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**Article (Accepted version)
(Refereed)**

Original citation:

Barr, Nicholas and Diamond, Peter (2009) Reforming pensions: principles, analytical errors and policy directions. [International social security review](#), 62 (2). pp. 5-29. ISSN 0020-871X

DOI: [10.1111/j.1468-246X.2009.01327.x](https://doi.org/10.1111/j.1468-246X.2009.01327.x)

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This version available at: <http://eprints.lse.ac.uk/25099/>

Available in LSE Research Online: February 2011

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Principles, analytical errors and policy directions

Nicholas Barr and Peter Diamond

Revised December 2008

forthcoming *International Social Security Review*, Vol. 62, No. 2, 2009

Abstract

This article, based on two books (Barr and Diamond 2008, forthcoming), sets out a series of principles for pension design rooted in economic theory: pension systems have multiple objectives, analysis should consider the pension system as a whole, analysis should be framed in a second-best context, different systems share risks differently, and systems have different effects by generation and by gender. That discussion is reinforced by identification of a series of widespread analytical errors – errors that appear in World Bank work, but by no means only in World Bank work: tunnel vision, improper use of first-best analysis, improper use of steady-state analysis, incomplete analysis of implicit pension debt, incomplete analysis of the impact of funding (including excessive focus on financial flows, failure to consider how funding is generated, and improper focus on the type of asset in trust funds), and ignoring distributional effects.

The second part of the article considers implications for policy: there is no single best pension design; earlier retirement does little or nothing to reduce unemployment; unsustainable pension promises need to be addressed directly; a move from PAYG towards funding in a mandatory system may or may not be welfare improving; and implementation matters – policy design that exceeds a country's capacity to implement it is bad policy design. We illustrate the ranges of designs of pension systems that fit the fiscal and institutional capacity constraints typical at different levels of economic development. The potential gains from simplicity imply that a country capable of implementing an administratively demanding plan does not necessarily gain from doing so. New Zealand has a simple pension system through choice, not constraint.

Reforming pensions: Principles, analytical errors and policy directions¹

Nicholas Barr² and Peter Diamond³

This article summarizes the central analytics and policy conclusions of Barr and Diamond (2008) (and a forthcoming shorter version). The books have two roots. First, we were members of a small group asked by the government of China to review their pension system and write a report that could help to improve policy discussion. Our report to Prime Minister Wen Jiabao in 2004 (Asher et al. 2005) is available online.⁴ The other root is our role as peer reviewers of a World Bank study (Holzmann and Hinz 2005), whose analysis we regard as incomplete.

This article starts with the relevant economic theory, addressing core analytical principles and some lamentably common analytical errors. Part 2 discusses implications for policy.

A central argument is that the primary cause of the pensions ‘crisis’ in many countries is a failure to adapt to very long-run trends: increasing life expectancy (with some sad exceptions), declining fertility, and earlier retirement.⁵ Superimposed are two more recent phenomena: the baby boom (widespread, though not universal) and the general increase in the scale of pension systems. Reform to address financing issues can also be an occasion to improve pension design.

Pension systems with contribution rates, monthly benefits, and retirement ages set for an earlier era are not consistent with the longer retirements implied by increasing life expectancy, earlier average retirement and the additional rise in dependency rates implied by declining fertility. Some adjustment is necessary, and would be even without the baby boom, given the striking similarity in age pyramids projected for 2050 for China (which has a one-

¹ We wish to thank all the people we thanked in the preface to our book from which this paper is drawn.

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⁴ http://www.oup.com/us/pdf/social_security_study_2005

⁵ The long-term trend to earlier retirement has attenuated or reversed in a number of countries. But we have not seen a trend in the other direction proportional to continuing increase in life expectancy. Thus there is still an ongoing trend to earlier retirement in percentage terms.

child policy⁶), the United States, which had a baby boom, and India, which had neither (Barr and Diamond 2008, Fig. 1.5). The main source of financing problems is that, apart from adjustment to price and wage growth, traditional defined-benefit (DB) systems have had a static design with no automatic adjustment to demographic trends. This problem is not inherent: a defined benefit system can be designed to adjust automatically to demographic variables, as shown by the recent reform in Germany. With funded and notional defined contribution systems (DC, NDC, see Box 1) the problem is different: both systems adjust benefit levels to available finances. With given contribution rates and ages of earliest access to retirement benefits, the problem is not sustainability but the possibility of inadequate benefit levels.

Box 1 Terminology

Contributory basic pension. A pension paid, often at a flat rate, to a person with a full record of contributions, or pro rata to a person with an incomplete contributions record.

Defined-benefit (DB) pensions. A pension in which the benefit is determined as a function of the worker's history of pensionable earnings. The formula may be based on the worker's final wage and length of service, or on wages over a longer period, for example the worker's full career. A DB system may be fully or partially funded, or unfunded. In a *pure* DB arrangement the sponsor's contributions are adjusted to meet obligations. Insofar as the degree of funding is maintained, contributions are adjusted to meet anticipated obligations; thus the risk of varying rates of return to pension assets falls on the sponsor.

Defined-contribution (DC) pensions. A pension in which the benefit is determined by the value of assets accumulated toward a person's pension. Benefits may be taken as a lump sum, as a sequence of withdrawals, or by purchase of an annuity. Thus the expected discounted value of benefits is equal to the value of assets, referred to as benefits being determined actuarially.⁷ Thus, a *pure* DC plan adjusts obligations to match available funds, so that the individual bears the portfolio risk.

Fully funded pensions pay all benefits from accumulated funds. Partially-funded pensions pay benefits both from accumulated assets and from current contributions.

A noncontributory universal pension is based on years of residence.

Notional defined-contribution (NDC) pensions are financed on a pay-as-you-go or partially funded basis, with a person's pension bearing a quasi-actuarial relationship to his or her lifetime pension contributions.

⁶ The policy has significant exceptions. The current total fertility rate is 1.8 and the rate has never been close to 1.

⁷ The discounted value depends on the relevant interest rate and load factors.

Pay-as-you-go (PAYG) pensions. PAYG pensions are paid out of current revenue (usually by the state, from tax revenue) rather than out of accumulated funds. Partially-funded pensions are often referred to as PAYG.

1 Principles

1.1 Principles of analysis

Economic theory suggests a number of conclusions about pensions.

Pension systems have multiple objectives. The major objectives of individuals and families are consumption smoothing and insurance. Governments have additional goals, including poverty relief and redistribution. Analysis needs to take account of all these objectives alongside other goals, such as economic efficiency and output growth.

Analysis should consider the pension system as a whole. Pension design affects the labour market, economic growth, the distribution of risk, and the distribution of income, including by generation and gender. Analyses of those effects need to consider the entire pension system, and in particular whether a change in one part needs to be accompanied by a change in another. There is no efficiency gain from designing one part of the system without distortions if distortions are then placed elsewhere to accomplish insurance and redistributive goals. Hence there is no gain from obsessing about an actuarial second-tier pension given the need for a poverty-relief element in the first tier. What is relevant for analysis is the combined effect of the whole system. Similarly, analysis of distributional effects should consider the progressivity of the system as a whole, rather than that of each element. Consider, for example, a universal flat-rate pension financed by a proportional tax; although the tax side, considered alone, is not progressive, the system overall is.

Analysis should be framed in a second-best context. Simple theory assumes that individuals make optimal choices and that labour markets, savings institutions, and insurance markets exist and function ideally. Formulating policy within that first-best framework is analytically simple, but a bad guide to pension design in a world with limited policy tools and major market imperfections, as discussed in Boxes 2 and 3.

Box 2 Deviations from first-best

In the theory of saving in a first-best world the individual is assumed to make choices about saving, borrowing, portfolio choice and annuitisation that maximize his or her lifetime utility from a complete array of competitively-priced market options. In those circumstances, consumer choice and

competitive markets maximize welfare, given lump sum redistribution. Pensions, however, face a number of serious deviations from such a theoretical world.

Imperfect information. Optimal use of markets requires people to understand the uncertainties they face and the options that markets offer. In fact, individuals are imperfectly informed in several ways:

- Some individuals have a poor sense of the risks and uncertainties they face, for example about future benefits from defined-benefit and defined-contribution plans.
- Many individuals 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 percent of Americans did not know the difference between a stock and a bond. The problem also has distributional implications, as information poverty and financial poverty are highly correlated.
- Defined-benefit plans are complex, and typically incompletely understood. With corporate plans, labour mobility, changes to the plan and financial problems of the firm have implications for pensions that can be hard to see. Complexity is often a problem with public systems as well.
- Information processing problems arise when the problem is too complex for many agents, even when they are 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 characterize most pension products. Advice can be expensive and inadequate.

For these and other reasons, poor decisions give a justification for compulsion, and the simple assumption of rational utility maximization is not a good basis for pension policy design.

Incomplete markets. Actual markets are limited in their ability to provide competitively-priced products that match the needs and wants of even a well-informed consumer. In the case of retirement income, the market for indexed contracts is thin. Asymmetric information in insurance markets makes perfect insurance impossible; and when insurance is provided through employment, labour market decisions may be distorted. Insurance firms must cope with potential consumers with different risks and so different costs, and may design products in response to poor consumer decision making. The problem of adverse selection can be eased by making insurance mandatory. Generally, marketing insurance products is highly costly; thus government provision of a uniform product may have much lower cost.

Progressive taxation is a further deviation from first-best. In comparing defined-contribution and defined-benefit plans, it is not possible to say that one approach dominates the other if labour market distortions are present:

“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 labour 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.” (Diamond 2002, p. 57).

All these deviations from first-best call into question the simple model of market choice and competition. Some resulting problems with the exercise of consumer choice are taken up in Box 3.

Box 3 Do consumers choose well? Lessons from behavioural economics

A recent and growing literature on behavioural economics documents poor choices that come from poor decision making (see U.K. Pensions Commission 2004, pp. 207-10, and Tapia and Yermo 2007).

Many people do not save enough voluntarily to maximize lifetime utility, and few buy annuities voluntarily despite their considerable value. People may fail to choose, or delay doing so:

- *Procrastination*: People delay saving, do not save, or do not save enough. People agree that they should save more for retirement but postpone the action itself (Choi et al. 2001).
- *Avoiding explicit choice*: With rational choice, it should make no difference whether individuals face an opt-in or an opt-out provision; in practice, automatic enrolment leads to much higher participation. Participation rates in employer 401(k) plans in the United States differ sharply depending on whether or not enrolment was automatic with an opt-out (Beshears et al. 2008).
- *Immobilization*: Complexity and conflicting information can lead to passive behavior. A larger range of 401(k) options can result in less participation. A large fraction of new workers in Sweden, able to choose from over 700 mutual funds, make no choice at all.

In addition, when people do choose, their choices may make little sense:

- *Short-term gratification*: Many people retire at the earliest age permitted, which may be too early for their own good or that of their spouses. In the United States a much larger spike in retirements occurs at age 62 than seems sensible given that the increase in pension for later retirement is roughly actuarially fair for the average worker.
- *Framing*: Choices are influenced by how they are presented, even at the simplest level. As Loewenstein and Ubel (2008, p. 1806) note: “people who learn first about the risks of a treatment followed by its benefits make different choices than people who first learn about its

benefits and then its risks. Decision aid developers have no choice but to present information in one order or another, but unfortunately the order they choose will almost inevitably affect people's decisions."

- *Familiarity*: Another poor but common choice is to invest heavily in the stock of one's own employer; if the firm goes bankrupt, employees invested in the firm lose both their wage income and much of their capital accumulation, as happened to many employees of Enron. Such behavior shows a failure to understand the benefits of diversifying risk.
- *Excessive trading*: many people appear to trade too much, on average worsening their position on the risk-return frontier while also incurring trading costs. Some try to time the market, moving between classes of assets in a way that increases risk relative to expected return, and indeed seems to lower the expected return on average as well.

Recent experimental evidence supports a tendency in some circumstances for people to have a higher discount rate in the short run (that is, 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, and can result in time-inconsistency.

These findings suggest a number of implications for policy design in employer and public plans:

- Keep choices simple, for example by offering only a small number of clearly differentiated funds.
- Use automatic enrolment, thus turning inertia to the individual's advantage: once automatically enrolled, most people will stay with the plan.
- Design a good default option: an arrangement based on automatic enrolment plus worker choice of plans requires a default option for workers who do not make a choice. The existence and design of the default option are important (see Beshears et al. 2008 for fuller discussion).
- In voluntary plans a further option is to allow people to commit now to (reversible) action in the future, thus making use of procrastination 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).

For the reasons set out in Boxes 2 and 3, progress in helping consumers to become better informed has been limited even in developed countries. People often fail to make choices that maximize their long-term well-being or that of their families, and often make no explicit choice at all—a common result where excessive choice or excessive complexity becomes overwhelming. In contrast with simple theory, offering people a restricted set of choices can at times improve outcomes; it is also critical to design good defaults for people who make no explicit choice.

Alongside problems in choosing among pension products, consumers also face problems in choosing the timing of retirement. If pension benefits bear an actuarial relationship to a person's expected duration of retirement, longer lives and retirement at an unchanged earliest possible age (a common occurrence) inescapably aggravate elderly poverty. The concern that some people are retiring too early for their own good and that of their spouses matters for choice of an earliest entitlement age and increases the importance of careful design of the incentives to work beyond the earliest entitlement age.

In addition to problems with individual choice, analysis needs to take account of the other deviations from first-best set out in Box 2, notably incomplete markets and taxation.

Framing the argument in second-best terms starts from the multiple objectives of pension systems, which cannot all be achieved fully at the same time. Thus policy has to optimize—not minimize or maximize—across a range of objectives. To illustrate, an exclusive focus on consumption smoothing suggests a system in which benefits bear a fairly exact relationship to a worker's accumulated contributions; but such a system would fail to relieve old-age poverty for low-paid workers and would not offer insurance against adverse labour market outcomes. Thus policy has to seek the best balance among consumption smoothing, poverty relief, and insurance, a balance that will depend in each society on the weights given to those and other objectives.

Different systems share risks differently. In a pure system of funded individual accounts, the risk of unsatisfactory outcomes (apart from the longevity risk, if benefits are taken as an annuity) is imposed on the individual worker. The allocation of risk in the pure case can be altered by government guarantees or government bailouts. In a pure, employer provided defined-benefit arrangement, the risk in paying benefit amounts according to formula is borne by the employer, unless there is bankruptcy. The employer may spread the risk across current and future workers, insofar as wages adjust, across shareholders, as profits decline, and across customers if the costs of a deficit fall partly on prices; hence the risk is shared more broadly.⁸ This allocation, too, can be altered by government insurance or bailouts. In a pure Pay-As-You-Go (PAYG) defined-benefit system financed out of mandatory social insurance contributions (e. g., through payroll taxes), risks are shared across contributors, that is, across the current working generation. The allocation in the pure PAYG case can be altered by adjusting benefits and, through variations in partial funding or borrowing, by transferring risks across generations, through adjustments of contributions or

⁸ Anticipated (as opposed to accrued) pension benefits are subject to revision of the pension formula.

benefits. Finally, in a system financed out of general revenue as well as, or in place of, contributions, the risks are shared across all taxpayers, and hence across generations (since future taxes as well as current taxes can change as debt varies). Thus – crucially – a system with a PAYG element allows intergenerational risk sharing; this does not happen in a fully funded system of individual accounts.

The level of funding affects intergenerational distribution. As discussed further below, funding that affects savings affects the intergenerational distribution of resources. To evaluate such a policy one needs to evaluate the relative positions of different generations in terms of the levels of their wages and their mortality and morbidity rates.

Different systems affect men and women differently. Pension systems, like other institutions, create incentives that affect decisions about paid work, care activities, and leisure. They also affect the income flows to men and women, both when married and when a surviving or divorced spouse. Analysis needs to reflect diversity in social values, individual preferences, and economic situations within a country and across countries.

1.2 Analytical errors: The World Bank and other culprits

Discussion of pensions is prone to analytical errors of which the following—some by the World Bank, but certainly not only the World Bank—are prime examples. It is important to be clear that these errors are not based on different value judgments or different views about empirical magnitudes – they are examples of flawed analysis.

Tunnel vision. Analysis that focuses, often implicitly, on a single objective such as consumption smoothing may be flawed because it pays inadequate attention to other objectives such as poverty relief and gender balance.

Similarly, it is generally mistaken to consider one part of the pension system in isolation, ignoring the effects of other parts. There is no efficiency gain from moving redistribution from one part of the system to another, even if the change leaves one part with no deviation from full actuarial principles.

Improper use of first-best analysis. It is a mistake to focus on the labour market distortions caused by a given set of pension arrangements while ignoring or downplaying the contributions of those arrangements to the various goals of pension systems—contributions that are not available without distortions. A pension system that includes poverty relief will be distorting; minimizing distortions implies minimizing poverty relief – the cure is worse than the disease. Any optimal program will necessarily induce distortions – starting from an efficient laissez-faire allocation, distortions create second-order efficiency costs but first-

order distributional gains. The argument that an actuarial relationship between contributions and benefits is optimal in terms of labour market effects is generally mistaken for second-best reasons. Of course pensions should be designed to avoid larger distortions than are justified by their contribution to goals, but it follows that minimizing distortions is not the right objective.

Also mistaken is uncritical acceptance of the argument that competition among pension providers benefits consumers by increasing choice and driving down administrative charges. Although widely applicable in many markets, this line of argument understates the serious problems of information and decision making in pensions discussed in Boxes 2 and 3. These problems do not mean that there should be no consumer choice, but rather that options should be carefully designed, for example through adequate incentives for delayed retirement and constrained choice and well-crafted defaults for the choice of assets. Competition includes selling efforts as well as competition on price and quality.

Improper use of steady-state analysis. It is mistaken to focus on the design of a reformed pension system in a steady state while ignoring or underplaying the steps that are necessary to get to that steady state. This issue becomes especially important when considering whether or not to move from PAYG toward funded pensions, as discussed more fully in Box 4. A related error is the claim that funding is inherently superior because stock market returns exceed the rate of wage growth; that claim is mistaken for several reasons, not least because it takes no account of how the move to funding is to be financed.

Box 4 What are we comparing with what?

In assessing proposals for pension reform, it is important to be clear what question is being asked. Feldstein (2005), for example, argues that the U.S. Social Security system has reduced national saving. A key question is what normative conclusion to draw. U.S. Social Security is less than fully funded because benefits were paid to earlier cohorts in excess of what their contributions could have financed. The purpose of paying higher benefits was to raise the consumption of those cohorts after retirement, and (short-run Keynesian issues aside) this inevitably reduced national saving. Thus the decline in national saving was not an avoidable side effect of poorly designed policy but a necessary consequence of the policy of increasing the consumption of earlier retirees.

If one does not include the value to earlier generations of the consumption that resulted from lower investment, the analysis implicitly makes a long-run comparison; that is, it compares the economic situation in the United States today with what it would have been in an alternative long run with funded pensions. Thus the underlying question is: How does welfare in long-run state B differ

from that in long run state A? For a policy choice the appropriate analysis asks a different question: What are the welfare effects of *moving* from state A to state B? Either question (and its related answer) is coherent. What is not legitimate is to take the answer to one question and apply it to the other.

Incomplete analysis of implicit pension debt. Analysis that looks only at future liabilities (that is, future pension payments), while ignoring explicit assets and the implicit asset from the government's ability to levy taxes, is misleading. Too narrow a focus on costs also ignores 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 growing excessively relative to the contributions base. A related error is to treat implicit and explicit debt as equivalent: they are not since the politics of changing the real values of the two debts are different, and bond markets understandably treat them differently.

Incomplete analysis of the effects of funding. This error appears in a number of guises.

1) Excessive focus on financial flows: housing aside, a pensioner's living standard in old age will depend on his or her ability to consume goods and services produced by younger workers. PAYG and funding are both ways of organizing claims on that output. It is therefore mistaken to focus excessively on how pensions are financed while ignoring future national output and its division between workers and pensioners. The error in this focus is its failure to recognize that the effects of funding on future output will depend on the answers to a series of questions, many of which are often addressed incompletely or ignored:

- Will funding pensions increase saving?
- Is increased saving a good objective?
- Will funded pensions strengthen the performance of capital markets?
- If so, is it necessary for this purpose that pensions are mandatory?
- Are redistributive effects across generations—which are inevitable—desirable policy?

We return to the discussion of the desirability, or otherwise, of funding in the policy discussion below. A common example of this error is to argue that with funded defined-contribution accounts little action is needed to adjust to demographic change. Longer lives in retirement reduce monthly benefits for given accumulations and so, it is argued, there is no

financing problem. But that does not mean that there is no social problem – in this case, inadequate benefits – particularly if retirement ages do not change much.

2) Failure to consider how funding is generated: one way to increase funding is to increase contribution rates (or reduce benefits) now in order to have lower contribution rates or higher benefits in the future; another is to place assets with the pension authority rather than hold them elsewhere. The first approach can raise national saving, and thus output, and so enhance the capacity to provide benefits in the future. The central point is very simple: to raise national saving, changes to pension arrangements have to lower someone's consumption, either that of workers, if contributions are increased, or that of retirees, if benefits are reduced. A transfer of assets does not have that effect if the assets would have been saved anyway. It does not create additional output, but only changes the distribution of the burden of paying for benefits, including benefits that are a legacy of an older pension system.

3) Improper focus on trust fund assets: despite claims that holding government bonds is not useful, the type of asset in a trust fund is not informative of the impact of trust fund activity on the ability of government to finance benefits, as two examples show. If the government raises contribution rates to buy (and then hold) government debt that would otherwise be sold to the public, the government is in a better financial position, even though the assets in the pension trust fund are the government's own bonds. In contrast, if the government issues additional debt to finance a purchase of stocks, the government is not in a better financial position, even though the assets are private assets.

Ignoring distributional effects. Because pension systems can redistribute across cohorts with different birth years, it is necessary to consider who gains and who loses. An egregious error is to ignore the fact that any choice between funding and PAYG necessarily makes choices about redistribution across generations. The point is most obvious if policymakers are establishing a brand new pension system. If they introduce a PAYG system, the first generation of retirees receives a pension, but returns to subsequent generations are lower; if they fully fund, later generations benefit from higher returns, but the first generation receives little or no pension. Thus it is mistaken to present the gain to pensioners in later generations as a Pareto improvement⁹, since it comes at the expense of the first generation. The same argument applies in a country that already has a PAYG system: a policy to move

⁹ 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.

toward funding through higher contributions or lower benefits redistributes from current generations to future ones.

Whatever the merits of a potential move towards funding, the error in ignoring distributional effects is profound: it makes an implicit assumption about the distribution of income across generations; it leads to mistaken claims for the Pareto superiority of some policies; and it ignores the fact that a PAYG element in a pension system is generally welfare enhancing because of the resulting possibility of intergenerational risk sharing (see, for example, Dutta, Kapur and Orszag 2000).

All of these analytical errors matter. They matter not because they offend our logical aesthetics, but because analytical errors lead to policy errors, many of which are identified in a World Bank evaluation of its own pensions work (World Bank 2006a, b).

2 Implications for policy

What do these theoretical arguments imply for policy? Successive sections consider general aspects of pension design, finance and funding, and implementation.

2.1 Pension design

There is no single best pension design. Proper application of the principles above can and does lead to widely different systems. The simple but important argument is set out in Box 5.

Box 5 No single best pension system

Pensions have multiple objectives, notably the achievement of consumption smoothing, insurance, poverty relief and redistribution.

The pursuit of these objectives faces a series of constraints:

- Fiscal capacity: stronger fiscal capacity makes it easier for the system to find additional revenues 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 of the income distribution increases the need for poverty relief.

There is no single best system for several reasons:

- 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.
- The pattern of constraints, including the value of key parameters, will differ across countries.
- Political processes, which vary across countries, affect what is politically feasible, given the range of alternatives that are economically and administratively feasible.
- History provides a set of institutions which influence the value and politics of change.

Thus is it not surprising that countries have successfully implemented very different pension systems.¹⁰ Countries have chosen systems that vary from more or less pure consumption smoothing, in the form of mandatory saving with little or no insurance (e.g. Singapore's publicly administered provident fund, which is in essence a savings plan), to a primary concern for poverty relief, achieved through a noncontributory flat-rate pension, with consumption smoothing on a voluntary basis (as in New Zealand). In between, a wide range of systems explicitly address both objectives. Similarly there is a wide range in the degree of funding (the extent to which benefits are financed from assets). Some countries have significant reliance on funding (Canada, Chile, Sweden, the United States), while others organise pensions mainly on a PAYG basis (France, Germany, Italy). Funding can be in individual accounts (as in Chile and Sweden's premium pension) or in a trust fund (as in Canada, Sweden's inkomstpension and the United States). The Netherlands has a noncontributory PAYG universal pension based on years of residence, together with funded occupational pensions that are effectively mandatory. Sweden's guarantee pension is based on residence and goes only to those with little or no mandatory pension income. In 2008, Chile introduced a noncontributory basic pension based on residence that is affluence-tested¹¹, that is, it goes to all but the well-off.

Avoid excessive implicit taxes. Pension rules have a major impact on decisions about when to retire. In particular, badly-designed rules can encourage people to retire earlier than is efficient; in the limit, such incentives can have an effect similar to a mandatory retirement age. Gruber and Wise (1999, 2004) calculated for each year the implicit tax on earnings by

¹⁰ See Barr and Diamond 2008, Ch. 11 and the references therein. Our judgment that a given country's system works reasonably well should not be read as an endorsement of all the details of that system. Indeed, we have never studied the system of a country without finding some elements we would change.

¹¹ I.e. a measure of eligibility for benefits that is designed to screen out only the best off, in contrast with an income test, which screens out all except the poor. Some countries use means tests – which look at assets as well as income.

workers eligible to retire and find that a high implicit tax rate creates a significant incentive to early retirement.

Earlier retirement does little or nothing to reduce unemployment. It is widely believed that earlier retirement will free jobs for younger workers. That view would be correct if the number of jobs in an economy were fixed. But the number of jobs is not fixed. First, as additional workers enter the labour force, they exert downward pressure on wages and make it easier for employers to find suitable workers, thus encouraging job creation; the number of jobs is variable and influenced by the number of workers. Second, taking a pension early does not necessarily remove workers from the labour force, since some workers continue to work elsewhere while receiving a pension from a previous employer. Third, in a developing economy (China, for example) urban unemployment is heavily influenced by migration from rural areas, which may overwhelm any attempt to reduce urban unemployment through early retirement.

Evidence shows that early retirement does not reduce unemployment: over many decades, developed countries have seen a large decrease in the average retirement age, with no parallel decline in unemployment rates; and the Gruber-Wise tax variable which has a significant impact on employment has no impact on unemployment (Diamond 2006).

Thus it is mistaken to change the pension system to encourage early retirement or to lower a mandated retirement age—both longer-term solutions—as palliative responses to cyclical unemployment, which is a short-term issue.¹² Better to focus on unemployment benefits and on incentives for long-run economic growth than to distort the labour market in the vain hope that retirement will have a large impact on unemployment. Similarly, disability benefits should be awarded on the basis of actual disability, not as a response to unemployment.

2.2 Finance and funding

Unsustainable pension promises need to be addressed directly. A frequently heard, but flawed argument runs, “PAYG pensions face major fiscal problems; therefore they should be privatized.” This is a non sequitur—the “therefore” does not follow. Whatever financing problems a pension system may face, privatization does little or nothing to alleviate them; indeed, it may exacerbate them (as it did, for example, in Argentina, and would have with

¹² Structural unemployment may raise different issues. Additionally, labour markets may take time to adjust to an increased supply of older workers.

some U.S. proposals). It is important to distinguish between two questions: is the fiscal cost of public pensions a problem; and would a move toward funding be beneficial? These are separate questions, requiring separate answers. If a public pension is running a deficit that is regarded as unsustainable, the only solution is to make it sustainable by increasing contributions, reducing benefits, or both. In contrast, if there are potential gains from funding, a move in that direction may be sound policy even where the fiscal costs of a public pension are sustainable.

A move from PAYG towards mandatory funding may or may not be welfare improving. Whether a move towards funding raises welfare depends on how the change in pension system is designed and on country specifics. However, all countries should bear in mind the following conclusions.

1) Explicit public debt is not equivalent to implicit pension debt, since the politics of changing the real values of the two debts are different, and bond markets understandably treat them differently.

2) Funding can be organized in a variety of ways, both with and without funded individual accounts. It is possible to have funding without individual accounts, for example through a central trust fund, as in Sweden or Canada, or, conversely to have individual accounts without funding, through a system of notional accounts.

3) A move to funding generally has major fiscal costs. In a PAYG system the contributions of younger workers pay the pensions of older people. But if a country moves to a funded system, the contributions of younger workers will instead go into their individual accounts and so the pensions of retired people must come from some other source: higher taxation, or a reduction in an existing budget surplus, or additional government borrowing, or reductions in spending on other government programs. Thus a move toward funding generally imposes an added burden on today's workers, who have to pay not only their own contributions but also some or all of the taxes that finance current pensions.

One way to spread (but not eliminate) the fiscal costs of the transition is to phase funded pensions in gradually. A country that wants to introduce individual accounts but cannot absorb the fiscal costs of transition, or where institutions are not yet strong enough to support mandatory funded accounts, has the option of introducing mandatory notional defined-contribution pensions, supplemented by voluntary funded accounts. This approach maintains the structure of individual accounts but avoids the additional fiscal and administrative burdens of funding; it also keeps open the option of phasing in funding at a later stage. The strategy is applicable to China (and was the recommendation of Asher et al.

2005), and potentially to other countries where mandatory funding might be premature or might have been adopted prematurely.

Given these fiscal costs, analysis needs to take account of the costs of moving from one steady state to another; it is mistaken simply to compare steady states before and after. The analysis also needs to consider differences in risk and differences in administrative costs.

4) There is no automatic relationship between funding and growth. Funding will raise the rate of economic growth if it increases saving or improves the efficiency with which saving is channelled into investment. This may or may not be the case:

- Financing increased funds by issuing debt may not increase saving; increased mandatory pension saving may be largely offset by declines in other saving; and funding may not be good policy if the saving rate is already high (for example, China).
- Formal capital markets may or may not allocate funds to investment more effectively than informal capital markets. Gains in the effectiveness of capital markets are possible but depend on effective administration and on political support for improved regulation of financial markets.

Thus funding may increase national saving, or it may increase explicit public debt, or some of each; and it may improve the operation of capital markets. Either is possible; neither is inevitable. The economic case for funding has to be analyzed in each country.

A related point is that funding is not an automatic solution to demographic problems; rather, its helpfulness is contingent on whether it has beneficial effects on growth (see also Barr, 2002, Myths 1-3). Without additional resources, longer lives require either later retirement or reduced monthly benefits, however they are financed.

5) A move to funding has intergenerational effects. If funding is to raise output growth in the future, it has to increase saving today. But for saving to increase, there must be a decline in consumption – by government, or today's workers, or today's retirees, or a mix. Thus a move to funding generally imposes a burden on today's generations to the benefit of future generations. Depending on country specifics, this may or may not be sound policy. More generally, introducing a new PAYG system allows the early cohorts to receive larger pensions than if the new system were fully funded. As noted earlier, therefore, any choice among PAYG, partial funding, and full funding is also and necessarily a choice about the intergenerational distribution of income and of risks. Hence, even if funding does increase output, the change cannot be presented as a Pareto improvement.

2.3 Implementation

Do not ignore fiscal capacity. Spending on pensions must be compatible with a country's ability to finance the consumption of retirees, the investment from which future economic growth derives, and the government's ability to raise revenues. Policy that ignores the fiscal costs of a move towards funding will run into problems. China, for example, is facing the problem of "empty accounts", as local governments often used the contributions of workers to their individual accounts to finance deficits in the PAYG pension, replenishing the account with IOUs, which are, in effect, government bonds.

Government is an essential participant in any pension system. All pension systems depend critically on public sector technical capacity. With PAYG systems this includes the ability to collect taxes and contributions, to keep track for many years of the contributions of workers who are mobile and who may change names, and to project future contributions and benefits with reasonable accuracy.

It is a fundamental error to suppose that private pensions get government out of the pensions business. Given the major market imperfections discussed in Boxes 2 and 3, purely private arrangements for insurance and consumption smoothing will be either inefficient or nonexistent. Thus government has a major role in pensions, whatever the specific arrangements. Government must be able to enforce compliance with contribution conditions, to maintain macroeconomic stability (and systemic stability more broadly), and to ensure effective regulation and supervision of pension plans and financial markets, including the annuities market. Such regulation is vital to protect individuals in areas too complex for them to protect themselves. More generally, private markets function best when government has put in place good, clear rules and where enforcement is even-handed, honest, prompt, and predictable.

Private sector capacity is essential for private pensions. Alongside government capacity, private pensions also require considerable private sector capacity. Administrative tasks include the ability to collect contributions, to keep individual records over long periods, to inform workers about their accumulations and expected benefits, and to determine and pay benefits. Financial tasks include the ability to manage large investment portfolios.

The capacity of consumers is important. Participants in pension arrangements need to be educated about what they can expect at retirement and about how to think about the choices they can make. This task, difficult enough in developed countries, is even harder in an economy where most workers have no experience in making such financial decisions. More generally,

consumer choice faces both information problems (Box 2) and problems over decision making (Box 3).

Implementation matters. Policy design that exceeds a country's capacity to implement it is bad policy design. Effective reform requires much more than good design; rather, it rests on a tripod of abilities: policy design, political implementation, and administrative implementation. The importance of implementation is often underestimated. It requires skills that are just as demanding as policy design, and those skills need to be involved when the policy is designed, not as an afterthought. Policy makers and advisers frequently take an unduly optimistic view of the extent to which a country meets the preconditions for effective reform.

Individual funded accounts require financial institutions that are effective enough that the added weight of pension business will further strengthen them. Yet "the Bank persistently encouraged countries such as Ukraine and Russia to institute multi-pillar reforms even when financial sector conditions were weak" (World Bank 2006a, p. 56); it also encouraged such reforms in countries with poor corruption indexes (World Bank 2006a, Figure 3.5).

Insufficient weight may be given to the administrative costs of individual accounts, costs that are significant even in large, developed countries with long-established systems, and considerably higher for small accounts in small countries starting a new system. For example, a charge of one percent of assets each year over a 40 year career reduces accumulations by nearly 20 percent at retirement.

The administrative capacity of government is also important, yet, '...the limited quality of civil records in Bolivia allowed people to change their age and even to invent beneficiaries of the...program. Second, the...state did not have a bureaucracy in place that was capable of actually distributing the Bonosol [pension benefit] to the elderly, many of whom had to travel from the countryside on foot to collect the benefit in person' (Valdés-Prieto 2007, para. 3.61).

Problems arise also in developed economies. Pensions were missold in the United Kingdom. Problems arise with regulating private defined-benefit plans. When a firm or industry with an inadequately funded defined-benefit pension gets into financial trouble, its workers and retirees lose some or all of the pension they were expecting. Countries have responded in a range of ways, including government-provided guarantees and the imposition of funding requirements. The former create a risk of moral hazard. The latter can also create problems, since this type of demand on a firm's revenue typically comes at precisely the time

when the firm is experiencing low profitability: low profitability and declining asset values are highly correlated.

Thus, policies designed to ensure the long-run stability of defined-benefit plans face an inherent tension: too little regulation leaves workers with inadequate protection, but too much imposes excessive costs on plan sponsors, often at inopportune times, leading to withdrawal of the plans, at least for new members. Given this tension it is worth considering whether employer-provided defined-contribution plans in place of employer-provided defined-benefit plans for new hires, provided they are well-structured and well-regulated, might improve the social outcome.¹³ And countries that do not have defined benefit plans are probably wise not to encourage them through tax concessions.

Voluntary pensions have an important role. The balance between mandatory and voluntary pensions must strike a balance between, on the one hand, the inefficiencies that arise from a uniform mandate that takes incomplete account of differences in preferences and individual constraints, and on the other, the gaps that arise if the mandatory system is small. Secondly, voluntary pensions can provide consumption smoothing in countries which wish to have some funding but do not have the fiscal or institutional capacity to warrant a mandate.

2.4 Pension design and economic development

The discussion in this section is not about optimal design, but about what limits on policy choices make sense for countries at different levels of development.

We illustrate implementation in terms of three stylized types of country: a low-income developing country, a middle-income developing country, and a developed country. Actual countries may occupy intermediate positions and mixed positions for different parts of the economy. The discussion here uses the conventional terms of first-tier pensions (aimed primarily at poverty relief), second-tier pensions (mandatory, intended to strengthen consumption smoothing), and third-tier pensions (voluntary at the level of the firm or the individual, subject to regulation and perhaps tax favoured, to accommodate differences in individual preferences).

The examples below are intended only as illustrations; *they should not be taken as a template*. A country's administrative capacity may have some parts that are typical of middle-income countries and others at a level more commonly found in low-income countries. Fiscal constraints may call for different systems for different sectors or forms of employment: for

¹³ Changing arrangements for existing workers can disrupt expectations in ways that may be unsatisfactory.

example, a middle-income country may have a formal system for urban areas and a simpler one (or none) for rural areas. Similarly, a system designed for civil servants may differ from one designed for an entire country. Once there is a national system, civil servants should be part of it, typically with a supplemental pension; large private firms may have a similar arrangement.

All the examples are based on the following assumptions:

- that the parameters of the system (such as benefit levels and the age at which a pension is first awarded) are consistent with fiscal sustainability, and
- that, alongside pensions, all countries with the necessary administrative capacity provide some degree of means-tested support for the elderly.

We cite countries that have particular institutions of the type we describe while such countries are not necessarily in the income-category being described.

Illustrative pension systems for a low-income country

First tier. The choice is highly constrained:

- A very poor country may be unable to finance or organize a national system of poverty relief, relying instead on family, charitable organizations, and local government.
- As capacity allows, it becomes possible to use general revenue for limited poverty relief, through transfers to local governments or through a national system that targets by age.

A country at a low level of development—typically with a large informal sector and substantial household production—will generally not have the capacity to administer an income test. A system of local discretion may be able to do so in an approximate way.

Second tier. A country at this level of development will generally not have the capacity to manage a mandatory earnings-related system, which requires, among other things, enforcing contributions and measuring and recording a person's income over forty years or more. Such countries should leave such a system as an agenda item for the future.

Third tier. Any voluntary saving plans operating in the country should not be tax favoured, since fiscal resources are highly constrained, and tax advantages are typically regressive. Nevertheless, provision of a simple, reliable opportunity for voluntary savings is important.

Illustrative pension systems for a middle-income country

First tier. Countries in this category have a choice of

- a noncontributory, tax-financed pension (as in Australia, the Netherlands, New Zealand, South Africa and, from 2008, Chile); or
- a simple contributory PAYG pension, for example a flat-rate pension based on years of contributions (such as the basic state pension in the United Kingdom or Old Age Security in Canada).

Second tier. The choice is between

- a publicly organized, 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.

If there is a contributory first-tier pension, these can be separate from it or integrated.

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

Third tier. Voluntary, defined-contribution pensions at the level of the firm or the individual are possible; regulation is important, and any tax favouring should be designed to avoid excessive regressivity. Tax-favouring should not extend to new defined benefit plans.

Options for pension systems in a developed country

First tier. Countries should consider either

- a noncontributory, tax-financed pension, as above; or
- a contributory pension aimed at poverty relief (used in many countries, including the United Kingdom and United States), with any of an array of different designs.

Second tier. The menu includes (separately or in combination)

- a publicly organized, defined-benefit pension, as above;
- an NDC system (as in Sweden);
- an administratively cheap savings plan with access to annuities (like the Thrift Savings Plan for federal government employees in the United States);
- mandatory, funded, defined-benefit pensions sponsored by industry (the de facto system in the Netherlands); or
- funded, defined-contribution pensions (as in Chile and Sweden), possibly including an antipoverty element (as in Mexico).

Third tier. Voluntary, defined-contribution pensions can be organized at the level of the firm, the industry or the individual; regulation (particularly of the funding 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 country:

- should not set up a system beyond its financial and administrative capability;
- should not introduce a mandatory, earnings-related pension system until it has a robust capacity to keep records accurately over forty or more years; and
- should not introduce individual funded accounts (whether mandatory or as an option in a mandatory system) until it can regulate investment, accumulation, and annuitisation.

It is clear that a developed country has a full range of choices. Thus it is not surprising that the richer countries have very different systems one from another. But the fact that the range of options is not greatly constrained by issues of feasibility should not be misinterpreted: that a country is capable of implementing an administratively demanding plan does not mean that such a plan is a good idea or that it is necessarily superior to a less administratively demanding system. New Zealand has a simple pension system through choice, not constraint.

3 Messages for policy makers

Core arguments

- The roots of the problems of pension finance are long-run trends, not a short-run 'crisis'.
- Pension systems have multiple purposes, diverse institutions, diverse histories, diverse politics and diverse constraints.
- Thus there is no single best system. Pension systems differ widely. This is as it should be.
- Options widen as capacity constraints relax. But, as discussed in Box 3, even in the most advanced economies there are benefits from keeping choices simple.
- Advice about pension reform needs understanding of the underlying principles. There is room for disagreement about choice between sensible strategies; there is wide agreement on some aspects of what makes bad policies.
- Examples of bad policies include staying too long with an unsustainable system; prematurely adopting a system that exceeds implementation capacity (Barr and Diamond 2008, chs 14 and 15 argue that the introduction of mandatory funded

individual accounts in China in 1998 is an example); and incorporating excessive implicit taxes – many countries have systems where benefits rise insufficiently in response to later retirement.

The main solutions to problems of paying for pensions. In responding to long-run trends, any improvement to the finances of a pension system must involve one or more of

- higher contribution rates,
- lower benefits,
- later retirement at the same benefit,
- policies, such as increased saving, designed to increase national output.

That statement remains true whatever the degree of funding.

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