poor investment decisions by the fund managers. However, a central fund foregoes the opportunity to have different degrees of asset return risk for workers with different levels of risk aversion.

It is important that corporate pensions remain close to fully funded since corporations can fail, leaving the workers with less than had been in the plan documents, or leaving it to government to insure the workers. In contrast, in countries with well-managed economies, governments can have defined-benefit systems that are less than fully funded.

PAYG DEFINED-BENEFIT SYSTEMS FINANCED BY SOCIAL SECURITY CONTRIBUTIONS. In such plans, the risk to the income of the plan comes from fluctuations in the earnings of covered workers. In a pure arrangement (i.e. one financed entirely by contributions, hence not able to run a deficit), risks are shared among current workers through changes in contributions.

If the fund can run surpluses (partial funding) and/or deficits (borrowing against future contributions and/or using previous surpluses), the risks can be shared with future workers or eased by the presence of accumulated past contributions. Any accumulation, involves risk in rates of return. There remains the risk of the evolution of mortality rates – if people live longer the cost of paying a given level of benefits will increase.

SYSTEMS FINANCED FROM GENERAL TAX REVENUES. In a system financed from general revenues or through a mix of social insurance contributions and general revenues, the risks are shared across all taxpayers and hence, through government borrowing, across generations. Thus – crucially – a system with a PAYG element allows intergenerational risk sharing.

In practice, plans are not pure, and countries frequently adjust both contributions and benefits, thus sharing risks between workers and pensioners.

IMPLICATION FOR POLICY: HOW RISKS ARE SHARED – AN ESSENTIAL QUESTION. When designing a new system or considering reform of an existing one, a central issue for policy-makers is to consider where risks fall and how they should be shared. As with redistribution, different answers are possible, but it is a major error to ignore the question.

2.4 Transition costs matter

A move towards funding requires that a larger fraction of workers' contributions go into their funded pension, leaving less to finance PAYG pensions, which must therefore be financed from some other source such as government borrowing. Thus a move towards funding raises public spending over a transition period until a new steady state is reached. However, that

period is long. Chile moved to mandatory individual funded accounts in 1981, but in 2008 public pension spending was still 5.2 per cent of GDP (OECD 2011, p. 208).

IMPLICATION FOR POLICY: PAY PROPER ATTENTION TO THE SCALE OF TRANSITION COSTS. It can be argued that the move towards funded pensions in Central and Eastern Europe in the late 1990s was based on optimistic fiscal projections which, at least in part, explains why reforms in some countries are being slowed (e.g. Poland) or abandoned (e.g. Hungary – see, Simonovits 2011).

IMPLICATION FOR POLICY: DO NO EXAGGERATE THE SCALE OF IMPLICIT PENSION DEBT. A related mistake is to exaggerate the fiscal costs of PAYG pensions. The concept of implicit pension debt is often used, but can be abused. It is misleading to consider only the total of future liabilities (i.e. future pension payments). This approach ignores (a) explicit assets (i.e. any accumulated funds), (b) the implicit asset from the government's ability to levy taxes and (c) the considerable improvement in people's well-being from increased old-age security. Just as public debt never needs to be fully paid off so long as the debt-to-GDP ratio does not get too large, so publicly-provided pensions need not be fully funded, as long as the unfunded obligations are not too large relative to the contributions base. The mistake, in short, is to argue that implicit pension debt should be minimised rather than optimised.

2.5 Administrative costs matter

Administrative costs in private pension plans are important and often overlooked. With individual accounts, administrative costs are to a significant extent a fixed cost per account. These costs are significant even in large, developed countries with well-established systems. They are considerably higher for small accounts, typically of low earners, in small countries starting a new system.

IMPLICATION FOR POLICY: PAY PROPER ATTENTION TO ADMINISTRATIVE COSTS. The point is far from trivial. An administrative charge of one per cent of assets each year over a 40-year career, reduces the worker's accumulation (and hence his pension) by nearly 20 per cent (Barr and Diamond 2008, Box 9.4).

2.6 Implementation matters

Good policy design is important. But the best design will fail to achieve its objectives without sufficient financial, political and administrative capacity. Policy design that exceeds a country's capacity to implement it is bad policy design. Implementation, whose importance is often not understood, requires skills that are just as demanding as policy design and needs to be considered from the start, not added as an afterthought.

An earning-related public pension requires that government can

- track and record a person's earnings across an entire working life;
- track across changes of name, jobs, employment status, and geographical region;
- keep workers informed through regular statements;
- calculate benefits accurately;
- pay benefits accurately and promptly;
- make the calculations necessary to keep the system financially sustainable.

Merely listing these requirements emphasises their stringency.

Private pensions require that government has the capacity to maintain macroeconomic stability and to regulate financial markets, to protect consumers in areas too complex for them to protect themselves. Regulation faces at least three strategic problems: that the regulatory regime collapses (or is ineffective); that the regulatory regime becomes de facto state control; or that the management and regulation of pension funds crowds out other demands for scarce skills.

Private pensions also require private-sector capacity (Barr and Diamond 2008 Appendix 9.1), including the ability to:

- collect contributions;
- keep records and inform workers;
- select portfolios;
- invest funds; and
- determine and pay benefits.

IMPLICATION FOR POLICY: DO NOT UNDERESTIMATE THE IMPORTANCE OF IMPLEMENTATION, NOR DELAY CONSIDERATION OF HOW A PENSION WILL WORK IN PRACTICE. A common mistake is undue optimism about institutional capacity. A particularly egregious error is to argue that since benefits will not need to be paid till later, there is no urgency about working out the arrangements for doing so.⁶

2.7 Sound principles of design but no single best system for all countries

As discussed, pensions have multiple objectives, including consumption smoothing, insurance, poverty relief and redistribution.

The pursuit of those objectives faces a series of constraints:

- Fiscal capacity: greater fiscal capacity makes it easier to find additional resources for a pension system.
- Institutional capacity: stronger institutional capacity makes feasible a wider range of options for pension design.
- The empirical value of behavioural parameters, such as the responsiveness of labour supply to the design of the pension system, and the effect of pensions on private saving.
- The shape of the pre-transfer income distribution: a heavier lower tail increases the need for poverty relief.

There is no single best system because (a) policy makers will attach different relative weights to the objectives, including views about the importance of poverty relief and about how risks should be shared within and across generations, and (b) the pattern of economic, institutional and political constraints will differ across countries. If the objectives differ and the constraints differ, the optimum will generally differ.

⁶ Despite the fact that great attention was paid to administrative requirements when planning the pension reforms in Poland implemented in the late 1990s, the reforms faced considerable administrative problems in the early days; see Chłoń-Domińczak (2004, especially pp. 165-171).

3 Examples of pension design

What do these various lessons imply for pension design? Since there is no single best system, what follows is not – because it cannot be – a single optimum. This section discusses four useful policy directions: non-contributory basic pensions; later and more flexible retirement; the design of simple, low-cost savings plans; and NDC pensions.

3.1 Non-contributory basic pensions

THE IDEA. A non-contributory basic pension, also called a citizen's pension or a social pension, is financed from taxation and paid at a flat rate on the basis of age and residence rather than of contributions.

The contributory principle assumed that workers would have a long history of stable employment. There are at least three reasons why history did not bear out this prediction. First is the changing nature of work: people are less likely to be in full time employment for the whole of their career; they have spells of full-time employment, of self-employment, and of part-time work, and spells outside the labour force. Thus the contribution record of a representative worker is less complete than in earlier decades. Second, family structures have become more fluid, with a weaker association between marriage and children, and divorce more common than previously. Third, women's labour-force participation has increased.

The first of these drivers of change means that on average workers will have less complete contributions records, so that the contributory principle no longer provides poverty relief as effectively as it once did. The second and third suggest that basing a woman's entitlement on her husband's contributions (whether or not it was ever desirable) is no longer feasible.

Non-contributory pensions strengthen poverty relief: they can cover everybody and can pay a pension high enough to keep people out of poverty. They also have advantages in terms of gender balance, since it is women who tend to have the most fragmented contributions records. There are other advantages: the benefit is fairly well targeted, because age is a useful indicator of poverty; and non-contributory pensions can be made internationally portable on a pro-rata basis.

Various instruments can be used to ensure that non-contributory benefits are affordable, notably (a) the size of the monthly pension and (b) the age at which the pension is first paid. It is possible also (c) to subject the pension to an affluence test, such that pensioners with the highest incomes do not receive the benefit.⁷

INTERNATIONAL EXAMPLES. The UK illustrates the problems of coverage in a contributory system. Until 2010 workers needed more than forty years of contributions to get a full basic state pension; in 2005, only 80 per cent of men and 35 per cent of women had a full contributions record. The problem was not that the authorities could not collect contributions but that the contributory principle for poverty relief no longer fits current labour markets and family structures. Precisely for those reasons, the British government relaxed the contributory requirements somewhat.

⁷ For example, in 2010 95 per cent of Canadian pensioners received the full Old Age Security pension, which is non-contributory; and only the top 2 per cent of income recipients received no Old Age Security pension at all.

Several OECD countries already have non-contributory pensions, including Australia, Canada, Chile, the Netherlands and New Zealand; and Canada and the Netherlands have among the lowest rates of elderly poverty. Chile introduced a non-contributory pension in 2008 explicitly to address elderly poverty (Box 3). Duflo (2003), shows that where (usually) the grandmother lives with children and grandchildren, the non-contributory pension in South Africa has gains for the wider family, including health gains for the children.⁸

Box 3 Pension reform in Chile

Chile introduced a system of mandatory, funded, privately-managed, competitive individual accounts in 1981. These individual accounts provide consumption smoothing, supported by various institutions to assist poverty relief. Until 2008, there was a minimum pension guarantee for someone with at least 20 years of contributions; in addition, a means-tested pension paid a benefit at about half the level of the minimum guarantee.

The post-1981 system in Chile was rooted in competitive supply, the argument being that competition would increase choice and coverage and drive down administrative costs. Not least because of the information and decision-making problems discussed earlier, these predictions were not borne out.

In the face of continuing elderly poverty, a Presidential Advisory Council was appointed. The central recommendation of its Report (Chile Presidential Advisory Council 2006), was to replace the minimum guarantee and the means-tested pension by a non-contributory pension financed out of taxation, payable to the poorest two-thirds of the population. The non-contributory pension was phased in from 2008.

The post-1981 system in Chile gave heavy weight to consumption smoothing, with some insurance through voluntary annuitisation and with limited weight to poverty relief. The primary lessons are threefold (for a fuller assessment, see Barr and Diamond, 2008, Chs. 12 and 13):

- Mandatory funded individual accounts are not easy and depend on complementary reforms.
 - Private supply plus competition are not on their own sufficient to keep down transactions costs or charges.
 - Unless accompanied by a robust system of poverty relief, individual accounts are not a pension system, but only a part of a pension system.
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Non-contributory pensions can be workable in countries with large rural populations, and in developing economies (see Barr 2012, Box 7.10). More specifically, Barr and Diamond (2010*b*), written at the request of the government of China, make recommendations about pension reform. Sections 7 and 8 of that report suggest that China should introduce a non-contributory pension (called a citizens' pension) for all older people. The suggestion was for a national system that covered urban workers, rural workers and migrant workers. The pension would be based on age and residence, and subject to a pensions test, i.e. the non-contributory pension would be progressively withdrawn in respect of any pension a person has from the mandatory contributory pension system. Thus the system screens out pensioners who previously had high formal-sector earnings, but is paid to everyone else.

⁸ More generally, Fishback et al. (2007) show the improved health outcomes which followed surprisingly rapidly after the introduction of a federal safety net in the USA as part of the New Deal.

3.2 Later retirement, but more flexible retirement

THE IDEA. People are living longer healthy lives, which is very good news. But a given pension from a given age is increasingly expensive the greater is life expectancy. The problem is not that people are living too long, but that they are retiring too soon. The obvious solution is that pensionable age should rise in a rational way as life expectancy increases. The argument for later retirement is stronger because many people enjoy their work and may not want to retire.

Alongside later retirement is a separate argument for more flexible retirement. When retirement was invented, a typical 65-year old worker was weak and infirm, and interfered with the productivity of younger workers. The purpose of pensions was to weed dead wood out of the labour force, so it made sense to make retirement mandatory and complete. Since then, however, countries have got richer, so that we can afford to give people a period of leisure at the end of their working lives. That, however, means that the purpose of retirement has changed. Policy should take account of the fact that people vary widely in their preferences and personal circumstances. Many people do not want to retire fully as soon as they are allowed, because of the extra earnings, because of possible extra pension and/or because they continue to enjoy working in their current job or another one.

The most efficient and equitable approach is to increase the average retirement age to accommodate resource pressures, but to recognise differences across individuals by offering choice over a person's time path from full-time work to full retirement. Making retirement more flexible would be good policy even if there were no problem in paying for pensions.

INTERNATIONAL EXAMPLES. OECD countries are increasingly taking action on retirement age. The USA is raising its retirement age from 65 to 67. The UK Pensions Commission (2004a, b, 2005) handled the politics of change with great skill; thus the state pension age will rise from 65 to 66 in 2020, with further increases thereafter. The Netherlands is also in the process of increasing retirement age, and many other countries are discussing the issue.

3.3 Simple, cheaply-administered saving plans

THE IDEA. Earlier discussion suggests a number of lessons, rooted in second-best analysis.

1) *Make pensions mandatory or use automatic enrolment.* Bounded rationality and bounded-will power explain why financial education and voluntarism will generally be insufficient. Automatic enrolment turns inertia to the individual's advantage: once automatically enrolled, most people will stay in the plan.

2) *Keep choices simple* by offering only a small number of clearly differentiated funds. In sharp contrast with simple theory, this type of constrained choice is a deliberate and welfare enhancing design feature, respecting the constraint of bounded rationality.

3) *Include a default option* for people who make no choice. That option should include life-cycle profiling, whereby young people's savings are mainly in the stock market, with assets moving into government bonds as a person moves towards retirement.

4) *Keep administrative costs low.* In order to do so, it is desirable to decouple account administration, i.e. the back office tasks such as record keeping, from fund management, i.e. the investment decisions. Record keeping should be centralised to exploit administrative

economies of scale. Investment decisions can be handled in two strategic ways: they can be outsourced to the private sector in tranches offered on a competitive basis (e.g. the US Thrift Savings Plan, discussed below), or they can be run by government (for example, the Norwegian government's petroleum fund (see Norway Central Bank 2011)). Either approach, however, makes significant demands on the quality of public and private institutions.

For voluntary pensions, a further option is to allow people to commit now to action in the future, thus making use of procrastination (i.e. bounded will-power) to assist policy. People are happy to promise to save more in the future, as in the 'Save More Tomorrow' plan of Thaler and Benartzi (2004).

INTERNATIONAL EXAMPLES. The Thrift Savings Plan, organised by the US government for federal civil servants (www.tsp.gov), is an example of this approach.

- Workers are auto-enrolled and choose from six funds, e.g. an equities fund, a government bonds fund, etc. There is also a life-cycle option.
- A government agency keeps centralised records to keep costs low. Fund management is on a wholesale basis. Investment in private sector assets is handled by private financial firms, which bid for the opportunity and which have to manage an identical portfolio for their private clients, providing some insulation against political interference.
- As a result, administrative costs are astonishingly low: as little as 6 basis points annually, or 60 cents per \$1,000 of account balance.

In 2012, the UK introduced a similar system, the National Employment Savings Trust (NEST), established under the UK Pensions Act 2008, to provide a low-costs savings vehicle, particularly for low-to-moderate earners (<http://www.nestpensions.org.uk/>).

Kiwisaver individual accounts in New Zealand, introduced in 2007, are another variant, and the first example of automatic enrolment on a national scale, reinforced by a government match for contributions up to a ceiling, plus a one-off payment when the account is first opened. The combined effect of these factors was considerable. In 2007, 13 per cent of workers belonged to an occupational plan and 5.5 per cent to a personal plan. KiwiSaver achieved coverage of 44 per cent within its first year, about three-quarters through occupational provision, the rest through personal plans – see Rashbrooke (2009).

The lessons from the economics of information and behavioural economics apply also to the decumulation phase, suggesting mandatory annuitisation of at least part of a worker's accumulation.

3.4 Partially funded notional defined-contribution (NDC) plans

Simple, cheaply-administered arrangements such as the Thrift Savings Plan are one way to organise consumption smoothing. As discussed in section 2.3, however, any such fully-funded plan can share risks only among current participants, i.e. among workers and pensioners currently in the system. In contrast, a partially-funded system can share risk more widely than individual accounts. This section discusses a partially-funded notional defined-contribution (NDC) pension system as an example of the approach.

THE IDEA. A recent innovation, pure NDC pensions are similar to pure defined-contribution plans in that contributions are notionally accumulated to determine a balance which is converted into an annuity at retirement, but different, in that they are not fully funded.

NDC arrangements work as follows:

- Each workers pays a contribution of a fraction of his or her earnings, which is credited to a notional individual account, that is, the state ‘pretends’ that there is an accumulation.
- The cumulative contents of the account are credited with a notional interest rate, typically the rate of growth of average wages, or of the total wage bill.
- Workers’ contributions are used partly to pay the benefits of current pensioners on a PAYG basis and may be used also partly to accumulate a buffer fund.
- When a person retires, the value of his or her notional accumulation is converted into an annuity on an actuarial basis, in that the present value of the flow of pension benefits (given the worker’s age and the life expectancy of his or her birth cohort) is equal to the value of the person’s notional accumulation, using the notional interest rate as the discount rate.
- However, the account balance is for record keeping only; the system does not own matching funds invested in the financial market.

Thus NDC plans mimic funded defined-contribution plans by paying an income stream whose present value over the person’s expected remaining lifetime equals his/her accumulation at retirement, but with an interest rate set by legislative rules rather than market returns. As with defined-contribution pensions, there are multiple ways of incorporating a redistributive element, including a minimum pension guarantee or by subsidising the contributions of people who are out of the labour force because they are bringing up young children or are unemployed.

NDC plans have a range of potential advantages. They are simple from the viewpoint of the worker. They are centrally administered, and thus have lower administrative costs than systems that offer workers choice. They do not require the institutional capacity to manage funded plans. They avoid much of the risk of funded individual accounts, since to a significant extent they avoid the volatility of capital markets. A partially-funded NDC system, with a sufficiently large buffer fund can share risk more widely than full-funded arrangements, with advantages in terms both of risk sharing and robustness in the face of economic turbulence. Finally, partially funded NDC plans can morph over time into simple individual accounts, for example Thrift-Savings-Plan type arrangements.

INTERNATIONAL EXAMPLES. Countries with NDC pensions or similar arrangements include Sweden, Poland and Latvia. Sundén (2009) explains how the partially-funded NDC system in Sweden adjusts to changing demographic and economic conditions (for more detailed discussion, see Barr and Diamond 2011). Of particular interest, Sundén describes the phased adjustment of benefits in Sweden after the 2008 economic crisis, illustrating the ability of such arrangements to share risk.

Barr and Diamond (2010*b*, section 10), criticise the system of mandatory funded individual accounts in China in terms both of policy design and implementation, and suggest that the system should move towards a partially-funded NDC arrangement.

‘China introduced individual accounts as part of the pension reforms in 1997, with an expectation of full funding. However funding has not occurred in line with the standard

model. There are no institutions for workers to select individual portfolios nor to make direct investments in different assets. The need to pay current benefits has not left enough resources to purchase assets as originally designed, seriously undermining the credibility of the new system. Since full-scale funding with individual portfolios is not a viable option in the near term, what is needed is to reform the accounts into a credible, transparent system with the flexibility to evolve in whichever direction makes sense in the future. We address the near-term task in section 10.1 and consider eventual funding in section 10.2. We recommend that China set up the existing individual accounts as notional defined contribution accounts (along the lines of Sweden's *Inkomstpension*); this approach allows for eventual evolution into a mix of funded and notional accounts ..., or eventually possibly only a funded account. As in Sweden, there should be a fund backing the accounts in general, but not attributed to specific individual accounts. The immediate task is to make the current accounts function better given the current level of funding' (Barr and Diamond, 2010*b*, p. 45).

The specific recommendation was that:

'By the end of the next five-year period, China should aim to have a system of individual accounts similar to the *Inkomstpension* in Sweden, known internationally as NDC. Implementing individual accounts through partially centrally funded NDC arrangements has significant advantages in China's current circumstances.

- It offers consumption smoothing to today's workers in a similar way to funded DC plans, and thus maintains individual accounts as a central part of the pension system.
- Because no additional fund is built up the arrangement does not require today's (poorer) workers to make larger contributions so that future (richer) generations of workers can make smaller contributions, thus avoiding unsatisfactory intergenerational redistribution.
- It does not require the considerable private-sector financial and administrative capacity of funded plans with individual choice, since the plan is run by the public authorities.
- It is less risky for workers, since the rate of return avoids the short-run volatility of assets in the capital market. This is particularly important at a time when banking and financial market institutions are still developing and given current global economic uncertainty.
- The arrangement is a basis for a future move to full funding, or both funded and notional defined contribution accounts should a future government decide that that suits China's then economic and social circumstances....' (Barr and Diamond, 2010*b*, p. 53).

4 Pension design and economic development

The previous section discussed options with desirable characteristics. This section, following Barr and Diamond (2009), discusses what is feasible, in particular the widening array of options as fiscal and institutional capacity constraints relax.

Discussion is couched in the conventional terms of first-tier pensions (aimed mainly at poverty relief), second-tier pensions (mandatory, intended mainly to provide consumption

smoothing), and third-tier pensions (voluntary, to accommodate differences in individual preferences).

The discussion is limited in two important ways. First, it considers three stylised types of country: a low-income developing country, a middle-income developing country, and a developed country; not all countries fall neatly into one of these categories. Second, the examples are only illustrations, and *not* intended to be a template.

All the examples are based on two assumptions: that the level of benefits, the age at which a pension is first paid, and similar parameters, are consistent with fiscal sustainability; and that alongside pensions there is at least some means-tested support for the elderly.

4.1 Illustrative pension systems for a low-income country

FIRST TIER. Choices are highly constrained:

- A very poor country may be unable to finance or administer a national system of poverty relief; in particular such a country will generally not have the capacity to administer an income test, relying instead on family, charitable organisations, and local discretion.
- As capacity allows, it becomes possible to use general tax revenues for limited poverty relief, through transfers to sub-national governments or through a national system that targets by age.

SECOND TIER. A low-income country will generally not have the capacity to manage a mandatory earnings-related system, which should be regarded as an agenda for the future.

THIRD TIER. Any voluntary saving plans should not be tax favoured, since fiscal resources are highly constrained, and tax advantages typically regressive. It is, however, important to provide a simple, reliable opportunity for voluntary savings.

4.2 Illustrative pension systems for a middle-income country

FIRST TIER. Countries in this category have a choice of:

- A noncontributory, tax-financed pension (as, for example, in Chile); or
- A simple contributory PAYG pension, for example a flat-rate pension based on years of contributions (for example, the basic state pension in the UK).

SECOND TIER. The choice is between

- A publicly organised, earnings-related, defined-benefit pension, or possibly an NDC pension; or
- A defined-contribution pension as part of a provident fund (as in Malaysia and Singapore), or with sharply limited individual choice.

Policymakers should consider the extent to which any tax favouring is regressive.

THIRD TIER. Voluntary, defined-contribution pensions are possible at the level of the firm or individual. Regulation is important, and any tax favouring should avoid undue regressivity.

4.3 Options for pension systems in a developed country

FIRST TIER. Countries should consider either

- A noncontributory, tax-financed pension; or
- A contributory pension aimed at poverty relief (as in many countries, including the UK and USA), with an array of different designs.

SECOND TIER. The menu includes (separately or in combination):

- A publicly organised, defined-benefit pension;
- An NDC system (as in Sweden);
- An administratively cheap savings plan with access to annuities (like the Thrift Savings Plan in the USA or NEST pensions in the UK), or simple savings plans such as KiwiSaver in New Zealand;
- Mandatory, funded, defined-benefit pensions sponsored by industry (the de facto system in the Netherlands); or
- Funded, defined-contribution pensions (as in Chile and a small part of the system in Sweden).

THIRD TIER. Voluntary, defined-contribution pensions can be organised at the level of the firm, the industry or the individual; regulation (particularly of defined-benefit plans) is important and difficult, and any tax favouring should seek to avoid excessive regressivity.

Clearly choices widen as fiscal and administrative capacities grow. A developed country has a wide array of choices and, given the earlier conclusion that there is no single best system, it is not surprising that richer countries display a range of very different systems. However, the fact that a country is capable of implementing a complicated system does not mean that such a system is a good idea or necessarily superior to a less administratively demanding one. New Zealand has a simple pension system through choice, not constraint.

5 Conclusion

A WIDE RANGE OF SYSTEMS. Countries have implemented very different pension systems, in part reflecting different relative weights for various of the objectives.

- Mainly poverty relief: an example is the system in New Zealand, which comprised a non-contributory pension plus (until 2007, when KiwiSaver was introduced) voluntary consumption smoothing.
- Largely consumption smoothing: an example is Singapore's state-administered provident fund, which is mainly a savings plan.
- Both objectives: Canada has a combination of Old Age Security and Guaranteed Income Supplement aimed mainly at providing poverty relief, plus earnings-related Canada Pension Plan aimed mainly at providing consumption smoothing. The Netherlands has a non-contributory PAYG universal pension plus funded occupational pensions.
- Chile has strengthened poverty relief by introducing a non-contributory pension alongside its existing system of individual funded accounts

- There is wide variation in the extent of mandatory funding: Chile relies substantially on funding, whereas countries like France, Germany and Italy are largely PAYG.

BUT ONLY FOUR POTENTIAL SOLUTIONS TO PROBLEMS OF PENSION FINANCE. If a country has problems financing its pension system, there are only four potential solutions, or a combination. A country can:

- Reduce the level of pension benefits: this policy reduces pension spending by lowering the living standards of pensioners, and hence risks elderly poverty.
- Raise the age at which pension is first paid, with no compensating increase in the level of the pension: this policy reduces pension spending not by lowering living standards in retirement but by reducing the duration of retirement.
- Increase the contribution rate: this policy reduces the living standards of workers. In many countries, not least because retirement age has increased little, contributions are already high, limiting the scope for significant further increases.
- Adopt policies to increase national output: this policy increases the contributions base and hence makes it easier to finance a given level of pension.

MISTAKES TO AVOID. A country:

- Should not reform piecemeal and in haste, but strategically and with a long time horizon;
- Should not set up a system beyond its capacity to implement;
- Should not introduce a mandatory, earnings-related pension system until it has a robust capacity to keep records accurately over forty or more years;
- Should not introduce individual funded accounts (whether mandatory or as an option in a mandatory system) until it can regulate investment, accumulation, and annuitisation;
- Should not underestimate how administrative costs cumulate over a long life;
- Should not underestimate transition costs, hence should not move towards funding if that risks breaching fiscal constraints.

WHAT REALLY MATTERS. In many ways two factors matter above all.

- Good government is important whatever the type of pension system a country chooses to adopt. Effective government will be able to implement PAYG pensions responsibly. It will also generally be able to maintain the macroeconomic stability and regulatory standards on which funded pensions depend.
- Economic growth is also important for any pension arrangement. Output growth makes it easier to finance PAYG pensions by broadening the contributions base, and easier for funded pensions to deliver planned living standards in retirement by ensuring that there is enough output for pensioners to buy without causing price inflation or asset market deflation.

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