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A CRISIS OF LONGER LIFE: REFORMING PENSION SYSTEMS

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ABSTRACT

Social security pension schemes around the world are facing a number of problems, of which demographic ageing is the most commonly discussed. This paper provides an overview of expected future demographic developments in European Union and some other OECD countries, and evaluates some of the range of solutions which have been, or are being, considered to address this and other problems facing social security in the late 1990s, drawing on examples from OECD countries, from Latin America and from central and eastern Europe. Consideration is given to the possibilities for increasing the level of funding in social security pension schemes or developing funded complementary pension schemes.

KEYWORDS

Pensions; Social Security; Demography; Funding; Savings

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1. DEMOGRAPHIC AGEING

1.1 Social security pension schemes around the world have been coming under increasing pressure as a result of a combination of factors, foremost amongst which is the expected demographic ageing of the population. In many countries the increasing demographic imbalance will be exacerbated by the maturing of the provisions of social security schemes which have been set up, or significantly improved, in the last 20 or 30 years. Social security legislation appears, sometimes, to have been introduced without adequate consideration being given to the longer-term consequences. (There are important exceptions to this, including the United Kingdom, Canada and the United States of America, where there is a tradition of long-term financial projections by the Government Actuary (or similar person).)

1.2 The rather rapid ageing of the population which is anticipated in most OECD countries over the next 40 to 50 years results from a combination of factors. Principal amongst these are falling levels of childbearing and increasing

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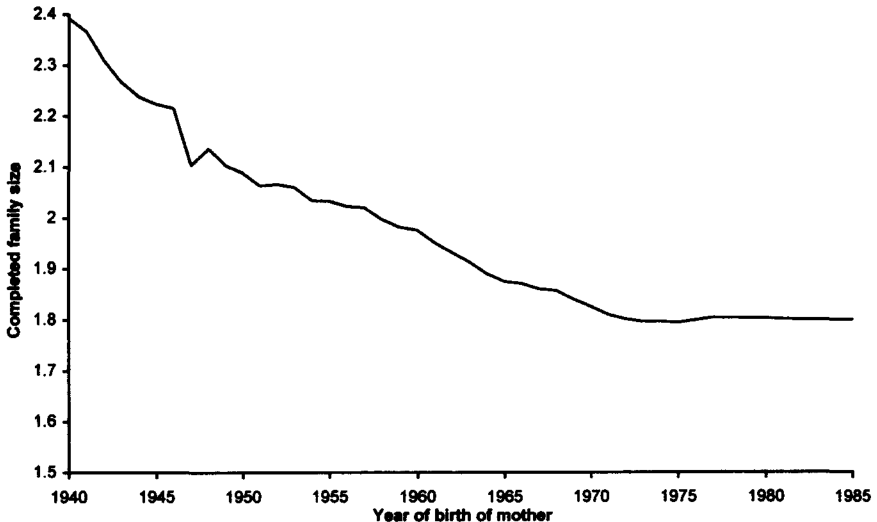

Figure 1. Actual and projected completed family size, U.K.

expectations of life. Some other features of particular countries' demographic structures derive from past fluctuations in fertility or migration and the impact of two world wars (for example the post-war baby boom in most OECD countries, and the absence of any prolonged baby boom in Japan, where fertility fell sharply from 1950 onwards). The result is a trend towards worsening old-age dependency ratios, i.e. a reducing number of people at the active working ages supporting each person over retirement age.

1.3 Figure 1 shows the build-up of average achieved family size in the U.K. for cohorts of women born from 1940 to 1978. Average completed family size can be seen to have fallen from 2.4 for women born in 1940, and is now expected to be around 1.8 for women born in the 1970s and later. (The official 1996-based national population projections assume total period fertility rates of 1.8 from 2006 onwards for the U.K. This implies that the average completed family size will continue to decline until around the cohort born in 1975, and eventually level off at 1.80 children per woman.)

1.4 Another indicator of fertility levels, which is more readily available for comparisons between countries, is the total period fertility rate (TPFR), which is derived as the sum of individual age-specific fertility rates in the year in question. This is not ideal as a proxy for average completed family size, as some of the fluctuations may result purely from changes in the timing of fertility choices. However, the strong downwards trend of TPFRs in most OECD countries over the last 30 or more years is associated, not only with a shift towards later childbearing, but also with a corresponding reduction in average completed

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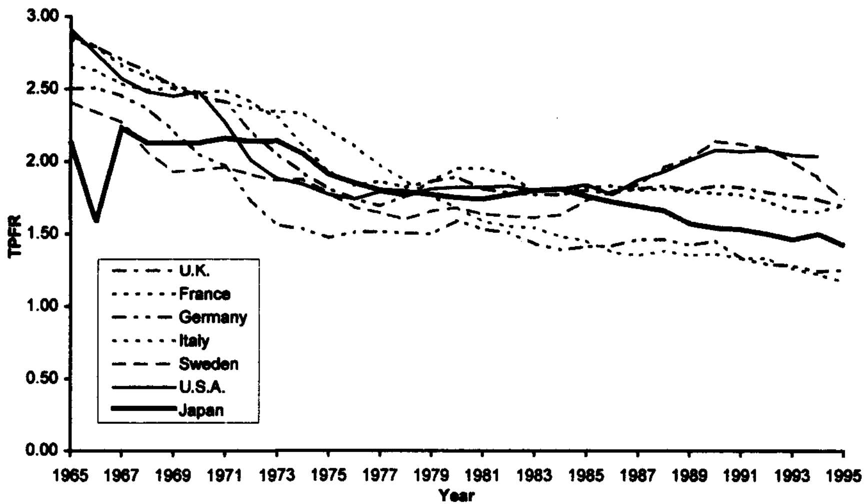

Figure 2. Total period fertility rates for selected countries, 1965 to 1995

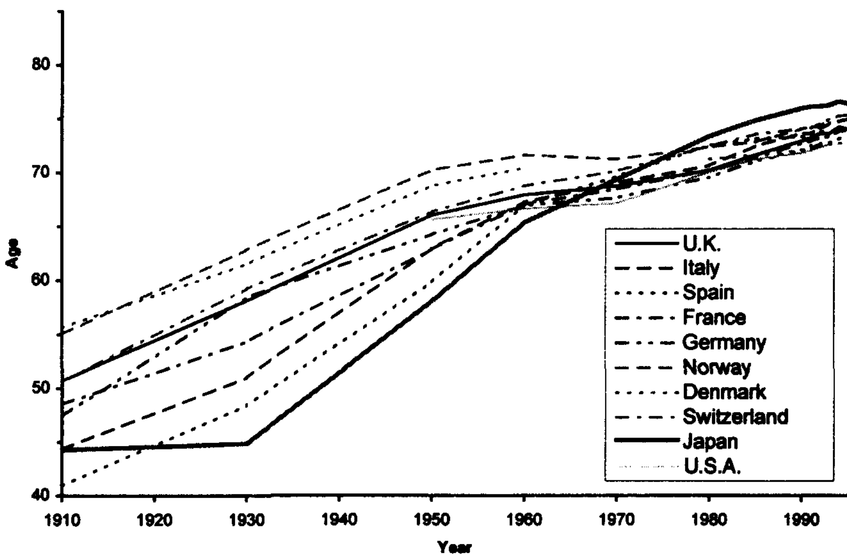

Figure 3. Expectation of life, males, 1910-1995

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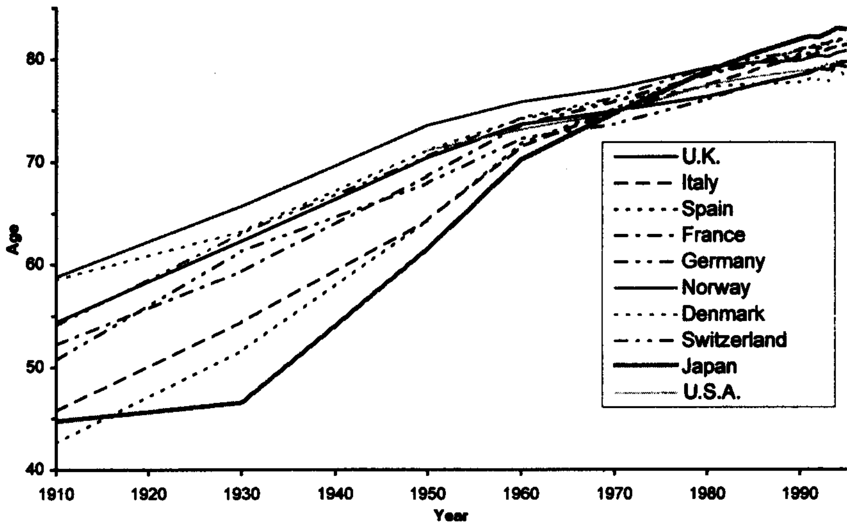

Figure 4. Expectation of life, females, 1910-1995

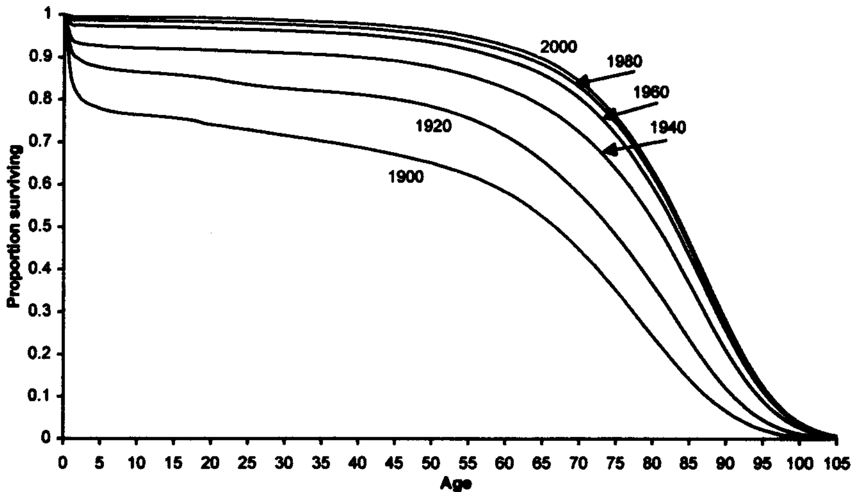

Figure 5. Proportion of persons surviving to successive ages according to mortality rates for given cohort, U.K.

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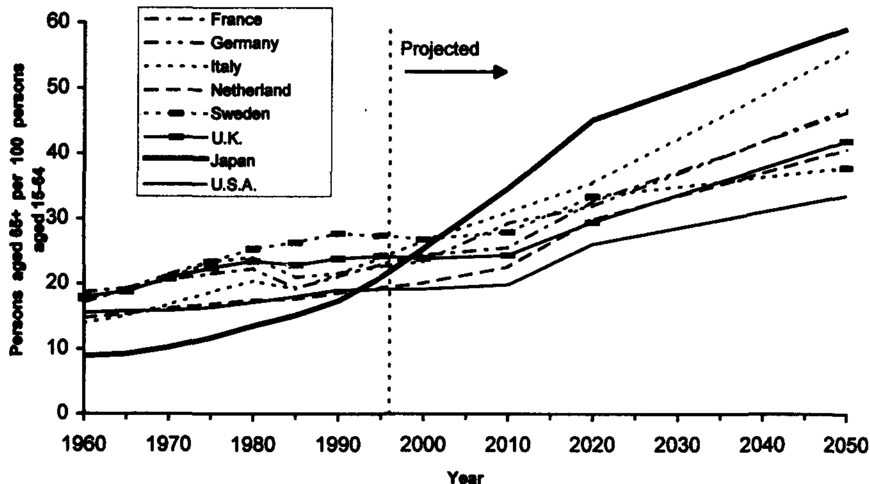

Figure 6. Old age dependency ratios, 1960-2050

family size for successive generations of women, as can be readily demonstrated for countries which have the statistics available in suitable form. The movements of TPFRs are illustrated for a selection of OECD countries in Figure 2.

1.5 The increase in expectation of life in the U.K., as measured by period mortality rates, is well known to actuaries (Daykin, 1996b). Figures 3 and 4 show the increases in expectation of life for different OECD countries, illustrating the significant convergence of values which has occurred. Figure 5 presents this information for the U.K. in terms of cohort survival curves. Of the generation born in 1900, 50% survived to age 67 and only about 6% to age 90. Projected mortality for the 1996-based official national population projections implies that 50% of the generation born in 1980 will survive to age 83 and over 25% to age 90.

1.6 As a result of these marked changes in the underlying demographic parameters, the number of older people can be expected to increase steadily in virtually every country, whilst the total population will, at least in the case of OECD countries, not increase so rapidly, and will, in many cases, soon reach a peak and begin to decline. Many OECD countries can expect to see the population at working ages beginning to decline soon after 2010 (earlier in Japan). This will have a marked effect on the so-called old age dependency ratio. This represents the ratio of the numbers in the population over the normal age of retirement to the numbers in the population at working ages (essentially from the normal school leaver age to normal retirement age). Figure 6 shows the trend in a stylised old-age dependency ratio in a number of OECD countries. This is taken, for ease of calculation and comparison, as the ratio of the numbers in the population aged 65

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and over to the numbers aged 15 and over, but under 65, regardless of actual retirement ages, school-leaving age, economic activity rates, etc.

2. Alternative Models of Pension Provision

2.1 In order to place the U.K. and Irish pension arrangements in a wider international context, it is worth reflecting briefly on some of the alternative models which have been adopted for pension provision in different countries, either by grand design, or, perhaps more commonly, by a process of evolution. It is customary to describe pension systems in terms of four pillars: the first pillar is social security; the second complementary pension schemes; the third individual saving; and the fourth continued earnings in retirement.

2.2 The model which is seen in southern Europe (especially in Italy, Greece, Spain and Portugal) and, until recently, in the countries of central and eastern Europe (including Austria) assumes that first pillar social security will take care of most of the needs for income in retirement, and in the event of other contingencies, such as death or disability. Social security benefits are earnings-related, up to quite a high earnings ceiling, and usually reflect earnings towards the end of the individual's career. Because of the generally high level of benefits, typically revalued in line with earnings in the economy, private second pillar provision is unnecessary, and is consequently not much in evidence, except, perhaps, for very senior executives. Social security schemes are invariably financed on a pay-as-you-go (PAYG) basis, and there is generally only a very small market in funded private pensions and annuities.

2.3 Some other continental European countries have similar PAYG earnings-related social security schemes, but at a less ambitious level. In Germany social security benefits are set at a level which encourages employers to establish occupational pension arrangements, which are typically designed to integrate with the social security benefits to provide an adequate income in total. The occupational pension arrangements, however, are mostly pension promises which employers support through establishing tax-allowable book reserves on their balance sheets. These could be seen as company-based PAYG schemes, or, alternatively, and perhaps more accurately, as funded occupational pension schemes with 100% investment in the company itself.

2.4 Because there is an obvious risk to the security of members' pension rights if the employer gets into financial difficulties, German companies operating book reserve pension arrangements pay annual premiums to an insolvency scheme (which they collectively own), which will underwrite vested pension rights if an employer's insolvency leaves them uncovered (incidentally, only those who have been members of a pension arrangement for 10 years or more usually have any vested rights). It appears that there is an increasing trend in Germany to make external investments to back the accounting provisions, although tax and supervisory regulations are not supportive of the trust fund approach adopted in common law countries.

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2.5 The French second pillar complementary pension schemes are PAYG, operated on an industry-wide basis rather than company by company. Security against employers going out of business is, therefore, provided by solidarity across the industry, and, sometimes, when whole industries are in decline, by transfers between industries. Since membership in a complementary scheme is obligatory, and most schemes now operate to one of two common frameworks, the effect is much the same as having a fully public PAYG system, although the institutions which administer it are autonomous non-governmental bodies. In France this is seen as being significantly different from having a national social security system run by a government agency, although the difference may be less obvious to observers from outside France. The complementary schemes are designed as defined contribution schemes, although financed on a PAYG basis, and, historically, probably seen by many people as providing earnings-related benefits.

2.6 Contributions made to the schemes qualify the member for points, which are accumulated, and then turned into equivalent pension values at retirement. The real value of the point was intended to be maintained by revaluation in line with earnings growth, but this has not been the case recently. As the contributions are not invested there is no 'market risk', as is commonly associated with defined contributions schemes, although there is a risk that adjustments to the indexation process will produce benefits less than are expected by contributors.

2.7 The revaluation process enables the schemes to continue to balance income and outgo, even in the face of demographic ageing. Another device has been to charge supplementary contributions which do not give entitlement to pension points. Private funded pensions have been very rare in France. Some senior executives receive supplementary company benefits, but these are not generally pre-funded, with a lump sum being paid at retirement only if the executive remains in service until retirement age. A new law (La Loi Thomas) on funded pensions was introduced in the last days of the previous government in France, but this has not been implemented by the current government, and the future for funded complementary schemes remains uncertain. (A wide-ranging review of pension arrangements has recently been initiated.)

2.8 Finland has a limited number of earnings-related complementary schemes, with everyone required to join one of them. It is a partially-funded system, with PAYG pooling of the indexation of benefits. Although book reserving is not permitted, employers may borrow from their pension funds, which gives rise to a security risk to pension scheme members similar to that which arises with book reserves, and there is, therefore, a compulsory credit insurance requirement to cover the loan-backs.

2.9 Another model is seen in Denmark, where the main first pillar social security pension is flat rate (independent of earnings) and non-contributory. Eligibility is based on residence, and the system is financed out of general taxation. Those in employment are expected to have a funded private pension. These are negotiated industry by industry, and are usually mandatory as part of

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collective bargaining agreements. Most of them are defined contribution arrangements, financed through specialised pension insurance companies.

2.10 The Netherlands and Ireland also have flat-rate social security benefits, but based on contributions and set at a moderate level to provide a safety net. Funded occupational pension schemes are widespread, mostly on a defined benefits basis.

2.11 The U.S.A. is similar, except that the first pillar social security scheme is earnings related, albeit at a relatively modest level of benefits. Canada has both a flat-rate residence-based minimum pension and a contributory earnings-related social security scheme, but it is common for there to be an occupational scheme to top up the level of benefits to a more satisfactory level.

2.12 In the U.K. the first pillar is the flat-rate basic pension. The second pillar is a mixture of public and private, although compulsory for all employed persons. Everyone with earnings from employment in the relevant band is a member of the State Earnings-Related Scheme (SERPS), unless they are contracted out of it. Contracting out may be through a defined benefit or defined contribution occupational pension scheme or through a defined contribution personal pension. Those who are contracted out receive a contribution rebate on the standard social security contribution, to help finance their funded complementary arrangement. Either occupational or personal pensions are available to provide benefits above the obligatory level.

2.13 Japan has a somewhat similar system to the U.K., with contracting out of the earnings-related social security benefits through defined benefit occupational pension schemes. Defined contribution schemes and, in particular, personal pensions, are not so common in Japan, and are not available as a vehicle for contracting out.

2.14 A further model is seen in Australia, where the basic pension is universal (non-contributory), but means-tested (on both income and wealth). The second pillar is characterised by a mandatory level of contribution to a private funded arrangement, either through an occupational pension scheme or through a personal pension. Defined benefit schemes have tended to disappear since the mandatory level of defined contributions was introduced, and good progress has been made on developing efficient low-cost delivery of personal pensions.

2.15 Switzerland also has a mandatory requirement to make contributions to a funded second pillar pension, but this is built on top of a contributory basic social security scheme.

2.16 A number of countries have historically operated national schemes based on defined contributions, known as national provident funds. Singapore and Malaysia are among the most successful of these. Everyone in formal employment is required to contribute a fixed percentage of earnings, and the contributions are accumulated, usually by the addition of interest each year (a savings account similar to the U.K. insurance contracts known as deposit administration), to provide a lump sum at retirement age. Sometimes an annuity facility is also offered. Not all of these provident funds have operated

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satisfactorily; in some cases high administrative costs have been a problem, and returns have failed to keep pace with inflation because of inadequate investment returns. The provident funds in Singapore and Malaysia are based on a single centralised investment fund. However, elsewhere (e.g. in India) the provident funds are operated by employers.

2.17 New provident fund legislation has recently been passed in Hong Kong. Contributions at 5% each for employers and employees are mandatory, but there will be a variety of providers, including employer-sponsored schemes, industry-wide schemes and open funds. Provident funds can be seen as the forerunners of the mandatory individual account pension systems which were pioneered by Chile in 1981, and which have now become the predominant system in South and Central America. Indeed, recent provident funds, like that in Hong Kong, are very similar to these. These developments are described in more detail in Section 8.

3. Unfunded Liabilities

3.1 Apart from the demographic pressures on social security pension schemes, there are a number of other factors which are driving the need for reform. Some of these are political or philosophical, relating to the role of welfare and the respective role of individual responsibility and community solidarity. Other issues are economic, such as whether PAYG systems discourage saving.

3.2 A number of commentators have drawn attention to the size of the unfunded liabilities of public pension systems in OECD countries (Roseveare *et al.*, 1996; Chand & Jaeger, 1996; Franco & Munzi, 1996; Kune, 1996; Social Security Committee, 1996). The existence of unfunded liabilities is inevitably a feature of the predominantly PAYG method of financing social security schemes. Furthermore, the liabilities relate to a stream of payments far out into the future, against which there is a reasonable expectation of continuing contribution income. The underlying principle is that the pensions for each generation of pensioners can be financed by the contributions of succeeding generations of workers.

3.3 The substantial present value of these accrued liabilities for future benefit payments should only be a cause for concern if:

(a) the scheme is likely to be discontinued, with the contribution income ceasing;
(b) the present contribution rates would be sufficient, but are not sustainable; or
(c) the present contribution rates will not be sufficient and the increases necessary to maintain the system in balance on a PAYG basis are greater than can realistically be contemplated.

Unfortunately, the last of these may well be the case in a number of countries.

3.4 Table 1 shows the present value of unfunded liabilities for a number of countries from Roseveare *et al.* (1996), expressed as a percentage of gross domestic product (GDP) in 1994. These particular figures assume future real

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Table 1. Net present value of public pension schemes as a percentage of 1994 GDP

	Discount rate assumption		
	3%	5%	7%
Australia	–181	–97	–61
Austria	–188	–93	–52
Belgium	–282	–153	–97
Canada	–192	–101	–61
Denmark	–416	–235	–153
Finland	–181	–65	–18
France	–198	–102	–62
Germany	–134	–62	–32
Iceland	–138	–66	–38
Ireland	–28	–18	–13
Italy	–131	–60	–31
Japan	–189	–70	–20
Netherlands	–124	–53	–25
New Zealand	–401	–213	–133
Norway	–254	–124	–70
Portugal	–234	–109	–59
Spain	–220	–109	–63
Sweden	–273	–150	–96
United Kingdom	–36	–24	–16
United States of America	–69	–23	–6

Source: Roseveare *et al.* (1996)

Notes:
1. These are the net present values of employee and employer contributions less pensions paid until 2070, plus existing assets.
2. Productivity growth is assumed to be 1.5% a year.
3. All economies are assumed to have returned to their medium-term growth path and there is no cyclical unemployment.
4. Participation rates are assumed to remain constant.
5. As far as possible all legislated reforms to date have been taken into account.
6. The scenarios for the Netherlands do not take account of recent changes to the widows' and orphans' scheme, which are estimated to reduce expenditure by 4%.

economic growth at 1.5% p.a.. The original paper also shows figures assuming real growth of 1% p.a. and 2% p.a., but the figures are not as sensitive to this assumption as to the discount rate, the effect of which is shown in Table 1. Legislation and policies are assumed to remain unchanged, and contributions are assumed held at current levels, which, in some cases, is not a very realistic scenario.

3.5 These figures have been quoted in support of arguments that the U.K. should not join the European Monetary Union (Social Security Committee, 1996; Stein, 1997), since, it is alleged, an explicit or implicit consequence of a single currency could be that the U.K. will end up shouldering a share of other countries' much larger unfunded pension liabilities. However, in our view these

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Table 2. Sustainable contribution rates and contribution gaps(in percent of GDP)

	Projected contribution rate in 1995	Sustainable contribution rate 1995–2050	Contribution gap
Major industrial countries	6.5	8.3	1.8
Canada	3.8	5.8	2.0
France	12.1	15.4	3.3
Germany	10.3	13.7	3.4
Italy	16.0	18.5	2.5
Japan	3.9	7.2	3.3
Sweden	7.1	8.0	0.9
United Kingdom	4.2	4.3	0.1
United States of America	4.7	5.5	0.8

Source: Chand & Jaeger (1996)

Notes:
1. Contribution rates include net budget transfers.
2. The sustainable contribution rate is defined as the constant contribution rate over 1995-2050 that equalises the net asset position in 2050 with the initial asset position in 1995.
3. The contribution gap is defined as the difference between the sustainable contribution rate and the projected contribution rate in 1995.

figures do not give a clear idea of how difficult it may be to sustain the system in future. The differences reflect different approaches to financing. For example, Denmark appears very high, but this is because the Danish social security is largely tax-financed, so the whole future liability is registered without the offsetting value of future contributions (or tax). The U.K. and the U.S.A. are very low, because social security benefits are at a relatively modest level, and the contribution schedule (assumed to remain at current levels for the U.K. and increasing in line with existing legislative provisions for the U.S.A.) is close to that required to meet the liabilities on a PAYG basis. Although this appears to be a satisfactory position, in the U.K. at least, the discussion is now about whether the resulting pension levels are too low to make this a sustainable policy.

3.6 Table 2, which shows figures from Chand & Jaeger (1996), provides an alternative perspective, highlighting the shortfall in contributions required to meet outgo on a PAYG basis over the period 1995 to 2050, as compared to 1995 contribution levels. On this basis, the U.K. is clearly particularly well placed. Some other countries will need to increase contributions by 3% of GDP, on average, over this period, which certainly represents a significant extra burden.

3.7 A comprehensive analysis of social security cost projections can be found in Franco & Munzi (1996), based on projections carried out within each country, either as part of a regular programme, such as the *Quinquennial Reviews* in the U.K. (Government Actuary, 1995), or on an *ad hoc* basis, in the context of considering the need for pension reform. This wide-ranging study provides some sensitivity analysis, shows the impact of reforms already carried out, and gives pointers to where further reforms are likely to be needed.

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4. OPTIONS FOR REFORM

4.1 In the light of these pressures, changes to pension systems may take a variety of forms, some of which may be politically more difficult to implement than others. In most cases an effective reform will require a number of different elements. One response to increasing costs of pensions on a PAYG basis could be simply to increase the level of contributions as required. Whilst some increases may be possible, particularly for less mature schemes such as those in Canada and the U.S.A., many schemes are already close to the limit of what seems to be regarded as politically acceptable.

4.2 Contributions from employees and employers could, in principle, be kept down by increasing, or introducing, government subsidies from general revenue. However, such subsidies would generally require increases in taxation or government borrowing, and few countries could contemplate this approach on any major scale for a sustained period.

4.3 The U.S.A. and, under recently announced changes, Canada are charging contributions greater than currently required on a pure PAYG basis. These will be used to build up a larger fund, which can be drawn down in later years when benefit outgo exceeds contribution income, thus avoiding unacceptably large increases in contributions in the future. This approach raises a number of questions regarding the investment strategy with respect to the accumulating funds. Investing purely in government securities may be felt to create little more than a presentational effect. If the government charges higher contributions than are necessary on a PAYG basis and then borrows from the social security scheme to fund its deficit, the effect is much the same as operating the scheme on strict PAYG principles and raising taxes (subject to possibly different redistributional effects). Allowing a nationally controlled social security scheme to invest substantially in equity markets, on the other hand, raises questions about political control or influence, and the funds could grow to an enormous size. For this approach to work, it is probably necessary to split up the fund and devolve the investment decision making to a number of competing private sector investment managers.

4.4 A variety of approaches have been taken to reducing the cost of benefits. In the end these nearly all come down to reductions in the benefits receivable, the only alternative being to reduce the administrative costs of delivering the benefits. However, the scope for savings in administrative expenses is usually quite limited, since in most schemes they already represent a small part of the total cost.

4.5 Reductions in benefits are likely to be politically controversial, although many countries have discovered ways of doing this which are less overt, and consequently inspire less of a popular reaction, although effective, at least over time, in controlling costs. A number of countries have tackled the indexation provisions of pensions in payment, since this can make significant savings over time, but in a relatively unobtrusive way. In OECD countries the change has usually been away from full revaluation in line with movements in gross earnings

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to price indexation (as in the U.K. from 1980 onwards), to indexation in line with movements in earnings net of tax and social security contributions (as in Germany), or to dynamism at an average of price and earnings movements (as in Jersey and Hungary).

4.6 Some countries have made explicit reductions in rates of accrual, especially for future service, or increased the requirements to qualify for a full pension (or indeed for a pension at all), such as the reining in of the generous seniority pension provisions in Italy as part of the recent reforms. Tighter controls on the award of disability pensions and lessening incentives to take early retirement may also be considered.

4.7 In the countries of central and eastern Europe, one of the priorities for reform has been to remove the special benefit privileges of certain population groups, so as to provide a uniform scale of benefits to all members. Care can be taken of any perceived need for special treatment in particular fields of employment through tailored occupational arrangements, paid for directly by the employer.

4.8 Many countries have effected, or are planning, increases in retirement age. This reduces the costs of providing pension benefits and, potentially at least, increases contribution income. Full realisation of the beneficial effects on contribution income depends on the extent to which such older individuals remain in employment or self-employment. Some of the changes have been designed to remove inequalities between the sexes. In the U.K. the retirement age for females will be increased from 60 to 65, starting with those due to retire in 2010, and completing the process in 2020, in order to bring the retirement age for females into line with that for males.

4.9 Germany is increasing the minimum age at which pension benefits may be taken, from 63 to 65 for males (over the years 2001 to 2009) and from 60 to 65 for females (over the years 2001 to 2018). Portugal is increasing the retirement age for females from 62 up to 65, the same as that for males, by 2000. Switzerland is increasing the female retirement age from 60 to 62 (male retirement age remains at 65). Italy, currently, has one of the lowest retirement ages, at 55 for males and 50 for females, but will increase both to 60 by 2001, and thereafter up to 65. In the U.S.A. the age at which an unreduced pension is payable is to be increased from 65 to 67 by 2022. Reduced pensions will continue to be available from age 62, with the proportionate reduction going up as the pivotal retirement age increases. A proposal has now been brought forward to raise the age for a full pension to 70. Japan is raising retirement age from 60 to 65, by 2014 for males and by 2019 for females.

4.10 In Ireland, concern has been more about the inadequacy of provision for certain sectors of the population, and recent proposals from the Pensions Board would aim to strengthen the first pillar Social Welfare pension by raising it to 34% of average industrial earnings and then maintaining its real value, at least in line with prices. However, it should be noted that Ireland does not face a demographic ageing problem over the same timescale as most other European countries.

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5. Structural Changes

5.1 In practice, neither contribution increases nor benefit reductions, however packaged, are very attractive politically, although both may be necessary to balance the books. As a result, proposals for reform often include changes of a more fundamental and structural nature.

5.2 A popular idea in recent years has been to move from a defined benefit to a defined contribution structure. This can be an important ingredient in restoring the incentive to contribute in some schemes where contribution compliance levels are poor. Making the ultimate benefit depend directly on the contributions paid should create better incentives, although it does not entirely overcome the problem that the primary concern of most younger people is with immediate take-home pay, rather than on future pension.

5.3 The recent Italian reforms, and those proposed in Sweden, adopt a defined contribution model. The individual accounts in which members' contributions are accumulated are notional rather than invested, with revaluation being in line with an index (e.g. related to wages) rather than based on investment returns. In Sweden, it is proposed that, in addition, part of the social security contribution (2.5% of earnings) should be accumulated in a real fund, with individual accounts. Individuals will choose to invest funds offered by a range of private fund managers, authorised by a new supervisory authority.

5.4 The January 1997 Advisory Committee on Social Security Report in the U.S.A. offered several possible suggestions, one of which was similar to this Swedish proposal, and another involved fully private management of the individual accounts. However, it is yet to be seen whether these ideas will lead to changes in the U.S. system.

5.5 The difference between an approach involving PAYG defined contributions, with revaluation in line with GDP (or similar), and a revalued career average salary structure, such as SERPS in the U.K., can be a fine one, and largely presentational. The accumulated benefits rights in SERPS are derived from accumulating 'earnings factors', which are based closely on contributions paid, in line with an index of earnings. This benefit structure may provide a way of increasing the incentive to contribute (through relating the benefit entitlement more closely to what is paid in), but there are problems of financing rigidity in a PAYG defined contribution scheme, unless significant discretions are left to the scheme managers (as in the French *régimes complémentaires* — see ¶¶2.6 and 2.7).

5.6 Another advantage of the defined contribution approach to PAYG social security is that it may be easier to adjust for improving mortality in old age. The Swedish proposals allow the annuity factor at retirement age to be adjusted, from time to time, in the light of improving expectation of life. This also permits a flexible retirement age, with the annuity corresponding to the age at which the pension is taken. Alternatively, a logical, if rather actuarial, approach might be to raise retirement age regularly — to maintain a constant expectation of life after retirement or a constant ratio of expectation of life after retirement to expected

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length of working life. However, frequent small changes may present administrative difficulties.

5.7 Some interest is being shown in structuring basic social security schemes more as a safety net than as an income replacement mechanism. This can be done through a flat-rate element, or adopting differential accrual rates which skew the benefit towards the lower paid, as in the recent proposals in the U.K. for the second state pension. The World Bank has argued for a separation of this 'social protection' role of a social security scheme from the savings component, which, they argue, is best offered through funded complementary schemes (World Bank, 1994). Moves to more flexible retirement are also popular, although not, of themselves, likely to result in lower expenditure on pensions. Indeed, in the shorter term they might increase expenditure if people claim their pension earlier, with the possibility of corresponding savings in later years, as the numbers build up with pensions reduced as a result of early retirement.

6. Complementary Schemes

6.1 Perhaps the most important element of recent pension reform proposals internationally is the increased role of funded complementary pension arrangements. First and foremost, these are seen as creating new savings and investment which will play an important role in the development of the economy, and, perhaps, even enhance the prospects for economic growth. Economists are divided as to whether the expansion of funded complementary schemes will really increase saving, or simply substitute for other savings. Additional monies for investment, moreover, will not automatically generate economic growth, unless they can be utilised productively and not simply force up prices in stock markets. Nevertheless, many people believe that there is at least a possibility that increasing the level of funding may assist economic growth, particularly in emerging markets or markets in transition.

6.2 It has increasingly been recognised that the switch from PAYG to funded provision does not automatically solve the demographic problems. The resources needed to support a growing elderly population will still need to be generated by an economy with a declining number of people at working ages. Wealth can only be transferred to a limited extent over time by investing, although ownership of assets does create a claim on the future resources of the economy. It may well be that such a market mechanism will achieve the transfers of resources necessary to support the elderly more smoothly than direct transfer payments (tax or social security contributions). It is also probable that it will make the process less political. If the additional investment does increase the economic growth, the size of the economic 'cake' to be divided up will be greater, and, if so, the transfer of resources to the elderly will be more affordable and, perhaps, easier to effect.

6.3 There is a danger that there may be significant disinvestment from share

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markets in the 2020s and 2030s as increasing numbers of people reach retirement age with access to a funded complementary pension. Although traditional occupational pension funds may need to reduce their exposure to equity markets as their age profile becomes more mature, the problem arises in more acute form with personal pensions, where equity style assets will need to be realised at (or approaching) retirement, with investments then being made in bonds (including index-linked bonds) as backing for annuities. The costs of longevity will, in any case, be passed on directly to pensioners through increasing annuity rates.

6.4 There are other reasons why the development of complementary schemes may be seen as desirable. They may help individuals to identify more clearly with their accumulating pension 'wealth' and to feel a sense of ownership of the underlying assets. This is seen as assisting in the development of a capital-owning democracy and also in increasing consumer choice. Complementary pension schemes may also offer a greater degree of flexibility to employers and to employees to manage the total remuneration package.

6.5 However, introducing an effective system of complementary pensions is not a straightforward matter. If priority is given to freedom of choice, and compulsion is avoided, then it is difficult to ensure that coverage will not be patchy. Employer-sponsored schemes are usually more efficient and keep costs down, but they require the active participation of employers. In most countries defined benefit schemes are favoured by members, and offer better possibilities for a coherent system of social protection, although there are cases where the pressure for a move to defined contributions has come from employees, and some would argue that defined contribution schemes are more transparent and, therefore, have advantages from the members' point of view. However, employers seem to be less and less enthusiastic about underwriting the financial risks involved in offering salary-related benefits and ensuring that they provide adequate protection against inflation for pensions in payment (and in deferment). To some extent this may be exacerbated by the increasingly onerous regulatory requirements in many countries.

6.6 A system of defined benefit schemes, organised by individual employers, will normally require considerable numbers of pension actuaries. This may be a significant obstacle in a country where the actuarial profession is in its infancy. Funding for defined benefits may also be quite a difficult exercise in an environment where the investment possibilities are extremely limited and future rates of return are particularly uncertain.

6.7 A further issue with employer-sponsored defined benefit schemes is the question of security of accrued rights. A coherent system needs to ensure that, should the employer go out of business, assets sufficient to pay out the accrued rights, or to purchase equivalent benefits elsewhere, are available. This can be done by:

(a) investment externally to the employer, with strict limitations on the possibilities for investing the funds in the employer's business (or any related business); or

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(b) investment in the employer's own business (or so-called book reserves, as in Germany), with an adequate system of insolvency to protect against the risk of the employer's insolvency.

Under (a) there needs to be an appropriate mechanism for ring-fencing the assets and ensuring that they are not subject to the employer's control (such as the trust concept in common law countries).

6.8 Ideally, there should be vehicles available for managing the run-off risk in cases of scheme discontinuance, particularly when the sponsoring employer is no longer involved. This can be organised through the insurance market, albeit at a cost if additional guarantees are involved. Alternatively, a rational approach would be to organise a centralised discontinuance fund facility, underwritten by the pensions market as a whole, as exists in various forms in Finland, Japan and the U.S.A.

6.9 There are a number of problems to be addressed with a defined benefits system, such as preservation and transferability of rights for early leavers, ensuring that funding levels are adequate, protecting the value of pensions in payment (and in deferment), dealing with deficits and surpluses, etc. This all tends to imply a relatively sophisticated pensions environment, with adequate professional expertise available and a powerful regulatory body.

6.10 There is a trend towards earlier vesting requirements, illustrated by the recent recommendation of the Pensions Board in Ireland to reduce the maximum permitted vesting period from 5 years to 2 years. Whilst helping to reduce perceived unfairness between stayers and early leavers, early vesting requirements add to employer costs, and may have the effect of making such schemes less attractive to employers to include as part of the remuneration package.

6.11 For a country taking a first step into the world of complementary pension schemes, a more practical possibility may be to introduce a defined contribution system. This has its own disadvantages, but fits well with the philosophy of individual choice and ownership of wealth. It can be introduced with a relatively simple regulatory structure, and it does not place quite such heavy demands on actuaries and other professionals. A significant factor also, in many parts of the world, is that defined contribution individual account complementary pension schemes are strongly recommended by the World Bank, and the World Bank has significant leverage because of its involvement in granting loans to countries with financial problems. However, it leaves much of the risk with the contributing member, in particular risk relating to the real rate of return during the period up to retirement age (including the impact of charges), interest rate risk at retirement age and longevity risk (passed on through annuity rates), not to mention risks of insolvency of providing institutions and risks of being sold the wrong sort of product. The eventual pension is critically dependent on investment performance, and, in particular, on the state of the investment markets at the time of retirement. If the investment proceeds are then used to purchase an annuity, the level of pension for the rest of life depends on the

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annuity terms available at that time, which, in turn, depend on market yields (fixed-interest or index-linked as the case may be).

6.12 It is relevant, also, to consider the cost and efficiency of different modes of delivery. The current U.K. contributory social security scheme, covering both basic pensions and additional SERPS pensions (not to mention all the other benefits), incurs administrative costs which were quoted in answer to a recent Parliamentary Question as being at the level of about 1.5% of the income. Contributions are collected with taxes, and there are huge economies of scale. Even allowing for hidden costs, such as those incurred by employers in operating the system, the overall level of expense is probably no more than about 3-4% of the income.

6.13 Occupational pension schemes can also operate relatively cost-effectively, although not quite as cheaply as a social security scheme. The results of a Government Actuary's Department survey have shown that, weighted by size of scheme, average costs amount to about 8% of contribution income. As these figures are on a weighted basis, they strongly reflect the cost structure of larger, and generally more efficient, schemes. The costs represent a higher proportion of income for smaller schemes, coming out at an average of 12% of contribution income on an unweighted basis.

6.14 Charges of 20-25% of the contributions would be typical for insured individual account pensions in the U.K. These are not all administrative or fund management costs, although administrative costs may be higher for a defined contribution scheme than for a defined benefit scheme. Personal pension products are priced to deliver a profit, and a significant part of the cost is accounted for by the need to remunerate salesmen or financial intermediaries, in particular given the need for financial advice in connection with the sale of such products.

6.15 It is worth emphasising, also, that a defined contribution scheme addresses the savings aspect of pensions, but only deals in a limited way with the protection aspects. It certainly offers no redistribution, which may be seen by some as an advantage, but, as a result, it does not really serve the same functions as a social security scheme.

6.16 There are many different possible structures for providing defined contribution pensions. In the U.K. and Ireland, the principal vehicles up to now have been insurance products. Provident funds, such as those in Singapore and Malaysia, offer another model, and competitive funds, as in South America and now central and eastern Europe (see Sections 8 and 9), are a further possibility. Compulsory contributions to a particular type of pension arrangement should help to keep costs down, as it removes or reduces the need for advice and, to some extent, marketing.

6.17 A key challenge is to get the administrative costs as low as possible and to make the system as accessible as possible to the whole population. We are already seeing trends of retailers with no history of providing financial services moving into the pensions market, so it is not hard to envisage a simple pension product being sold as a commodity in supermarkets or at petrol stations, based on

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brand awareness rather than on a track record in pension provision! In the U.K. the government is committed to introducing stakeholder pensions as a low-cost vehicle for delivering individual account pensions to parts of the population that existing arrangements have been unable to reach.

6.18 In Ireland, there are proposals to introduce a Personal Retirement Savings Account (PRSA) as a new personal pensions vehicle, which may help to reach those parts of the population which occupational schemes do not reach, with the intended expansion of coverage of individual or occupational schemes to 70% of the working population.

6.19 It is important, also, not to forget the needs of the self-employed, for whom defined contribution individual savings accounts will normally be the most practical option.

6.20 The tax structure usually plays an important part in facilitating or encouraging different forms of complementary provision. Most countries have chosen to offer some tax reliefs on contributions to approved pension arrangements, usually associated with treating the resulting pensions as taxable. Apart from possible advantages to individuals who move to a lower rate of tax after retirement, this amounts to little more than ensuring that the pension savings are not taxed twice, but it is regarded as psychologically attractive (and avoids the risk, under the alternative system of no tax reliefs and pensions payable free of tax, that future governments may change their mind and tax the pension as well).

6.21 A major concern in countries such as the U.K., Ireland and the U.S.A. has been that the tax régime has become too complicated, with a whole layer of additional regulation designed to prevent misuse of the taxation arrangements, but adding greatly to complexity, and sometimes conflicting with other prudential supervision requirements.

7. AVERTING THE OLD-AGE CRISIS

7.1 In 1994, the World Bank published an influential book on pensions and social security entitled *Averting the Old-Age Crisis* (World Bank, 1994). Developed by a team of academic economists and World Bank experts, the recommendations contained in the book have been widely promulgated as offering a blueprint for countries seeking to reform their social security pension arrangements.

7.2 Following a damning review of the problems which they see afflicting publicly run social security schemes, the World Bank team advocated a solution based on:

— a relatively modest publicly run first pillar, with flat-rate benefits, either on a contributory basis or means-tested and tax-financed;
— a mandatory second pillar, based on a fully funded defined contribution system, with individual accounts and a competitive market of privately managed funds; and

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— a voluntary third pillar of funded occupational and personal pension provision.

7.3 The proposal to restrict the first pillar to a modest safety net has not been well received in social security circles internationally, although a number of industrialised countries already organise social security in this way (including the U.K., Ireland and the Netherlands with contributory flat-rate basic pensions, Denmark with a universal flat-rate pension based on residence, and Australia with a means-tested pension). The mandatory funded second pillar is also seen as threatening solidarity through the emphasis on individual accounts with no cross-subsidies and little concept of social protection.

7.4 Some reactions, both for and against, are predictable, since the different approaches to social security reflect differing social, political, philosophical and economic points of view. From a technical point of view, the funded, competitively managed, individual account approach to the second pillar can be criticised on grounds of high transaction costs (marketing and administration expenses), the weak level of insurance protection (unless separate insurance elements are introduced), reinforcing inequalities of income, discrimination against women (and men with breaks in their work histories) and engendering short-termism in investment strategies rather than longer-term investment policies.

7.5 Practical experience of personal pension models, for example in the U.K., has led to some disillusionment about the role of financial institutions and intermediaries, the dangers of unprofessional and commission-driven marketing and the risk of disappointing levels of benefit when contribution levels are too low or accumulating funds are eroded by high expense charges or poor real rates of return.

7.6 This is not to say to that there are not valid criticisms of publicly run social security systems. In some countries these systems have been inefficient, they sometimes have perverse incentives which influence labour market behaviour, they often fail to achieve much redistribution, even when that is an explicit objective, and, most tellingly of all, many of them are too costly to the public purse and becoming more so, even though the transaction costs of delivering pensions by this route may be relatively low. In a few cases this may be because the long-term costs were not adequately recognised when the scheme was established. In others the perception of what was affordable has changed over time, with many governments now pursuing economic policies involving a shift to a lower tax and social charge burden on employment. In many cases it would be possible to address the criticisms, whilst retaining the essential structure of the social security system, rather than making wholesale changes.

7.7 Schemes which resulted in generous benefits to the first generations of pensioners, who had not contributed very much during their working lifetime, have been criticised by some as poor 'value for money' for later generations, who will have contributed for a full working lifetime, but may not receive such good benefits because of the changing demographic balance. It can reasonably be

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argued that such schemes were not designed to deliver good value for money to each individual, or even to each cohort of contributors, but, instead, offer a system of solidarity to protect the weaker members of society and encourage social cohesion. The extra benefits to the first cohorts were a bonus from the introduction of such a system, and cannot be repeated. Such an argument is easier to run if the scheme is explicitly a safety net; there is a respectable line of argument that the safety net should be tax-financed, rather than maintaining a facade of 'value for money' by speaking of contributions and entitlements. However, in the U.K. and Ireland it has generally been felt that there are advantages in maintaining the contributory principle, since the resulting benefits are then more obviously an entitlement, rather than a charity hand-out.

7.8 Alternative mechanisms for the second pillar include employer-sponsored (occupational) defined benefit schemes. These have played a major role in pension provision in the U.K. and Ireland, the Netherlands, Switzerland, Finland, the U.S.A., Canada and Japan, to name but a few. A number of the problems which can affect such schemes have already been mentioned: safeguarding the rights of early leavers; maintaining the value of benefits in inflationary times; ensuring adequate protection for accrued rights; keeping the costs for employers within bounds.

7.9 In a number of countries, there is some evidence of a switch of occupational schemes from defined benefit to defined contribution. This is often in response to the perceived open-endedness of the financing commitment by the employer in many defined benefit schemes. However, there is also a feeling that final salary schemes are not well suited to modern employment patterns, where few people will spend a full career with one employer, and more people will spend parts of their career in casual or part-time employment, on fixed-term contracts, or in self-employment.

7.10 A career average revalued structure of defined benefits might have been better able to offer the flexibility required, whilst being less open to some of the abuses which have brought criticisms on final salary schemes, but avoiding some of the features which are open to criticism in defined contribution schemes. However, the current fashion amongst many companies and advisers is to favour a switch to defined contribution (money purchase) schemes. This enthusiasm for money purchase may be tempered if we again experience a period of relatively poor real returns on investment, just as, in a previous cycle, money purchase schemes became discredited in the U.K. in the late 1960s and early 1970s.

8. Latin American Experiences

8.1 *Chile*

8.1.1 Chile effected a radical reform of its social security system in 1981, closing down the old defined benefit social security scheme for new entrants and

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replacing it with a mandatory defined contribution system based on individual accounts. This, in effect, became a funded first and second pillar, although the government guarantees a minimum level of pension for those who have contributed to the funded system for 20 years or more. There are also means-tested welfare benefits (at the very low level of US$50 a month) for those without income from other sources. Those in employment at the time when the new system was introduced were given the choice of opting to remain in the old system. Even now there are 250,000 workers (5% of the economically active population) still contributing to that system, although this is clearly an ageing group. For those who opted to change to the new system, accrued rights to benefit under the old system were recognised through special 'recognition bonds' issued by the government, which are a promise to pay a defined amount into the individual account at the time when retirement takes place.

8.1.2 Each member is free to choose to which Administrador de Fondos de Pensiones (AFP) to affiliate, there being currently 13 to choose from (down from 24 a few years ago). Contributions are paid at 10% of earnings (up to a ceiling of approximately US$2,000 a month at present) into the individual account, the whole amount being payable by the member rather than the employer. A once-and-for-all pay increase was granted to employees to coincide with the introduction of a new scheme. An additional 2-3% of earnings is paid to the AFP (the administrator, or manager, of the pension fund) to cover administrative costs, to purchase insurance protection for disability and survivorship benefits, and to generate profit for the AFP.

8.1.3 The AFPs are not entitled to make any annual expense deduction from the funds themselves. Indeed, in some circumstances they may have to subsidise the funds, as they are required to guarantee that the return each year will be no lower than 2 percentage points below the average rate of return from all the AFPs. To date there have only been a few occasions on which AFPs have produced returns falling outside this range and have been required to support this guarantee from their own resources.

8.1.4 AFPs may make a charge on exit, if a member transfers his or her monies to another fund, but, in practice, they do not. Maintaining adequate contribution income is thus the key to their survival, and much effort is expended in trying to attract new affiliates. This results in rather high marketing costs, and a sum of the order of 15-20% of contribution income being absorbed in the expenses of the operation. Although all the charges are made at the front end, no provisions appear to be made for future expenses, so that continued viability depends on having a good number of affiliates.

8.1.5 Affiliates are free to change from one AFP to another. However, if they decide to contribute to a new AFP, they must also transfer their existing balance to the new AFP. An affiliate can only have savings with one AFP at any time. There have been concerns about the frequency of switching. Since the system is compulsory, all employed persons belong to an AFP, so, apart from some scope for increasing coverage among the self-employed, who can opt to contribute, the

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main way in which an AFP can increase its income (to cover management expenses and create the possibility of profit for the owners) is through persuading affiliates to transfer from another fund. Measures have been introduced to ensure that a transfer is only made as a deliberate choice of the affiliate, and not simply under pressure from a sales agent.

8.1.6 It is important to distinguish the pension fund itself from the entity which manages the fund. The pension fund is a pure unit fund, without any deduction of charges, and the assets effectively belong to the affiliates. The administrator has to be authorised by the Superintendent of AFPs and must have a minimum level of capital of about US$600,000. There have been three insolvencies of AFPs, that is to say cases where the Superintendent has withdrawn the authorisation to manage a pension fund, on the grounds of insufficient resources in the management company. In these cases the pension fund assets were not impaired, and affiliates were required to transfer the balance of their accounts to new AFPs.

8.1.7 At retirement age the member can opt to convert the accumulated sum into a price-indexed annuity, or to use the draw-down facility (programmed withdrawal), withdrawing an income of his or her choosing, with the option of converting the balance into an annuity later. So far the experience has been of a fairly equal split between those opting for an annuity and those opting for programmed withdrawal. There is evidence, not unsurprisingly, that this results in antiselection from the point of view of the insurance companies, as only the healthier retirees select the annuity option. Annuities have to be indexed (they are expressed in UFs — *unidades de fomento* — a 'real' currency unit), but index-linked bonds are available from the central bank, so that a reasonable degree of matching of assets to liabilities is possible. The matching possibilities are, however, limited by the range of redemption dates available and by the absence of index-linked bonds with duration of more than about 15 years.

8.1.8 The system has proved successful in many respects, although the success has been due, in large part, to the spectacular investment returns achieved, averaging 12.5% p.a. real (in excess of price inflation) over the first 15 years, with 1995 being the only year to produce a negative return. The circumstances giving rise to this were in many ways exceptional. Investment was initially (from 1981 to 1985) restricted to bank deposits and government, mortgage and corporate bonds, but the real returns on these were high. Then interest rates fell and the funds reaped substantial capital gains. From 1985 investment was permitted in the various privatisation issues, and this also proved highly profitable for the funds. From 1986 investment was permitted in the shares of joint stock companies, subject to various restrictions, which have been gradually relaxed; these have also yielded good returns. The pension funds had a somewhat bumpy ride in 1997, with significant losses on investments in the privatised electricity company, and set-backs on the Chilean stock exchange in response to global movements in equity markets. However, there was still a positive real rate of return for the year.

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8.1.9 The annuity market is growing rapidly, with considerations from accumulated AFP monies at retirement age now constituting 80% of premium income of the insurance market. Although the insurance market, generally, is relatively lightly regulated, with companies having freedom to develop new products and to set premium rates, annuity reserves are controlled by the Superintendencia de Valores y Seguros (SVS). A new mortality table is under discussion, which is regarded by the Chilean actuaries as very light. It is, of course, intended to allow for future mortality improvement, and for antiselection, but certainly appears to lead to very strong reserves. The SVS is concerned to ensure a high level of security for the annuities, given the compulsory nature of the system, although it is not clear how concentration on stringent reserving requirements for annuity business excludes the possibility of problems arising in an insurance company from other types of business.

8.1.10 Some have suggested that contribution compliance is still poor (poor compliance was endemic under the former system), but the problem is the nature of participation in the labour market, with many affiliates having only a very partial contribution record. With 5 million people in the economically active population, more than 5 million accounts have been activated, but only 3 million people are currently contributing. Of the balance, some 250,000 are in exempt categories, such as the armed forces, and 250,000 are still contributing to the old PAYG defined benefit scheme. The remaining 1.5 million are self-employed or working in the informal economy; only 50,000 of these have opted to contribute to the AFP system.

8.1.11 The level of transaction costs is quite high; many feel that that is exacerbated by the right to change AFPs once a year. With the high investment returns which have been experienced, amounts accumulated at retirement should generally be satisfactory. In these circumstances, the guaranteed minimum level of pension should not involve much cost for the government. There is, potentially, a significant contingent liability in this respect. The cost of transition to the new system has had quite major budgetary implications, with the cost of continuing to pay pensioners from the old system, and to finance recognition bonds when affiliates of the new system reach retirement age, adding up to 5% or so of GDP each year over a fairly lengthy transition period. This was manageable for the Chilean economy, which was running a budget surplus over much of the period, and, crucially, at the start of the transition.

8.2 *Argentina*

8.2.1 In recent years the Chilean concept of funded individual account pensions has been taken up, with various modifications, in other countries of South and Central America. Argentina introduced individual accounts in 1994, but, unlike Chile, left a basic social security pension in place, which currently requires contributions from employers at around 10% of salaries (up to about US$59,000 a year). A further 11% of salaries is payable by the employees into the AFJP (Administrador de Fondos de Jubilaciones y Pensiones — the

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Argentinean equivalent of a Chilean AFP) of the contributor's choice. In Argentina, individuals can, if they wish, opt to pay these additional contributions into the social security scheme to purchase additional benefits there instead of having a funded individual account.

8.2.2 With a reduced level of contributions to the social security scheme, some changes were necessary to maintain financial balance on a PAYG basis. The pension age is being gradually raised by 5 years, to 65 for men and 60 for women. The period of contribution necessary to qualify for a pension is also being doubled from 15 to 30 years. Existing rights in the social security system will be recognised by payment of defined benefit pensions, as and when individuals reach retirement age.

8.2.3 There are about 17 AFJPs, with over two-thirds of the economically active population affiliated, but 6 of the AFJPs have 80% of the business. As in Chile, the AFJPs must guarantee a real rate of return which does not diverge by more than 2 percentage points from the average return of all AFJPs in the year (with an additional requirement that it must be at least 70% of the average return). In addition to the continuing arrangements for a basic social security pension, the government also guarantees an underpin for the defined contribution element.

8.3 *Mexico*

8.3.1 Under the new Mexican mandatory individual account social security system, which began on 1 July 1997, new entrants to the labour market are required to contribute to the funded system. Existing members of the labour force have certain retained rights with regard to the former defined benefit social security system. Part of the social security contributions of employers and employees is paid into the AFORE (Administrador de Fondos de Retiro — the private pension fund administrator, similar to AFP in Chile and AFJP in Argentina) of the individual's choice. The contributions allocated to the AFOREs are 6.5% of covered earnings up to 15 times the minimum wage, and 2% above that level, up to 25 times the minimum wage. The 15 times cap is to be increased by 1 minimum wage each year, reaching 25 times the minimum wage in 2007.

8.3.2 Disability and survivors' benefits are paid for by a contribution of a further 2.5% of covered earnings. In addition, 1.5% is contributed to retiree medical care, making a total contribution of 10.5% for these benefits, which is the same total as under the previous system for old age, disability and survivors' pensions, if one includes the 2% contributions to savings for retirement. The government also contributes 5.5% of the minimum wage per employee to fund the deficit in the PAYG system.

8.3.3 At retirement the accumulated sum will be available for the purchase of an index-linked annuity (with reversion to spouse and orphans) from an insurance company. The individual will be able to elect for programmed withdrawals instead of an annuity. Those with retained rights in the old system (IMSS) will be able to elect to receive their IMSS entitlement pension instead. In such cases

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the accumulated sum will be handed over to IMSS in return for payment of the relevant pension (which they, in turn, will purchase from an insurance company).

8.3.4 Existing pensions in payment will continue to be the responsibility of IMSS, and will be paid for out of the general government budget. Normal retirement age will continue to be 65, although benefits may be taken from age 60 if out of work.

8.3.5 The contributions for disability and survivorship benefits are not passed over to the AFOREs. Although responsibility remains with the IMSS for these benefits (on death before retirement age), IMSS no longer pays the benefits directly, but, for benefits vesting on or after 1 July 1997, purchases an annuity from the insurance company of the claimant's choice.

8.3.6 No guarantees are provided on the investment of the AFOREs, as it was felt that the guarantees required under other such individual account systems (e.g. in Chile and Argentina) would unduly constrain investment freedom. However, the government will guarantee a minimum level of pension to every retiree (at the level of the minimum wage).

8.3.7 Contributions continue to be collected by IMSS, and are passed on to the chosen AFORE in bulk. AFOREs are licensed by a regulatory body under the Ministry of Finance. Only insurance companies are allowed to offer annuities; they are supervised by the Comisión Nacional de Seguros y Fianzas, also under the Ministry of Finance. The liability for payment of pensions rests with IMSS in case of failure of an AFORE or insurance company, so that the privatisation can be regarded as a form of reinsurance. There is a strong element of mutualisation of disability and mortality risk through the payment by all of a fixed percentage of earnings for risk benefits. IMSS will continue to manage this risk sharing, reinsuring the delivery of the resulting annuities, with the insurance companies taking on the subsequent mortality and financial risks.

9. Eastern Europe and Former Soviet Union

9.1 Some interesting developments in the field of complementary pension schemes are taking place in central and eastern Europe. Each of the countries in the region has a fully developed social security scheme, originally providing a good level of benefits relative to salary levels, although the benefits have, in many cases, now been significantly eroded by inflation. The costs were met either from the national budget or from the contributions of employers. There were generally no employee contributions, and there was little or no scope for private pension arrangements.

9.2 Following the political changes in these countries, and in the light of concerns about the growing costs of the social security schemes, each country is embarking on a programme of reform of the social security scheme, in conjunction, in most cases, with plans to encourage the formation of complementary pension schemes. Reform packages usually involve: the introduction of employee

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contributions; the elimination of special categories of members with privileged benefits; raising retirement age (especially, initially, for women, who generally have a very low retirement age, particularly if they have had children); introduction of unemployment benefits; and scaling down of pension benefits.

9.3 *Hungary*

9.3.1 Hungary introduced legislation in 1993 to provide for the establishment of mutual benefit funds, reviving an old tradition in the country, but now primarily as vehicles for complementary pension provision (health insurance and welfare funds are also provided for). The funds can be set up on the initiative of an employer or a group of employers, or at the instigation of a group of employees (with or without financial support from their employers), or by a group of people with some common affiliation (e.g. members of a union or profession, or people from a particular geographical area). Control is exercised by the members, but the fund is required to make use of appropriate professional skills, including actuarial skills, if any death benefits or annuities are provided.

9.3.2 Further legislation was passed in July 1997 to introduce mandatory private pension funds. Employees were required to pay contributions of 6% of earnings in 1998, rising to 7% in 1999 and 8% from 2000 onwards. Additional voluntary contributions are permitted up to 10% of earnings. Private pension funds to provide the mandatory coverage may be established by employers, professional associations, mutual benefit funds or local governments. Membership of the new funded system is mandatory for new entrants to the labour market after 1 July 1998, and optional for employees aged 47 or less. Older employers, pensioners, and younger employees who so opt, will remain in the old PAYG social security system, which will be mainly financed by employer contributions (currently 24% of earnings, but expected to be 22% from 2000 onwards), by contributions from employees who remain in that system (7% of earnings rising to 9% from 2000 onwards), and by 1% contributions from employees who participate in the new private funds.

9.4 *Czech Republic*

The Czech legislation provides for the establishment of commercially run 'open' pension funds, owned by insurance companies, investment houses, or other interested providers of capital. Individuals can select which pension fund to belong to, or employers may offer to their employees membership in a particular fund, with a defined level of employer and employee contributions. There are no tax reliefs for these funds, but a small matching contribution is available from the government if employees opt to contribute.

9.5 *Russia*

9.5.1 A considerable number of pension funds have already been established in Russia, where there has been prolonged discussion about the legislation, which was eventually approved by the Duma in April 1998. Defined contribution or

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defined benefit schemes are to be permitted, although the former are expected to predominate. There will be single employer funds (primarily for large employers), as well as open funds, which individuals or small employers can join. Funds are required to invest through a separate asset management company. A number of issues which have been uncertain have been clarified by the passing of this legislation, and there is some optimism that there will now be strong development of the pension fund sector.

9.5.2 The Superintendent of Pension Funds has been established and is authorising pension funds which meet certain criteria. Examinations have been held with a view to licensing pension actuaries to work with pension funds. They are expected to have a grasp of the fundamentals of actuarial mathematics, knowledge of the principles of investment, familiarity with the provisions of the non-State pension fund law and the requirements of the Superintendent, as well as general knowledge about the ways in which pension funds can be operated.

9.6 *Slovak Republic*

Legislation was passed in the Slovak Republic in 1996 to permit the formation of pension funds. They may be employer-specific, multi-employer (e.g. industry-wide) or open funds to which anyone can affiliate.

9.7 *Poland*

A system of mandatory private pension funds was introduced in Poland from the beginning of 1999. The social security system will remain as the first pillar, restructured along similar lines to the new Swedish scheme as a notional defined contribution structure. Contributions to the new funded system will be mandatory for those under the age of 30 at the start, and optional for those over that age and under the age of 50. Contributions will only be mandatory on earnings up to 2.5 times national average income. The pension funds will just handle the accumulation and investment of monies up to retirement age, when an annuity will be required to be purchased from a specialised pension annuity company. The government will underwrite a minimum level of pension (from the first and second pillar systems together) of 28% of national average earnings.

9.8 *Latvia*

9.8.1 Latvia has also been engaged in a major pensions reform. In 1995 the Saeima (parliament) approved the concept for pension reform, involving the introduction of funded complementary pension funds. An Act of Parliament making changes to the social security retirement pension was passed in November 1995, and the new provisions came into effect in January 1996. Pension age for women is being increased from 55 to 60, the same as for men. The pension calculation has changed to something akin to a defined contribution basis, with accumulation of contributions on a basis related to economic growth, and conversion of the resulting amount to a pension by means of an annuity factor.

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This approach follows the recent proposals for a revised social security scheme in Sweden.

9.8.2 Funded private pensions are being developed, both to relieve pressure on the social security system and to develop the capital markets through institutional investment. To begin with the system will be voluntary. This will enable appropriate regulatory procedures to be put in place and valuable experience to be gained in the running of non-state pension funds. Once the system is fully operational, it is intended to make it compulsory for all in the labour market to contribute.

9.9 *Croatia*

A three pillar system has been introduced in Croatia from 1999, with the first pillar slimmed down to produce a maximum basic pension of 32% of national average earnings from a retirement age of 65 for both men and women (as compared to 60 for men and 55 for women currently). A new funded second pillar, based on individual accounts, has been introduced for those aged 40 and below at the start, with existing accrued entitlements being recognised, but accrual only of the new basic pension thereafter, together with the funded complementary arrangement. The deficit which will arise from switching some of the contributions to the second pillar system will be covered from the state budget.

9.10 *Kazakhstan*

A new system of defined contribution funded complementary pensions was introduced from 1 January 1998. Those entering the workforce after that date will receive retirement benefits based solely on the funded system, whereas existing members of the workforce will receive partial pensions from the first pillar system. Only employers are required to pay contributions, with 15% of payroll going to finance the PAYG system and 10% to individual accounts. Employees will be able to make additional voluntary contributions, with some tax deferral benefits. There will be a statutory minimum level of pensions for those in respect of whom mandatory pension contributions have been made for three-quarters of the time between January 1998 and retirement.

10. Modelling Pension Reform

10.1 Whilst there are many economic and political arguments about pension reform, one of the major contributions which actuaries can make is in modelling the financial impact of proposals. The impact of major changes to a pension system is complex, and the focus of attention may be on one or more of the following aspects:

- benefit costs of the social security scheme;
- employer and employee contributions necessary to meet costs of social security;

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Table 3. Projected population numbers on low and medium fertility assumptions, 1990-2040

(a) Low fertility projection (TPFR 1.5 from 2010)

Age group	1990	2000	2010	2020	2030	2040
0-19	12,238	10,719	9,288	8,657	7,637	6,754
20-59	20,030	22,277	23,183	21,630	21,077	18,999
60-69	3,365	3,320	4,372	5,607	4,528	5,617
70-84	2,140	3,156	3,560	4,503	6,227	5,482
85+	309	431	793	1,180	1,341	2,290
Total	38,082	39,903	41,195	41,577	40,809	39,142
60+/(20-59)	0.29	0.31	0.38	0.52	0.57	0.70

(b) Medium fertility projection (TPFR 1.8 from 2010)

Age group	1990	2000	2010	2020	2030	2040
0-19	12,238	10,819	10,108	10,228	9,441	8,939
20-59	20,030	22,277	23,183	21,730	21,893	20,660
60-69	3,365	3,320	4,372	5,607	4,528	5,617
70-84	2,140	3,156	3,560	4,503	6,227	5,482
85+	309	431	793	1,180	1,341	2,290
Total	38,082	40,002	42,015	43,248	43,429	42,988
60+/(20-59)	0.29	0.31	0.38	0.52	0.55	0.65

— overall financing impact on employers and employees;
— adequacy of resulting pensions for different subsections of the population;
— cost of tax reliefs and effect on tax revenue;
— overall impact on public expenditure (however defined);
— impact on capital markets;
— impact on the economy as a whole; and
— size and structure of private funded schemes.

10.2 Detailed consideration of the range of topics listed above is not possible within the scope of a short paper. However, we present some results from a simplified model to illustrate the timing and order of magnitude of some key design features and assumptions.

10.3 Table 3 summarises the projected numbers in the population of a hypothetical country, from 1990 to 2040, on two alternative scenarios as to future fertility developments. The low fertility scenario assumes that period fertility continues to fall for a few more years, levelling out at a total period fertility rate of 1.5 from 2010. The medium fertility scenario assumes a modest increase in fertility from current levels, to the levels of the late 1980s, with total period fertility rate of 1.8 from 2010. Allowance is made in both projections for steady mortality improvement. Migration has been assumed to be zero.

10.4 The demographic ageing process can readily be seen, with steadily growing numbers over pension age, whether this is set at 60, 65 or 70. The population of working age (broadly taken as represented by the 20-59 age group)

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Table 4. Projected PAYG contribution rates for existing system

	1990	2000	2010	2020	2030	2040
TPFR 1.8						
Retirement age 60	13.0%	14.5%	18.1%	25.0%	26.9%	31.5%
Retirement age 65	8.3%	10.6%	11.8%	18.0%	20.7%	23.1%
60 rising to 65	13.0%	14.5%	14.0%	18.0%	20.7%	23.1%
TPFR 1.5						
Retirement age 60	13.0%	14.5%	18.1%	25.1%	27.8%	34.4%
Retirement age 65	8.3%	10.6%	11.8%	18.1%	21.4%	25.0%
60 rising to 65	13.0%	14.5%	14.0%	18.1%	21.4%	25.0%

rises to 2010 and then falls back, roughly to current levels, by 2040 on the medium fertility scenario, but to somewhat lower than current levels on the low fertility scenario. The old-age dependency ratio, defined here as the ratio of the population over 60 to that between 20 and 60, rises from 0.29 in 1990 to 0.70 in 2040 on the low fertility scenario, and to 0.65 in 2040 on the medium fertility scenario. Even a relatively high fertility scenario, with total period fertility rates rising to 2.1 or higher, would still result in almost a doubling of this dependency ratio measure over the 50-year period, reflecting the fact that much of the potential for ageing is already built into the current population structure and the current low fertility rates, combined with the assumption of improving mortality. An assumption of more rapidly improving mortality would further worsen the age balance, as it has greatest impact on the projected elderly population.

10.5 We consider first a simple PAYG pension system which provides a pension of 50% of national average earnings from the retirement age of 60 to those who meet the qualifying conditions. To simulate a scheme which is still not mature, we assume that 90% of males aged 60-69 in 1990 are in receipt of this pension, and 90% of all those reaching 60 thereafter, but proportions lower than 90% for age-groups over 70 (85% for 70-74, 80% for 75-79, etc.) and lower proportions for females. Assumptions are made about activity rates for each age group of the working population, and approximate allowance is made for earnings to change with age. None of these assumptions are particularly critical with regard to the patterns of outcomes which we illustrate. They do, of course, affect the absolute level of contributions required to finance a particular benefit level.

10.6 Table 4 shows the projected PAYG contribution levels to finance this particular benefit structure on the alternative fertility scenarios. We consider retirement age 60, but also look at the effect of a higher retirement age of 65 and a retirement age rising from 60 to 65 between 2000 and 2020. This illustrates the very substantial increase which is projected for the PAYG contribution if nothing is done, particularly in the low fertility scenario. Raising retirement age from 60 to 65 helps to moderate the increase, particularly over the period to 2010, but significant increases are still projected for later years, rising to almost double the 1990 levels by 2040.

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Table 5. Projected PAYG contribution rates for existing accrued entitlements (no further accrual after 2000)

	1990	2000	2010	2020	2030	2040
TPFR 1.8						
Retirement age 60	13.0%	14.5%	16.8%	19.2%	15.9%	11.2%
Retirement age 65	8.3%	10.6%	11.1%	13.7%	12.2%	9.0%
60 rising to 65	13.0%	14.5%	13.1%	14.1%	12.4%	9.1%
TPFR 1.5						
Retirement age 60	13.0%	14.5%	16.8%	19.2%	16.4%	12.1%
Retirement age 65	8.3%	10.6%	11.1%	13.8%	12.6%	9.8%
60 rising to 65	13.0%	14.5%	13.1%	14.2%	12.9%	9.8%

Table 6. Percentage reduction in retirement pension by cohort if accrual of PAYG scheme ceases after 1999 and mandatory contributions of 10% are required thereafter to a funded system (TPFR 1.5, retirement age 65; different real rates of return net of earnings during the accumulation period)

	Year of birth							
	1935-40	1940-45	1945-50	1950-55	1955-60	1960-65	1965-70	1970-75
Annuity indexed to prices								
Real return 1%	4.2	10.4	12.9	13.6	13.5	11.7	10.2	8.8
Real return 2%	4.2	10.1	11.7	10.7	8.1	2.8	–3.2	–9.8
Real return 3%	4.1	9.8	10.5	7.5	1.9	–8.0	–19.9	–33.8
Annuity indexed to earnings								
Real return 1%	4.3	11.0	14.4	16.1	17.2	16.7	16.4	16.3
Real return 2%	4.3	10.7	13.3	13.5	12.4	8.6	4.3	–0.4
Real return 3%	4.3	10.5	12.2	10.7	6.8	–1.1	–10.7	–22.0

10.7 A well-known feature of PAYG systems is that the working population are paying, not for their own pensions, but for those of previous generations of workers who are now retired. A consequence of this is that there is enormous ‘momentum’ in the system. Even if accrual of entitlement to pension benefit were stopped completely for the future, the PAYG cost of meeting the accrued liabilities would be substantial for many years. Table 5 illustrates this.

10.8 Clearly the Table 5 scenario would be difficult to sustain as a pension policy, even though the resulting contribution rates might be attractive. By 2025 those retiring would be entitled only to a pension of 25% of national average earnings, and by 2050 those retiring would have no entitlement. Such a radical step might, however, be accompanied by the introduction of mandatory contributions to a funded defined contribution system. Table 6 shows the percentage reduction in retirement benefits for each generation reaching retirement age after 2000 (taken as 65 for this table), with an assumed mandatory contribution of 10% of earnings, according to the real rate of return on the funded

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part of the provision. Although, in most cases, the indexation (if any) required on the pension deriving from the funded part will be based on the consumer price index, Table 6 also shows the loss of pension with earnings indexation, which is really a fairer comparison with the earnings-linked social security benefit which is being replaced. Generations reaching retirement age in the years immediately after 2000 will have relatively little opportunity to build up a sizeable fund. Those in the final column will, however, have contributed to the funded system for almost all of their career. By this point, the funded pension with a 10% contribution level can replace the lost social security pension if the real rate of return net of earnings is 2% p.a. (net of expenses) or more.

10.9 It should be noted that the defined contribution scheme is assumed to require the purchase of an index-linked annuity (linked to prices or earnings) and this has been included on the basis, respectively, of 3% or 1.5% real return after retirement, assuming investment in index-linked bonds, regardless of the assumption for investment growth (assumed to be a mixed portfolio) prior to retirement. The comparison in the first half of Table 6 is not entirely transparent, as the first pillar pension which is being given up is assumed to go up in line with earnings, whereas the complementary pensions go up only in line with prices after award. It should be noted that the funded system will result in the accumulation of very large funds; even at 1% real return up to retirement these could amount to 5 times the total salary mass after 40 years of the new system (by 2040) with 10% contributions. At 3% real rate of return up to retirement with 12% contributions, the funds could amount to more than 8 times salary mass.

10.10 The other side to the story is the contribution rate. A mandatory contribution rate of 10% to the funded system from the year 2000 produces aggregate contributions which give substantial increases relative to the old PAYG system for some years, as shown in Table 7. Although lower contributions are achieved by 2040, the increases of contributions in the early years of the transition would be difficult to accommodate, so some phasing would be required, for example 2% in the first 5 years, 4% in the second 5 years, and so on. Even this leaves quite a high transitional cost, for example from 2010 to 2025. It would also substantially increase the pension losses for some generations whose lifetime contributions would, on average, be well below 10%. This aspect could be alleviated by introducing a scale of contributions to the new funded system when it starts, with those close to retirement paying closer to 10% (or having higher contributions paid by employers on their behalf). A disadvantage of such an approach is that it is likely to be a disincentive to the employment of older workers. Alternatively, the whole transition can be phased over a much longer period, for example by leaving those over a selected cut-off age (e.g. 40 or 45) in the old PAYG system.

10.11 Since many new individual account systems have been established on the basis of contributions of 10% of earnings being allocated to the savings account (net of deductions), it is worth considering the conditions under which this is likely to produce adequate pensions. Table 8 shows the replacement

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Table 7. Increases in contribution rates if accrual of PAYG system ceases and 10% mandatory contributions to a funded system are introduced from 2000 (TPFR 1.5)

	2000	2010	2020	2030	2040
Retirement age 60	10.0%	8.5%	3.2%	–2.5%	–12.7%
Retirement age 65	10.0%	9.3%	5.7%	1.2%	–5.3%
60 rising to 65	10.0%	8.8%	5.7%	1.2%	–5.3%
Phased introduction (2%, 4%, 6%, 8%, 10%)					
Retirement age 65	2.0%	5.3%	5.7%	1.2%	–5.3%

Table 8. Replacement ratio with contributions to funded scheme of 10% of earnings

Age at entry	Real rate of return on investments (relative to earnings growth) 0%	1%	2%	3%	4%	5%
Males — retirement age 60						
25	24.4	29.2	35.2	42.8	52.4	64.5
35	17.4	19.8	22.6	25.8	29.6	34.1
45	10.5	11.3	12.2	13.2	14.2	15.4
55	3.5	3.6	3.7	3.8	3.9	4.0
Males — retirement age 65						
25	33.3	40.9	50.8	63.8	80.7	103.1
35	25.0	29.1	34.1	40.2	47.6	56.7
45	16.7	18.4	20.4	22.7	25.3	28.2
55	8.3	8.8	9.2	9.7	10.2	10.7
Females—retirement age 60						
25	21.4	25.5	30.8	37.4	45.8	56.4
35	15.2	17.3	19.7	22.6	25.9	29.8
45	9.2	9.9	10.6	11.5	12.5	13.5
55	3.0	3.1	3.2	3.3	3.4	3.5
Females—retirement age 65						
25	28.5	35.0	43.4	54.4	69.0	88.1
35	21.4	24.9	29.2	34.4	40.7	48.4
45	14.2	15.8	17.5	19.4	21.6	24.1
55	7.1	7.5	7.9	8.3	8.7	9.2

Notes:
1. Annuities are calculated on population mortality, allowing for future mortality improvement, at a real rate of return of 3% p.a. No allowance is made for any survivorship pension on death after retirement.
2. The contribution of 10% of earnings is assumed to be after deductions for disability and survivorship cover before retirement age and for initial expenses.
3. The rate of return is assumed to be the effective rate after all fund management charges.

ratios (initial pension as a percentage of final year's earnings) for a variety of real rates of return (net of earnings growth and fund charges) and for different starting ages. Not surprisingly, replacement ratios are relatively low unless contributions are made for a full 40-year career (no allowance is made for any interruption of earnings). Even for someone entering at 25 and contributing up

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to retirement age of 65, a replacement rate of two-thirds of final earnings can only be achieved with an average real rate of return net of earnings growth of 3% p.a. or more. This suggests that a 10% contribution is unlikely to be sufficient to give most people an adequate pension, unless investment conditions are particularly good or there is a sizeable first pillar pension. A more realistic target level of contributions might be 15% of earnings if there is only a modest first pillar.

11. LESSONS FROM THE PENSION REFORM PROCESS

11.1 The last few years have seen a spate of pension reform programmes throughout South and Central America and Central and Eastern Europe. A common feature is that almost all involve the concept of fully funded defined contribution individual accounts, drawing on the Chilean experience, although with a variety of individual characteristics. Management of investment funds is decentralised, with private managers. The fund management bodies are usually profit-making entities (except for the voluntary mutual benefit funds in Hungary), but are subject to more or less intensive regulation and scrutiny by a supervisory body. Supervision may be by a part of a government department (such as the Ministry of Finance) or by a semi-independent agency, reporting to a minister, usually the Minister of Finance or the Minister of Welfare.

11.2 Some countries have made it compulsory to contribute to a funded individual account; others have started with a voluntary system, perhaps with the intention of making it compulsory later. In some countries the new funded system applies on a mandatory basis to new entrants to the labour market, but on a voluntary basis, or not at all, to existing members of the workforce. There is usually freedom to switch from one pension provider to another, although there may be restrictions on how frequently this is permitted. The investment policy of the funds is usually significantly constrained by regulations, overseen by the supervisory authority.

11.3 Many countries wish to maintain a public PAYG social security system as the first pillar, albeit, perhaps, with significant changes to restrain the growth of costs. In a number of cases the government is underwriting various guarantees with regard to the funded system, for example a minimum level of pension after a given number of years of contribution, or a minimum rate of return. The pension funds, or the companies responsible for administering them, may be required to offer other guarantees, for example in relation to the return on the funds, or may do so for competitive reasons.

11.4 There are different approaches to charging structures, including deductions from the initial contributions, part of the return on the funds, or an exit charge on withdrawal of monies from the fund. Some régimes restrict the use which can be made of certain types of charges, or the level at which they can be pitched.

11.5 Some systems permit withdrawals to be made before retirement age,

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although most are designed to produce a capital sum at retirement age. Options which may be available include:

— taking all or part as a lump sum;
— converting the accumulated amount (or part of it) into a life annuity (with or without a reversionary annuity to a partner);
— withdrawing income on a more or less regular basis until the fund is extinguished;
— withdrawing income for a period and then purchasing an annuity; and
— converting the accumulated amount into an annuity certain.

11.6 A few countries have sought to encourage a strong level of employer involvement, in the expectation that many pension funds will be established by individual employers for their employees, or perhaps by groups of employers in a particular industry. Other possibilities include different types of affinity groups, for example based on locality, profession, union membership, religious affiliation. Almost all systems allow for the possibility of entirely open funds, to which anyone may contribute.

11.7 Most of these pension reforms are still at a relatively early stage. Only the Chilean system has a significant track record, and special factors which were present in the Chilean experience make it difficult to draw conclusions of general application. Early indications are that these individual account systems are proving popular, with significant numbers opting for that route where a choice is offered. However, there have been some upsets, with a number of failures arising from, for example, investment in the sponsoring company or inability to attract sufficient affiliates to cover expenses.

11.8 A danger which may become more evident over time is the increased exposure of the insurance market to the risk of longevity. In some countries the annuities arising from the new funded pension system will rapidly become a very major part of the new business of the insurance industry. In Chile the total considerations for annuity purchase are already higher than the aggregate of other premium income for life insurance companies. This could happen quite quickly in Mexico also. With annuities required to be written on a non-participating price-indexed basis, this exposes life insurance companies quite strongly to any mis-matching risk if index-linked assets of sufficiently long duration (or an adequate spread of durations) are not available, and to a longevity risk if mortality improves more rapidly than allowed for in premium rates or there is a significant antiselection problem (with programmed withdrawal options available as an alternative to annuity purchase).

11.9 Some lessons which might be drawn include:

— the importance of having in place from the start a clear regulatory framework and a strong supervisory authority;
— the need to adapt the concepts to the circumstances of the country, including its existing social security system, legal framework, social and political ethos and state of development towards a market economy;

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— the desirability, in most cases, of retaining the public social security system as a safety net;
— the need to have a properly functioning banking system and at least embryonic capital markets;
— the desirability of the government making available suitably long-dated bonds, including index-linked bonds, for pension funds to invest in;
— the desirability of facilitating the formation of employer-sponsored schemes (occupational schemes) as well as open funds;
— the need to plan the transition very carefully, with both short and long-term financial projections, in order to maintain financial balance in the public social security system and to keep public expenditure under control;
— the need to avoid imposing too many constraints on the freedom of pension funds to charge to cover their costs, whilst preventing the potential abuses of high charges;
— the need to ensure that options and guarantees are not offered which cannot realistically be given, or whose true costs have not been properly assessed;
— the need to control the marketing of personal pensions; and
— the need to plan well in advance for the creation of an annuity market with appropriate deployment of actuarial expertise in pricing, reserving and asset/liability management.

11.10 The importance of the actuarial role appears to have received insufficient attention in some cases. Naturally enough, countries without an established actuarial profession are less familiar with the role which actuaries should play, and it is sometimes assumed that a defined contribution system can be run without much actuarial involvement, whereas it is rightly recognised that a defined benefit system would be impossible without actuaries. Nevertheless, it seems clear that a properly functioning defined contribution system will also require many of the skills of actuaries, and a priority in the pension reform process should be to establish a process for training and qualifying actuaries to work in this field, preferably as a specialism within the framework of a more general actuarial education process. To the extent that actuarial expertise is limited, care needs to be taken to restrict the operation of the pension funds accordingly. One option, for example, would be to require pension funds to purchase life (and survivorship) annuities from life insurance companies, where actuarial expertise certainly will be required. Options and guarantees would also need to be carefully avoided.

11.11 The principal activities for which an actuary is needed in relation to defined contribution pension arrangements are:
— ensuring appropriate design of pension fund contracts, including arrangements for covering expenses of administration and investment management and the appropriateness and affordability of any guarantees offered;
— pricing of guarantees and any options offered to members;
— control of expenses and management of necessary changes to the expense charges which are applied to contributions, to funds or to withdrawals;

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— ensuring that adequate technical provisions are maintained for future expense commitments and for the cost of any guarantees and options;
— determining appropriate rates of conversion of accumulated sums at retirement into annuities;
— ensuring that adequate technical provisions are maintained, with appropriate investments to back them, in respect of any liabilities to pay annuities, either for life, for term certain, or to surviving dependants;
— advising on the appropriate investment policy;
— advising on the appropriate general level of contributions to achieve target levels of pension;
— advising on additional contributions which a member might make, to top up his or her pension to target a desired level; and
— advising on arrangements to finance any risk benefits, such as additional cover on death or disability, including the possibility of reinsurance.

11.12 In many countries a radical reform process is probably unavoidable, because of the collapse of the previous social security system or manifest shortcomings. The new system has to have good incentives to contribute, and should, if possible, contribute to economic development. However, a combination of modest social security and mandatory defined contribution individual accounts will not necessarily lead to everyone having adequate income in retirement, especially if investment returns struggle to keep pace with inflation. At the level at which contributions are likely to be set in most mandatory systems, additional voluntary provision will still need to be strongly encouraged.

11.13 There remains a lively debate on what sort of pension reform is best for industrialised countries, with long-established (and reasonably efficient) social security schemes. A full Latin American style reform is unlikely to be considered appropriate in most continental European countries, since there is a strong social and cultural attachment to social security in its traditional form and a belief in the value of social protection and concepts of solidarity. Questions about whether individual cohorts are 'getting their money's worth', such as are commonly asked in North America, are barely understood. However, demographic and other pressures on the financing of such schemes in an era of intensive international competition and with the need to comply with stringent criteria on public indebtedness, will mean that significant reforms will be needed in countries such as Belgium, France, Germany, Greece and Spain, to name but a few.

11.14 One can expect to see reductions in the level of social security benefits and much greater emphasis on the role of funded complementary schemes. It is quite likely that the strength of the European social tradition will ensure that occupational pension arrangements have a significant role to play in many countries. However, personal pensions will undoubtedly also become more popular. Many countries will need to consider whether to make the funded second pillar mandatory, in order to ensure that there are no major gaps in coverage (including the self-employed).

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12. CONCLUDING REMARKS

12.1 The topic of social security and pension reform is a vast one, with so many variations in the form and mode of delivery of pension benefits, so it would be rash to draw too many firm general conclusions. It is also unreasonable to expect there to be any panacea for the significant problems facing social security pension schemes. Each country has its own characteristics, even if the ageing of the population is a widespread phenomenon. A viable pension reform must have regard to the detailed structure of the existing social security and pension arrangements, to the historical background, to the current social structure and to factors such as the state of development of the banking sector and the capital markets.

12.2 Payment of pensions to the elderly involves a transfer of resources from those parts of the economy where wealth is being created. This is so, whether it is done through transfer payments (by means of tax or a public social security system) or through a funded system involving the private sector. The mechanisms are, of course, different, and the impact of ageing may be less evident in a funded system. In principle, however, the changing demographics will affect the relative interests of workers and shareholders, and the value of investments will be affected by the balance of buyers and sellers, which could change markedly as the population ages and pension funds become 'super-mature'.

12.3 It is not at all clear that increasing the level of funded pension provision will necessarily increase overall savings levels in the economy, or generate new productive investment. This form of saving may simply replace other forms, and the additional investment may drive up prices if there are insufficient worthwhile investment projects to absorb the extra funds. Nevertheless, it is widely assumed that the growth of funded pension arrangements will be beneficial for the economy. It could certainly play a role in facilitating the development of an active capital market in countries which are at an early stage of development as market economies. Switching to a funded system (or increasing the degree of reliance on funding) may also help to focus on the affordability of pension promises, and may encourage individuals to identify with their accruing pension rights and take a more active interest in pensions.

12.4 The rising cost of paying pensions to the elderly will be made more affordable if the economy exhibits sustainable real growth, inflation is kept under control and unemployment is brought down to a low level. The capital investment resulting from funding may play a contributory role in bringing about these favourable outcomes.

12.5 It is likely that most countries will seek to develop a multi-pillar pension system, with social security as the first pillar, a funded second pillar based on the employment relationship, and a third pillar based on individual initiative. However, there will be a lot of resistance in many countries to reducing the first pillar to a flat-rate or means-tested safety net, as recommended by the World Bank, so many first pillars will still offer substantial salary-related benefits, at

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least for lower earners. Reforms will, however, include raising retirement age, making indexation less expensive, toughening eligibility conditions, reducing the earnings ceiling for benefit, reducing benefit accrual rates, but probably still requiring some increase in contributions of employees and employers.

12.6 For the second pillar there is likely to be a lively debate on whether or not contributing to a funded system should be made compulsory. If it is not, there may need to be a higher first pillar, with contracting-out options, if an underclass with inadequate pension provision is to be avoided. Concerns about the security of private funded pensions will need to be addressed by strong systems of regulation and supervision. If the second pillar is voluntary, strong encouragement should be given to employers to set up externally funded occupational pension schemes, as this will be a more effective way of increasing coverage. Employer-sponsored pension funds are often more efficient, even as part of a compulsory system, and help to keep down the transaction costs and administrative overheads. It is, perhaps, an inevitable consequence of moving across the scale from solidarity systems to individual accounts that a greater and greater degree of regulation is thought to be necessary.

12.7 To the extent that open funds are used, particular attention needs to be given to keeping the marketing costs down, and avoiding frequent switching possibilities. The marketing of such schemes provides fertile opportunities for misleading unsophisticated customers, and needs to be strictly controlled. Requiring schemes to offer investment performance guarantees, or limits on expense charges, may be attractive from a public interest point of view. However, careful attention should then be paid to reserving requirements, and pension fund providers should satisfy prudent free asset requirements. The more guarantees are introduced, the more important it is to have proper actuarial financial control.

12.8 Although pension reform programmes will often be presented as reducing the involvement of government, disengagement may be difficult to achieve. Apart from the important role of regulation and supervision, taxation policy is a key factor. Governments also remain responsible for fall-back guarantees of minimum income (through means-tested welfare benefits, even if there is no explicit guarantee of pension level). In some cases governments may retain a role as guarantor of last resort for compensation funds, and almost all systems assume that governments will issue sufficient bonds (particularly index-linked bonds) to enable annuity liabilities to be satisfactorily matched.

12.9 The growth of funded pension systems will provide significant opportunities for actuaries to play a major role. However, it is likely, in the short term, that the growth will be very largely in defined contribution schemes, and the need for actuarial involvement in this type of scheme for sound financial management is not always well understood. In many of the countries where pension reform is taking place, the establishment or strengthening of the actuarial profession must be a priority.

12.10 Whatever the process of social security debate and ultimate reform in

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individual countries, it is important for the actuarial profession to get across the message that actuaries can play an important role in the development of policy and its implementation.

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ABSTRACT OF THE DISCUSSION

HELD BY THE INSTITUTE OF ACTUARIES

AND THE SOCIETY OF ACTUARIES IN IRELAND

The President of the Society of Actuaries in Ireland (Mr B. N. Maxwell, F.I.A.): This is the first time that a Sessional Meeting of the Institute of Actuaries has been held in Dublin, and it is an honour for the Society jointly to host the meeting.

The Society of Actuaries in Ireland is the professional body for all 200 actuaries practising in Ireland, but we are not an examining body. All of us have gained our professional qualifications through the Institute of Actuaries or through the Faculty of Actuaries. We are full members of the Institute or of the Faculty as well as of the Society. So, it was obvious that the Society would want to do something to recognise the 150th anniversary of the Institute and of the actuarial profession.

The recent report of the Irish Pensions Board on the National Pensions Policy Initiative, entitled 'Securing Retirement Income', sets out many recommendations for the future of public and private pensions in this country. Working groups are already reviewing the various proposals. This paper, therefore, is very topical to us in Ireland, both to actuaries and to the many other parties involved in pensions and social security.

Mr D. Lewis, F.I.A. (introducing the paper): Social security systems vary widely between different countries:

— There is a wide variety of *benefit levels*, ranging from countries where people must rely on family and the community to support them in their old age, through countries like the United Kingdom, the Netherlands and Ireland, which have a safety net benefit level, to countries which have social security benefits intended to provide people in retirement with a standard of living similar to what they had while they were earning.

— There are big differences in *entitlement* bases. Entitlement to a social security scheme might occur through contributions, as is often the case; or through residence, as happens in some countries; or by means testing, which happens in some other countries.

— The methods of *financing* vary according to whether the employees and/or the employers pay; whether the cost is met by general taxation; from investment income; or from taxes on pensions.

— Considering *funding*, pension systems may be pay-as-you-go or partially or fully funded.

Given that we have such a wide variety of social security systems throughout the world, and such a wide variety of economies, cultures, and political climates that they operate in, it is interesting that so many countries are questioning their social security arrangements.

There are several problems that are giving rise to these discussions:

(1) *Costs*. There are several underlying problems that are causing costs to go up, and these are worrying many people. How will they be able to go on funding their social security schemes in the future? If costs are not seen as a problem, then the other side of the coin is that benefit levels may seem to be too low, which is, perhaps, more of the U.K.'s position.

(2) *The maturing of schemes*. Often schemes were set up with benefits which did not mature for quite a few years, and, unless these were properly costed with an eye to the long-term future when they were established, then people might not be aware that when these schemes reached maturity the costs would rise dramatically.

(3) *Early retirement benefits*. Some schemes give very generous early retirement benefits, which can cost a great deal of money.

(4) *Economic recessions*. These can reduce the income and increase the outgo for schemes simultaneously. One of the things which makes social security affordable is economic growth, and economic recessions, of course, are not the same as economic growth.

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(5) *The role of the welfare state.* The welfare state has an effect on labour markets and on people's incentive to work and to save. Given that the welfare state is often such a large part of an economy, perhaps 12% to 15% of gross domestic product (GDP), then the whole social security system must have an implication for the economics of the country.

(6) *Administration.* This can cause serious problems, and sometimes evasion is also a problem. There may be a multiplicity of schemes or a lack of proper control over assets.

(7) *Demographics.* To illustrate some of the demographics, Figure 2 shows total period fertility rates, which is the sum of birth rates by age for a particular year. It goes back only to 1965, but one can see the trend. Then birth rates were much higher, and above the replacement level, and are now dropping. For many countries they have now dropped to below replacement level, to a level of 1.8, and even lower for some countries. Low birth rates mean fewer workers in the future. Italy, Germany and Japan are particularly affected. Migration can also affect the numbers of, and the timing of, the income and outgo of a scheme.

At the other end of the scale are the expectations of life, as shown in Figures 3 and 4. These show how long people are living, and, for a variety of countries, how life expectations are increasing. Not only are they increasing everywhere, but they are also converging. Figure 3 shows, for male lives, an expectation of life for later cohorts of up to just above 70-75 years of age. Figure 4 shows the equivalent for female lives, which goes even higher.

The consequences of these fertility and mortality changes are apparent in dependency ratios; that is how many people there are over pension age compared with people of working age. Figure 6 shows that dependency ratios are projected to rise significantly, if any of the population projections are to be believed, and, for a pay-as-you-go scheme, increases in the dependency ratio will lead directly to increases in costs of a similar order of magnitude.

Figure 5 shows a cohort survival-type graph, giving the proportion of people who live to different ages, depending on when they were born. Infant mortality has dropped dramatically for later generations of people, and, for the generations born in 2000, the proportion is almost stationary to nearly age 65. Even at ages 85 and 90 there are high proportions of people still alive.

Table 2 reproduces some figures that were given in Chand & Jaeger (1996), and shows the levels of contribution rates in a variety of countries. The first column of figures shows the proportion of GDP that was projected to be paid as contributions in 1995. The second column shows the equivalent contribution rate which would be required throughout the period 1995 to 2050 in order for the scheme to end up in the same position in 2050 as in 1995. The contribution gap is the increase in GDP which is necessary to balance things out over that period. For some countries the increase in cost is equivalent to 3% or 4% of GDP, a very significant burden. So it is a large problem. The U.K. does not have the same scale of problem, but I think that the U.K.'s problem is that the benefits are dropping away.

What should be done? There are no quick and easy solutions. Greater economic growth will help, because it is easier to satisfy the needs of a growing number of pensioners from a growing cake. However, the Asian financial crisis makes the growth outlook very uncertain.

The alternatives: reducing benefits; increasing contribution rates; or increasing government subsidies; will not be popular, but they may have to be contemplated. Wider investment of funds may be a useful option for those schemes that have any significant amount of funds. Saving administrative costs is a possibility, but, generally, administrative costs are a very small proportion of social security costs, and they are not going to save the day.

Indexation is a subtle, but very powerful, method of reducing benefits over time. The indexation of benefits, both before and after retirement, whether to prices, earnings, economic growth or any combination, can have, in the long term, a dramatic effect on the costs of pensions, and maybe a cost that is not realised by the general public.

Reducing accrual rates, probably only future accrual rates, is an option to be considered, perhaps by averaging over longer periods. Increased contribution requirements could be looked at; to raise the minimum number of contributions which are needed to get any pension at all, and to require more contributions to gain a full pension.

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The amounts of sickness and disability pensions have exploded in many countries, and may be a proxy for unemployment benefit for many people. Incentives for early retirements and special benefit privileges, which are a feature of some schemes, should, perhaps, be considered for reduction or removal. If there is any need for special benefit privileges, perhaps it is the employer who should pick up the costs rather than the social security scheme.

The most logical solution might be to increase retirement age. People are living longer and will go on living longer. If people were, at one time, expected to live for only 11 years from age 65, and now are going to live for another 14 years, on average, that is roughly a 25% increase in the cost of the pensions, which could be addressed by increasing the retirement age.

A gradual switch from defined benefit to defined contribution arrangements is taking place, both in social security schemes and in private pension arrangements. A closer correlation of pensions and contributions makes pensions easier to understand, and there is more incentive to contribute. On the other hand, a switch can be used to disguise a cut in benefit.

Defined contribution schemes have taken off in South America and are now coming to the fore in eastern Europe as well. I wonder whether you can call defined contribution schemes social security, in that they do not really redistribute money from people who are well off to those who are not. Other problems with defined contribution schemes, particularly in the private sector, are high expenses and the costs of regulation. Those of us in the U.K. know something about that.

The whole question of whether countries can afford to pay high levels of social security benefit, in order to offer an earnings replacement type scheme rather than a safety net, is one that needs addressing, whether or not means testing is used. Flexible retirement is another option, although I do not think that this is one that will reduce costs in the long term.

Funded schemes can be compulsory or voluntary. Compulsory ones will be seen as a tax, or at least they will be talked about as a tax by any opposition parties that are around when they are introduced; and with voluntary schemes there will always be many who do not want to contribute.

Many of the projections made by actuaries of the finances of social security schemes assume that there will be real earnings growth in the future. If this is maintained over a number of years, then people will be substantially better off, and, perhaps, this extra economic growth can be used to provide decent pensions.

Mr T. N. Sharples, F.I.A. (opening the discussion): The paper begins with a comparison of demographic trends in the OECD countries. I would also have liked to have seen a comparison with demographic trends in the eastern European countries which are cited as examples of countries undergoing reform. Although it is difficult to find reliable statistics, I believe that the OECD countries may be in a relatively favourable position. The total fertility rate, for instance, is only 1.3 in Estonia, 1.5 in Russia and 1.6 in Poland.

Recently in eastern Europe, there has been a reduction in male life expectancy. However, this is probably temporary. Indeed, there is evidence, in Russia, that it is recovering already. This reduction is most active at ages below retirement age, and so far it has had a negative effect on the dependency ratio.

The dependency ratios for pension systems are important, as they are the ratios between contributors and beneficiaries, not just the demographic relationships between different age groups. Unemployment is a major factor affecting dependency ratios, so much so that in France, if you ask commentators what the problem is, then most will say that unemployment is the problem that they have with the system rather than the longer-term demographic trends. They feel that the nationwide complementary unfunded system (AGIRC/ARRCO), with its point value system, has sufficient flexibility to cope with long-term trends. However, it is high unemployment, causing a reduction in contributions, which is the problem, and also the erratic effect that unemployment will have in the future.

In eastern European countries, too, there have been major changes to employment patterns, with growth in the self-employed and informal sectors. This has meant that the coverage of the social security scheme has changed greatly. The self-employed do not now contribute on as much of their income, and, while they will receive lower benefits, those benefits are not going to be received until many years in the future.

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The agricultural sector remains important in many countries in eastern Europe. There have been major changes in the industry structure, involving the removal of collective farms and land ownership reform. In many cases the social security system has been used in an attempt to bear the costs of the restructuring. In Poland farmers have been taken out of the general social security system, and are now financed directly by the Ministry of Agriculture. In other countries farmers are a major drain on the system. In Albania the rural population provides 50% of the beneficiaries, but less than 10% of the contribution income.

Estonia has made a small, but very important, reform to its system. It has made the Social Insurance Board a separate budget entity, which has to stand by itself. Therefore, any benefit increases, including pension increases, have to be covered by increases in contribution income. There, just slightly less than 50% of the electorate are pensioners. It has been a very important change. It has taken benefits out of the political arena for the moment. However, the pressures will grow, as they are growing in the U.K., to do something about benefits.

Too often our advice to countries in eastern Europe and elsewhere is: "This is what we do. You should do it too." The problem is often compounded when this consultancy is being provided as part of an aid or loan programme. The loan agency often has its own agenda, and is looking for results, which can lead to unrealistic expectations of reform on all sides. The World Bank has now recognised that the universal solutions, as set out in *Averting the Old Age Crisis* (World Bank, 1994), have been softened slightly. It is now recognised that this solution is not suitable for all situations.

One idea that has become fashionable recently is the notional defined contribution account system — known as the Swedish model. A major disadvantage of the state-run unfunded pay-as-you-go system is the political risk involved; will people receive the benefits currently promised or, at least, which they think they are promised? Will the government change the rules tomorrow to deprive them of their benefit? History shows that the answer is 'yes'. The proponents of the Swedish model argue that, with a notional defined contribution plan, the government has less control over the benefits, because the investment income added to your account is determined by reference to some external index. Such indices are out of the government's control. However, I do not think so. External indices are affected by political decisions. In many countries the retail price index is a political statement. Very often it is at variance with the experience of people in the marketplace. Even in the United States of America there is debate about the consumer price index, and whether it is too high because of the substitution effect. An example of the substitution effect is as follows. Thirty years ago, if you bought a kettle and left it on, it would boil itself dry. Today it automatically switches itself off. The same goods have improved in quality, but the improvement is not recognised in the consumer price index.

Many of the provident funds operating in Africa are really notionally defined contribution accounts. The investment returns granted to the accounts seem to bear little relation to the investments actually held, and, over time, people have had money taken away from them in real terms.

The section on actuarial modelling presents the results very clearly, and there is no doubt that such projection models assist policymakers greatly in the decision-making process. However, problems are caused when those decision makers see the model as providing the answer, when they try to use the model to generate a policy rather than to justify a policy or to test a policy that is being proposed.

In a situation where the current statistics are not clear, and small changes to future assumptions can make great differences to the outcome of the policies that you are trying to decide upon, the whole output of the model can be put into doubt.

The authors are concerned that the actuarial implications of pension reform are not taken into account sufficiently in the decisions that are made in many countries. The main reason is that the policymakers in these countries do not quite understand what the 'actuarial implications' are. They can grasp the idea of a pension fund as a special type of savings account, especially if they are looking at defined contributions. After some time they appreciate that guarantees are being given, and that, if they are going to give a lifetime pension then they have to make sure that there is enough money to pay everybody. Then they conclude that pension funds must buy annuities from insurance companies. This places the insurance companies in those countries in the same difficult position. They have very rarely provided annuities in the way that insurance companies in the west have provided annuities, so have the same problems, misunderstandings, and lack of actuarial knowledge.

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As a result, the legislation that has been passed in this area has had little understanding of the issues involved. I am not sure, however, that we can get the actuarial message across very quickly. That is not to say that great strides have not been made in actuarial education in these countries.

However, in the current circumstances, this education is, for the students, still very much in the theoretical context. It is not being applied widely by them in practice, as it should be. Until practical experience has been gained, it is not going to be possible to rely on actuarial techniques to provide strong regulation of the pension systems.

Mr A. J. Jeffery, F.I.A.: The savings that we are putting aside for retirement may simply be boosting the stock market. If this money is not actually being turned into genuine investments — there is some evidence that this has happened in the past, and it may still be happening — all that it does is to force up stock market prices. When that money is taken out, the assets will not be there in terms of real value.

More significantly, differences in the demographic patterns in various countries will partially balance each other out by immigration and emigration. Ireland is very familiar with this problem. The population is about half of what it was when the Institute was founded, 150 years ago, almost entirely due to emigration. The consequences of a falling birth rate are going to be very severe. One possible solution is to have more babies, which governments can encourage through advice and tax incentives.

Mr D. I. W. Reynolds, F.I.A.: I take issue with the title of the paper. Why should the fact that mortality is improving and that people live longer lives be a crisis? We should treat this as a measure of success, and a measure of opportunity.

Section 10 shows how actuaries model the consequences of the improvement, but we have to be careful about the conclusions that we draw. More rapidly improving mortality would further worsen the age balance. Mr Jeffery suggested that we could improve the dependency ratio by raising the fertility rate. The French tried that approach a few years ago, and that is the worst possible solution.

As people live longer, we should be more concerned with keeping them active and healthy, in giving them opportunities to work, and so to spread the load. That does not always have to mean employed work. As people get older they need more care, more people who are carers, and that will happen.

If more investment is created through funding, that drives down the return on assets by raising the value of assets already in existence. We have to realise that stock markets are mainly secondary markets, and just affect transfers of current assets between people. Lower returns are equivalent to reducing hurdle rates for projects that will increase economic value. Lower returns, lower requirements to achieve acceptable levels for investment, will give more opportunities to invest in economic benefit.

One reason why people in India have large families is to be sure that they have someone to look after them in old age. The authorities had no success in spreading contraception until there were indications that pensions would be introduced. Once people understood the idea that there would be pensions available in retirement, then they had less need to have larger families.

These things are very complex. We have to make sure that decision-makers think right through the problem. Why is there a problem in France, Germany and Italy with their state pension schemes? Because nobody thought through what would happen if things changed.

None of this will work if individuals do not know what benefits they are getting. Most people I come across are contracted out of the State Earnings Related Pension Scheme in the U.K., but very few know what guaranteed minimum benefits our schemes have to provide. However, it is important that individual members of the population know what benefits they are going to get. I know that is difficult with defined contributions, but, at least if we can tell them what fund they might have when they get to retirement, that will be of benefit.

Mr R. J. Myers, A.I.A. (in a written contribution, of which an abridged version was read to the meeting): I view the matter from the standpoint of my own country, the United States of America. I very much dislike the use of the word 'pillar', because I think that it biases the discussion by

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implying that, to have a stable structure, all four pillars must contribute equally to the solution. Rather, I would use 'floor', with the basic one being a responsible, reasonably adequate pay-as-you-go social insurance system of universal application, and the other three floors being built on top of it, possibly in varying heights. By 'responsible', I agree with the authors' criteria that actuarial analysis should be made over the very long range, and that the contribution rates ultimately provided should not be so high as to be fiscally unaffordable.

One other point that I would make about pay-as-you-go social insurance systems is that they can well have no unfunded liabilities (or, at least, have this as the goal) if these are computed on the open-group method (which is the only proper method to use). If responsible financing is used, then, if adverse experience occurs, legislation reducing benefit costs and/or increasing contribution or other income can completely wipe out any unfunded liabilities shown by the latest preceding actuarial valuation.

The authors point out that one of the solutions to the problem that they pose, of 'longer life', is to raise the minimum retirement age at which full-rate benefits are paid. In my view, this is, by far, the major solution. Briefly, if people live longer and have increased work ability too (as generally seems to be the case), then they should work longer and retire at older ages.

Proposals to raise the retirement age — necessarily on a deferred, gradual basis — are not popular with the general public, and even with policymakers. They appear to think statically about the matter, and believe that the retirement age is as unchangeable as, say, the value of π. They should consider that, if a social security system had been established 150 years ago, it would have had a retirement age of, possibly, 50; they certainly will realise that it would have been untenable to retain such a low age for ever. The authors might well have recognised, to a greater extent in their historical analyses, the underlying dynamic nature of the retirement age.

Probably the greatest weakness (if not the only major one) in the U.S. Social Security programme is that the increasing longevity — both in the past and likely in the future — has not been significantly recognised by corresponding changes in the retirement age. The increase from the 'traditional' age 65 made by the 1983 Act — moving slowly, beginning in 2003, to age 67 for those attaining that age in 2027 — was really only slight recognition. The age currently comparable to age 65 in 1940 (when benefits were first payable) is about age 71, when relative life expectancies are taken into account.

I have advocated that, beginning for those who attain age 65 in 2003, the retirement age should be increased by 2 months for each succeeding year-of-birth cohort indefinitely into the future. Thus, it would reach age 75 for those attaining that age in 2073. Persons with static thinking in this area are, of course, horrified at the thought of this, but if they would only consider it thoroughly, they would appreciate its logic. If, under this procedure, the age were ever to become excessive in relative life-expectancy terms, the increases could be suspended at that time. In the meanwhile, this one change alone would do much to avert 'the crisis of longer life', as well as to put the system on a responsible, sound pay-as-you-go basis.

Mr D. B. Duval, F.I.A.: The idea that the retirement age should be increased is one that makes people think that actuaries do not live in the real world. In the real world most people find it difficult enough to keep a job even up to normal retirement age. There are many people over normal retirement age who want to get work, but it seems impossible to find any. To suggest increasing the normal retirement age in these circumstances seems crazy. We have significant unemployment. As the opener commented, many countries have much higher unemployment than appears in the published statistics, and this is funded through the disability or early retirement programmes. A key reason why social security systems have fewer contributors is not demographic, but because of unemployment. Many people who could work and want to work are unable to do so.

The demographic problem of ageing (which has been very well analysed in the paper) is not necessarily the same as the financial problems facing social security schemes. If you look much more widely than at social security, the big demographic concern for the world is its increasing population. The solution to increasing population is not to have more babies to deal with the 'problem' of increasing longevity; the solution might be to find another world. Alternatively, the solution must be

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to manage better with the population that we actually have. There are big margins in our unemployment rates to deal with much of the demographic shift that is going to occur.

One of the problems in social security is that its financing almost invariably falls on labour, and on labour alone. That is certainly exacerbating unemployment in some of the former central European countries. If social security contributions go up to 45% (as they are now in Poland), then it is not surprising that unemployment is high. We need to get away from that.

One of the proposals in the Irish National Pensions Policy Initiative Report is to create a public fund, which, I think, is the worst of all possible retirement systems. Publicly managed money has a disastrous record all over the world. Essentially, there are two options with such a fund. One option is to give control of it to politicians, and we have learned not to trust them, and the other option is to have nobody in control; there is no alternative mechanism for control in the public sector. An 'independent' social insurance board is either accountable to nobody, or the structure by which it is appointed becomes a political structure in its own right. For example, it is interesting that, in Singapore, the Chairman of the Central Provident Fund is still Lee Kuan Yew. It is the one official post that he chose to retain. In Hungary they insulated the social insurance body so successfully that it had veto rights over any future pensions reform, so it was, in effect, its own independent political system.

If you do not go to that extreme, then the more common position is where management is accountable only to itself, and the result is the normal problem of developing state inefficiency. A public fund is asking for trouble; effectively, the government will borrow money at one rate and invest it at a significantly lower rate.

There is not a complete dichotomy between defined benefit and defined contribution schemes. Most defined contribution systems around the world have guarantees — some of them quite extensive. Many defined benefit schemes have let-outs (like the ones that Mr Myers spoke about), so that, if necessary, benefits can be reduced. So, it is false to talk of the dichotomy between an absolute guarantee of a defined benefit system versus a defined contribution system, where people get just the performance of their particular investments. Most systems combine features of both, and this is logical and sensible. One of the problems with the British system is that it is difficult for private schemes to occupy this middle ground. The legislative structure effectively pushes private schemes to one extreme or the other.

Mr E. P. Heffernan, F.I.A.: I speak as the Chairman of the Irish Pensions Board, and I believe that the most difficult hurdle to cross in terms of pensions reform is the first hurdle, and that is convincing policymakers that there is an issue before it becomes a major problem to which there are only very painful solutions. The cost of social security pensions in Ireland is reducing, and will continue to do so for the next decade or so. Any financial pressures on Irish social security are 20 or more years down the road. Therefore, it pleases me that, in conjunction with the Pensions Board, the Department of Social Community and Family Affairs launched an initiative, two years ago, to look at pensions and, indeed, pensions reform, and I hope that, not for the first time in our history, we have learned from the mistakes of others.

Some of the statistics that relate to Ireland illustrate why doing nothing is not an option. At the present time we have five people of working age for every person over 65. By the middle of the next century this number will have fallen to two people of working age per person over 65. If pensions are indexed to wages, total spending on social welfare pensions will rise, relative to GNP, from a current 4.5% to 7.9% by then. If growth rates are 1% less than assumed, that 7.9% will be practically 14%. If the Exchequer subvention to social welfare pensions is frozen at the present level, and pensions are indexed to wages, then contribution rates for employers and employees will increase by 227% by the middle of the next century. If pensions are indexed to prices rather than to wages, the rate of basic social welfare pension, currently equivalent to 28.5% of national average earnings, will have fallen to 9% of average earnings over the same period, a period in which the number of pensioners will have trebled, from something like a quarter of a million to three quarters of a million.

Mr Duval commented on the Pensions Board's recommendation to create a social insurance fund, that I would call a stability fund. It recognises that, if we continue as we are, this generation of workers

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will have got off lightly, and therefore there is a need to create some form of intergenerational balancing mechanism, perhaps similar to the mechanism that exists in the U.S.A. and in Canada.

The Pensions Board recognised that such a fund would be meaningless if it invested in government securities, and, accordingly, it recommended that no Irish government securities be permitted. Instead, it envisaged that the fund would be managed by an agency independent of government, and would be invested in a broad portfolio of financial assets selected from global financial markets — in other words, the report recognised that, even if we invested in an Irish equity market, a future generation of Irish workers would be responsible for paying the pensions of the current generation, in much the same way as the current pay-as-you-go system.

On the issue of the agency being independent of government, I would draw Mr Duval's attention to the National Treasury Management Agency here, which operates the government debt with a similar independent mandate, and has been very successful.

Concerning supplementary pension provision, in Ireland, at the present time, some 44% of those with pension provision in the private sector, including the self-employed, are in a defined contribution or money purchase arrangement. If the recommendations of the Pensions Board are implemented, this will grow further.

The paper identifies a number of issues relating to pension provision on a defined contribution or a personal pension basis: investment risk; deciding on an appropriate investment policy; annuity risk, falling interest rates; the impact of charges and other administrative costs; mis-selling risk; the impact of maturing defined contribution accounts on equity markets; and the importance of having in place a clear regulatory framework and strong supervisory authority. I agree with these as issues, and would endorse the conclusions in the paper that they need to be addressed in terms of any solution. Two areas additional to those that appear in the paper are critically important in any voluntary supplementary pension system on a defined contribution basis. These are the question of tax stability and education and awareness. As we move from supplementary pension provision on a defined benefit basis to a defined contribution basis, the impact of any tax on the accumulated funds will move from employers to members. Furthermore, if the system is to operate on a voluntary basis, individuals will need to be encouraged to forgo the fruits of today's labour so that they can enjoy them at a future distant date. I believe that any uncertainty in the overall tax regime will act as a major deterrent to the expansion of private pension provision, and could seriously undermine any strategies to increase cover, particularly on a voluntary basis.

The lack of understanding and awareness of pensions among the general public came through very clearly to the Pensions Board, and must be addressed. Market research showed that the primary reason for non-participation in pension provision was 'never thought about it', and lack of appreciation of the importance of retirement planning. Many people have little comprehension of the impact that retirement will have on personal standards of living, and have given little thought to how they will compensate for the absence of employment earnings. There is a tendency to believe that the state will look after them when they retire, and, perhaps, even then they have no real appreciation of the level or extent of social welfare pensions. In order to increase private pensions cover, a co-ordinated and effective public education campaign is needed in order to highlight the importance of making sufficient retirement provision.

Another issue for defined contribution schemes is the question of annuities — and more so, perhaps, index-linked annuities — backed by index-linked assets. As we move towards a single European currency, I would ask who is going to issue the index-linked assets, and what index are they likely to track?

Miss P. E. Merriman, F.I.A.: I draw your attention to the problems posed to voluntary top ups of state pensions by the existence of a means-tested supplement to the basic state pension. Looking at Britain, I believe that William Beveridge's original intention was that the basic state pension would provide all that was needed for the basic means of life, and that there would be room for voluntary supplement to that. However, for many years the basic state pension has been recognised as not being sufficient, on its own, to maintain any sort of standard of living, and there is a system of top-ups on a means-tested basis.

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So long as you have this system, it discourages people from saving more in order to improve their standard of living in retirement. It is a sort of poverty trap — people whose savings would only add marginally to the basic state pension feel that it is not worth them saving, as they will get no more in total when they retire than if they had saved nothing.

I was interested to see, in the report of the Irish Pensions Board, that it is proposing, for the next two years at any rate, that the system of supplementary pensions would be purely voluntary, to see how far the powers of persuasion would go. I believe that the British Government is very much exercised, at the present time, as to whether the new system of pensions to be introduced in Britain will be on a voluntary or on a compulsory basis, but, unless there is some element of compulsion, the lower paid will not participate, because of the existence of a means-tested top up.

I support Mr Heffernan on the advantages of a partly funded pension system, particularly for smaller countries, where the money can be invested outside the country itself. In this case, the existence of additional reserves provide a real protection for future generations.

Mr S. F. Whelan, F.F.A.: I think that there exists a straightforward solution to the problem posed by the paper that makes everybody a little bit happier. Given a rich or a relatively rich society, that is a society that people of working age might want to join, then there is a straightforward answer to the problem, phrased by Mr Jeffery as: work has to be done in the future and we will be too old and too frail to do it. Someone has to do it. Normally it would be our children. We can have children ourselves, or we can foster or adopt. By this I mean that we can attract people of working age from poorer countries who may want to come here when they attain working age, 18-21. We need not just foster them (i.e. give them no entitlements to our social welfare system), we can adopt them (i.e. give them full entitlements), because, when they draw them down, neither we nor, by assumption, our children will be around.

What needs to happen — ignoring the problem of funding — is that we build an infrastructure in which future generations will want to live; then we may be able to attract people of working age from other countries, in which people will want to live and will want to work. If they are not our own children, then they can be other people's children. This solution brings happiness to those who seek opportunities here, and happiness for ourselves, because we do not have to do the work when old and frail.

Mr P. J. Maher, F.I.A.: I want to draw attention to Figure 5, which shows the effect of mortality in successive 20-year periods for the U.K. Ireland was part of the U.K. in 1900 and 1920, and Irish mortality was much heavier. The gap has closed considerably since then, but even back in the 1960s we used to rate up something like two years to adjust to U.K. mortality. I am sure that the GAD has good enough regional statistics to take Ireland out of the U.K. figures if it wanted to do so.

As regards ¶4.3, I fail to see why, in any funding of the social security system here, we cannot invest in the infrastructure in Ireland. We are looking at private finance initiatives, and so on, to meet our need for infrastructure, which is in a very bad way. This affects the future progress and competitiveness of those who have to generate increased transfer payments. We do not have anything like the accumulated build up that other countries have.

Mr P. A. C. Seymour, F.I.A.: The debate about whether funding in a macro-economic sense does, or does not, make any difference, particularly if you invest in your own country, is interesting. It might improve economic growth rates, and therefore make the problem less.

Mr Duval pointed out that the problem in the world is too many people, and now Mr Whelan has proposed that we should bring the people to us. However, it would be a major issue to bring people to us to keep us going, even within a 50-year time frame.

However, does not the use of capital effectively offer the same option? If we take our capital to the developing countries, those people, it is hoped, will have a much higher growth rate, and, in effect, by having the capital there, the value added by their work is coming back to us to support our generation. I very much agree that, if we are going to adopt a funded approach, we must invest funds into the world economy as a whole.

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Mr B. Duncan, F.I.A.: I was involved in two actuarial reviews of the Irish social welfare system. The first was done six or seven years ago, and we identified the problem with the substantial increase expected in our dependency ratio. At the time the Irish economy was going through a very difficult period, so the conclusion from that review was that: "this is a disaster, something will have to be done."

We conducted another review two years ago, and produced broadly the same conclusions, but at that time we were the 'Celtic tiger', and everyone said: "There is no problem. We can afford all these increased pensions". That was a big turnaround in a five-year period.

Over the next 60 years we are going to go through all economic cycles, and we need a robust system to survive. I think that a suitable system is a fairly simple, not all that generous, flat rate pension scheme that can be flexed, if necessary, but which is never going to be an overwhelming financial burden. For years, some people in Ireland have looked with envy at the level of state pensions in continental Europe, and even in the U.K. I suspect, now, that we were right all along, even if we did not know that at the time, and that more countries are going to move towards the Irish system.

Second tier pensions are desirable, so, according to popular argument, there should be many incentives for them, with additional education and training, and eventually people will see the sense and take out voluntary pensions. Exactly the same result can be achieved overnight by making second tier pensions compulsory. As a profession, it might be worth our while spending time putting more thought into how can we make compulsory second tier pensions workable.

Mr D. M. Riddington, F.I.A.: The numbers of people who are converting to retirement are going up, and are going to continue to go up dramatically. The numbers remaining in employment, and therefore contributing to pension provision in whatever way it is done, will continue to go down for some time, and, as the paper says, the net result of that is likely to be major disinvestment, certainly in the equity market. That has all sorts of possible repercussions in terms of the economy of the country, company performance, etc. I wonder whether the effect of this has really been thought through.

The converse is that there is going to be a hugely increasing market for pension annuity business, that, in itself, requires the right matching assets. We are already starting to see difficulties in getting the right assets to give a level of income that people find acceptable at retirement, and that is going to be exacerbated in the future. I wonder whether the insurance market in the U.K. and, perhaps slightly further down the line, in Ireland, is prepared to underwrite the required level of pension annuities that are going to be devolved out of the changing demographics, and whether they are prepared to take the mortality and investment risks that will come with that.

We will have to find a better way of converting investments into income. I think, particularly, in terms of developing with-profits annuities, unit-linked annuities and annuities where we do not have to divest so quickly from the equity market.

Mr A. D. Horn, F.I.A.: I think that compulsion may be the easy way out, and I expect it within five years. What is the problem that we face? It is that people are not making sufficient provision for their pensions, whether that be as individuals or by the government. One way is to hit them with a stick and say: "You will do it." Maybe, in theory, a much simpler solution is to educate them as to the value of pensions. People have no trouble providing for houses and cars, both of which are a lot less valuable than a pension. If people actually understood the value of pensions — and more importantly, understood how much they actually have to contribute — they would probably choose to make enough provision.

Mr A. R. Munro, F.F.A. (in a written contribution, of which an abridged version was read to the meeting): I was disappointed that no additional commentary on the very successful Singapore Central Provident Fund (CPF) was given. For years now, the CPF has been viewed, justifiably, as a world-class leader, and has been operating exceptionally successfully.

However, during a recent visit to Singapore, I was surprised to hear concerns being expressed that

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many members of the CPF will reach retirement without sufficient resources for their retirement needs, and this is despite the very high total contribution rate of 40% of salaries. On enquiring how such a situation could possibly arise, I found that the fund had made a 'minor adjustment to its regulations'. Historically, the CPF has had two major reasons for existence:
— to provide for members' retirement needs; and
— to provide finances so that members can purchase housing.

Historically, both needs have been met adequately. However, until recently only the first purchase could be financed by CPF assets and contributions. If a member wished to upgrade his accommodation, the CPF could not be used to finance that. The regulations were, however, relaxed to permit the financing of these improved accommodations. Seemingly, this was a minor change.

The systemic effect has been rather significant, and prices have soared, in response to the enlarged group of buyers of 'upgraded housing'. This results in significantly larger payments out of the retirement part of the fund, and hence the concern that many will reach retirement with very good accommodation, but insufficient capital to provide for their needs throughout their old age.

The CPF cannot easily reverse this situation. Restoring the previous situation would, almost certainly, result in accommodation prices falling significantly. This would leave some, maybe many, members in a position where, with hindsight, they had overpaid for their accommodation. Some might have mortgage bonds in excess of the new market value of their property. In short, this is a situation that is very difficult to reverse.

Although this is not a specially actuarial question, it does demonstrate how important systemic impacts can be on even, what were regarded as, exceptionally successful social security schemes.

Mr J. R. Kehoe, F.I.A. (closing the discussion): Contrary to what Mr Duncan said, I do not think that we should under-estimate the power of education when it comes to solving this demographic problem. I remember being very impressed, some time ago, when I came across a survey which asked the question: "What is the single most significant factor affecting infant mortality?". You might think that the answer would be the standard of healthcare, or the GDP per capita, but it is not. Globally, the single most significant factor affecting infant mortality is the standard of education of the mother. We have an opportunity to educate our young people as to what is going to happen over the next half century in a pension context, and I would not under-estimate their capacity to respond voluntarily. The Irish nation is not noted for its capacity to respond constructively to compulsion.

According to recent OECD statistics, over the next 25 years around 70m people will retire, to be replaced by just 5m new workers. This contrasts strongly with the past period where 45m new pensioners were replaced by a workforce of 120m 'baby boomers'. Despite these stark statistics, I am very confident about the future, and I would certainly describe the demographic changes as giving rise to a challenge rather than to a crisis.

I was impressed by the balanced view presented in Section 12, which states: "It is … unreasonable to expect there to be any panacea for the significant problems facing social security pension schemes". The authors go on to say: "Payment of pensions to the elderly involves a transfer of resources from those parts of the economy where wealth is being created. This is so, whether it is done through transfer payments (by means of tax or a public social security system) or through a funded system involving the private sector."

So, throughout the paper and throughout the discussion there has been a lot of balance about the issue of whether funding is better or worse than pay-as-you-go. The profession has come a long way in the context of that particular debate, and is now much more receptive to the argument that there is not such a difference between pay-as-you-go and funding when it comes to transferring resources.

I have been very impressed by the work of Robert Brown, an eminent Canadian actuary, of the University of Waterloo. He does not believe that funding social security benefits makes sense. Mr Heffernan explained the concept of an equalising fund that might be invested abroad. That would have some merit if it can be achieved in a political context, which is difficult when there is a huge demand for our own infrastructure to be improved. Ten years ago, Francisco Bayo, the Chief Actuary of the U.S. social security system, wrote the following: "For social security you cannot accumulate assets,

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i.e. claims from somebody else's production. If we have a large amount of money in the social security trust funds, we have a claim on ourselves which does not have much meaning. The truth is whatever is going to be consumed, be it a product that you can get a physical hold of or services that are very difficult to hold, those products cannot be stockpiled. They have to be produced at the time of consumption. No matter what kind of financing we are going to have in our social security programme, you will find that the benefits that will be obtained by the beneficiary in the year 2050 will have to be produced by the workers in the year 2050 or just a few years earlier."

In a well-argued paper, relating to Canada's social security system, published in 1996, Robert Brown concluded: "Pre-funding of social security does not solve Canada's demographic problems. Those who believe that it does confuse macro-economic problems with micro-economic solutions". Happily, the Canadian Government listened to Robert Brown, and rejected the Chilean model. As a system for social security, it suffers from what I would regard as unacceptable disadvantages. In the first place, as with any defined contribution scheme, the investment risk, inflation risk and mortality risk fall on the shoulders of the individual; it offers no wealth redistribution system, which, I believe, should really underpin any social security system on the basis of social solidarity. In other words, if an individual is poor throughout his or her lifetime, he or she is going to be guaranteed poverty in retirement; and likewise, if a person is wealthy throughout his or her lifetime, he or she is going to be guaranteed a wealthy retirement, probably aided by tax incentives. It also discriminates seriously against people who take career breaks to rear children. Unless there is specific legislation to impose unisex annuity rates, it will discriminate against women at the point of retirement. I am sceptical about any form of compulsory defined contribution arrangements constituting, or having a part to play in, any sensible social security programme.

I think that the Irish model has a lot going for it. We have earned a reputation of being the Celtic tiger economy, with GDP growth over the past decade something like twice the European average; our inflation rate has averaged 2.6% as opposed to the European average of 3.8%; the government deficit has been consistently below the Maastricht criterion of 3%, and unemployment has fallen from about 15% to just over 9%.

This has not always been the case. The Irish social security system developed from very rudimentary beginnings, where we provided means-tested benefits only to relieve absolute poverty, but the system has evolved over the past 50 years to arrive at a situation where we spend £4.5bn on social welfare benefits, accounting for about one-third of net government expenditure and about 11.2% of GNP.

The income maintenance payments consist of the social insurance benefits, which are not means tested, but are based on a person's contribution record, and social assistance benefits, which are designed really to help people who cannot satisfy the social insurance entitlements. The system has about 1.5 m contributors, and makes weekly payments to 860,000 beneficiaries, roughly split 50-50 between those who are in the social insurance programme and those who are dependent on means-tested benefits. The entire system is administered by the Department of Social Community and Family Affairs, at an overall cost of 4.6% of expenditure. This is a very significant factor when you compare the expense rates that are involved in, say, the Chilean system of 15% to 20%.

For pensions purposes, the social security system is supplemented by a tax environment which encourages occupational pension provision and personal pension savings. At present the state pension amounts to about 28.5% of average earnings. The recent National Pensions Policy Initiative strongly advocated that this should be increased, in the short term, to 34% of average earnings, and to be indexed thereafter to earnings. It also advocated further facilitating the voluntary retirement savings to help atypical workers, part time workers and homemakers.

The benefit levels are driven, primarily, by a social inclusion strategy, which fundamentally aims at combating relative poverty as opposed to absolute poverty. In effect, the state pension is designed to ensure that, at a minimum, pensioners have the guarantee of an income which not only provides for their essential needs, but also enables them to participate in activities which are regarded as the norm for other people in Irish society. Given a defined benefit scheme aiming to provide 34% of average earnings as a base pension level, there are certainly challenges to be faced over the next 30 years or so, as the number of people in the population aged over 65 grows from 11% to 27%. On any

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reasonable expectation regarding economic growth, I would describe this as a challenge rather than a crisis.

The OECD has published a report entitled *Maintaining Prosperity in an Ageing Society*. When completing the order form, I noticed that it was inadvertently described as *Managing Prosperity in an Ageing Society*. This is really what the debate should be about. It is fair to assume that prosperity will be created through the impact of productivity and economic growth. The real challenge will be how to divide the cake in a way that achieves inter-generational equity. The reality is that, probably, there are going to be higher tax rates or higher social security contributions, but there is a reasonable expectation that the level of production will be sufficient to sustain those.

Mr C. D. Daykin, C.B., F.I.A., Hon.F.F.A. (replying): The title was deliberately ironic. We were not really suggesting that longer life is a crisis. Indeed, we should be pleased that people are living longer, although some see it as a crisis from a public finance point of view. It was the World Bank which coined the phrase "averting the old age crisis" in the book published a few years ago (World Bank, 1994). I do not think that we really accept that it is a crisis, but it is a problem that needs to be managed and thought about, and not just allowed to creep up upon us.

As my fellow author mentioned, economic growth over the next 30, 40 or 50 years is likely to mean that some increase in spending on social security will be readily affordable in most industrialised countries. We should not get too worried about it, but we should think ahead about the costs. Some countries have more of a problem than others. I think particularly of Japan, which has the most seriously ageing population in the world. The very rapid ageing which is taking place there will cause them quite major strains of financing.

We will have to think more about the question of retirement age and the life cycle. We cannot just push up the retirement age and assume that everybody will be in work up to ages 70 or 75. There are issues concerning the expectations of how long people should work and the duration of retirement.

Pension systems which rely on a pension being defined in terms of the salary at retirement may work the wrong way, because they encourage people to think that their salaries will go on rising up to pension age, whereas we should, perhaps, be thinking about people reducing their level of work as they get older, with their pensions being based more on the average salary over their whole career rather than just on their salary at retirement age.

I shall not go into detail on the eastern European situation here. Their demographics are quite variable from country to country. Generally they have low fertility, but the expectation of life is not as high as in the OECD countries, and has actually been getting worse in recent years, although that will, no doubt, be a temporary phenomenon. The real problem is that there has been a fundamental transition of the economy. With unemployment developing and major differences of wealth occurring between people, which were not present under the former regimes, social security systems have buckled under the strain, and cannot cope. Some countries have not re-valued their pensions as inflation has shot up, with the result that what was intended to be an earnings-related system has suddenly become a flat-rate system, as, for example, in Bulgaria, where almost all the pensions are now paid at the minimum level. A key factor for these countries, as indeed, perhaps, for all countries, is to achieve economic growth in the long term in order to make the system affordable.

A major issue for actuaries to address is the development of the annuity market. Chile now has more premium income for the purchase of annuities than for the rest of the life insurance market. Mexico introduced its new funded system only just over a year ago, and it is already in a similar situation. This is guaranteed business with index-linked annuities. They have index-linked bonds on offer from the government, but not of sufficient duration to match the liabilities in a way which actuaries would regard as satisfactory. Then there is the issue of who is going to issue these investments. Is it just transferring the risk back to the government if you rely on index-linked government bonds? Perhaps with-profits annuities may have something to offer, as Mr Riddington suggested.

One of the reasons for writing this paper was to encourage actuaries to think about some of the wider issues, and not just to operate in a narrow technical context. We should widen our perspective to some of the social issues and other aspects of social security reform, because it is not just a

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technical issue. Pension reform involves the whole structure of society and the whole economic situation. These are matters on which actuaries ought to have something to say, but where often, in the past, we have been a bit narrow in our thinking. In today's context, when so many countries are reviewing these issues on a large scale, we need to have actuaries thinking about the issues and having their views heard.

The President (Mr P. N. Thornton, F.I.A.): We have had an extremely good discussion, as befits a joint meeting of the Society of Actuaries in Ireland and the Institute of Actuaries.

I particularly welcome, both in the paper and in the discussion, the way in which actuaries are looking at the wider implications of their work and are not rooted purely in the technical aspects. We need to continue in that vein, and work with economists to understand even better the economic implications of pensions issues.

One subject that I thought might have been mentioned, but was not, was the scale of pension liabilities in other European Union countries, and the extent to which this might threaten European monetary union.

I was not surprised that the question of compulsion was raised. Effectively, we do have compulsion in the U.K. to a certain extent. I think that that is the right way to go. There are some difficulties with compulsion, of course, and I think that we need to help our policymakers address those difficulties.

Another theme that I thought we might have spent a little more time on was the role of the employers who provide occupational schemes. There is a tendency to take for granted the willingness of employers to provide pensions. We are beginning to test that willingness in the U.K. with some recent tax changes, and it is not a truism that employers have to provide pension schemes. We need to make sure that policymakers understand that, if occupational pension schemes are to be part of the framework, then employers need appropriate assistance and encouragement.

An issue surrounding employers, which Mr Lewis touched on, is the way in which employers are moving from defined benefit to defined contribution designs in many countries around the world, but, typically, with a much reduced level of contribution input. The implications will be much reduced benefits in the future. We are coming to the point where the actuarial profession may need to consider speaking out and drawing attention more widely to what is happening. We, as individual actuaries advising our clients, can see it happening, but not enough is being done to warn of the future dangers.

The best way of summing up the discussion and concluding this vote of thanks is to go back to the final few words of the paper: "Whatever the process of social security debate and ultimate reform in individual countries, it is important for the actuarial profession to get across the message that actuaries can play an important role in the development of policy and its implementation."

I hope that this discussion has proved that. I thank the authors of the paper, the opener and the closer and all those who joined in the discussion.

WRITTEN CONTRIBUTIONS

Mr I. J. Kenna, A.I.A.: I make three points in relation to this excellent paper:

(1) I am pleased that there is no reference to the danger of default in the payment of pensions by younger generations. Of course, the danger of default on an even wider scale does exist. Money could be demonetised, for example. However, the possibility of crisis measures would merit a completely different paper.

(2) There is still the danger of mis-selling. Securities which are appropriate to a flutter with surplus cash are not appropriate to pensions. The free market can only operate satisfactorily within a strong regulatory framework. We do not wish to see again the situation shown by such as the Life Assurance and Unit Trust Regulatory Organisation (LAUTRO) in the late 1980s.

(3) In ¶6.1, the point is sensibly made that "Additional monies for investment, moreover, will not automatically generate economic growth, unless they can be utilised productively and not simply force up prices in stock markets". Because of the phenomenon, first observed by Redington, of too much money chasing too few shares, prices in stock markets have been forced up to

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unrealistic levels. The corollary of the authors' statement is that pensions actuaries and trustees should pull pension fund investment out of overpriced stock markets, gaining useful capital appreciation for pension funds while the going is good.

Professor T. Pentikäinen: I here present some supplementary information concerning the Finnish system, referred to in ¶2.8, particularly relating to innovations that might be of larger common interest.

Originally Finland, as many other countries, had a nearly *fully funded* system. Under this system benefits accrue slowly, however, and remain at a very low level for a long time. As inflation also had fatal consequences, the scheme became most unpopular, and was replaced by a flat-rate scheme in 1957. It was believed that voluntary earnings-related complementary schemes and individual insurance would develop as viable supplements to the mandatory pensions. The idea resembled that of the U.K. system proposed by Beveridge and the post-war solutions of Scandinavia following its principles. The experiences of all these countries, as well as Finland, were, however, that the complementary schemes had not attained satisfactory coverage, and were often insufficient as regards benefits. These experiences led to the complementary schemes of all these countries being made statutory. This should be kept in mind now when the World Bank, among others, apparently ignorant of previous experiences, surprisingly suggests a return to that very system, which already proved a failure in many countries.

Complementary schemes were, thus, also made obligatory in Finland. This happened in 1962. Then the same problems were solved, as also discussed in the paper:

— The target level for the pensions was defined as 60% of the final salary without any upper limits (pension ceiling) in Finnish marks, i.e. the defined benefit system was assumed.
— The organisation was fully privatised, so that each employer may choose his own pension insurance company where his personnel is insured, or he may establish his own pension fund.
— The benefits are fully vested. The transferability of benefits earned in the custody of various pension institutions is an inconvenience in decentralised schemes. It was solved by establishing a nation-wide central register, where pension rights accrued from employment under all the different employers or during self-employment are registered. The last pension institution gets, ex officio, the data from the insured person's whole working career, and awards a pension based on these records. The costs are settled annually between the pension institutions, considering the different employment contracts under which the different parts of the pension have accrued.
— The financing is a mix of pay-as-you-go and a funded system. Approximately one quarter of the pensions are paid through funds. Index protection and certain benefits are financed by pooling among all the pension institutions.
— The funded reserves have also functioned as a buffer against fluctuations in pensions expenditures and incomes. These are provoked by the upturns and downturns of the country's national economy.
— Employer organisations and trade unions are well represented in all pension institutions, which has proved very useful from the point of view of the popularity of the schemes and of further development of it, and the information flow between the insurers and the customers.

Supplementary pensions were first built on top of the *flat rate pensions*. The combination proved inconvenient, however, since it was difficult to dimension the pension total so that it would not be too high nor too low. An important rationalisation was implemented in 1975. Earnings-related pensions, determined according to the real earnings, were made primary, and the flat rate pension should be supplemented only for those whose earnings-related pensions remain insufficient to provide a minimum income. (It is interesting that Sweden is planning a similar guaranteed pension system.)

This fact and the lack of a pension ceiling result in that the three pillar system, common abroad, has been amalgamated into almost only one pillar in Finland. This makes the system less patchy, avoiding overlappings and gaps in benefits and reducing costs. Due to the lack of a pension ceiling, the need for supplementary individual pensions has decreased.

Since the ageing process and the need for retirement vary by individual, a single common

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retirement age (in Finland 65 years) is not satisfactory. That is why it was made possible to retire on an early pension either through a kind of moderated disability pension on grounds of impaired health, or by calculating a smaller amount of pension as it is taken early, or through a part-time employee pension. These reforms, believed to be useful under conditions, have, however, brought with them exceptionally big expenses, largely due to the pressure caused by high unemployment.

The ageing problem is also of current concern in Finland. Changes have already been made in the systems in order to reduce the costs without affecting the original target structure. A major campaign is presently being prepared, aiming to make people stay longer at work instead of retiring far too early, as is now the case. Being well aware of how difficult it is to implement such a project, it is still believed that, through a coherent combination of various measures and through extensive long-term information activities aimed also at the grassroots level, this will be achieved, at least at the point when the baby boom generation retires, and unemployment turns into shortage of labour. This will also strongly motivate the employers to hold on to their ageing employees. Gerontologists have shown that, as the common average age of the population rises strongly, the age up till which the majority of ageing employees will still be capable to work without unreasonable strain will also rise.

The discussions about defined benefit and defined contribution alternatives have also reached Finland. It seems as if those in favour of the latter (including the World Bank) have forgotten the primary purpose of the pension. According to the general indemnification idea of insurance, the pension should compensate for the earnings loss at retirement while preserving a reasonable standard of living. Retirement should not be an economic collapse for the family! The defined contribution option does not meet this requirement, since the pension will frequently be random, and often the contribution may be set too low or the payment of contributions started too late, resulting in that the recipient will never reach a proper pension level, which he might realise too late.

I vigorously support the defined benefit alternative. It has been the policy in Finland from the beginning, and I believe that it will be retained. I read a comment by Professor Wilkie which strongly took the same direction (*Transactions of the International Congress of Actuaries*, 1998, **1**, 27). "In the U.K. defined contribution (money purchase) schemes were widely used in the 1920s to 1950s. They proved extremely unsatisfactory for many pensioners and defined benefit schemes became fashionable. The pendulum is now swinging back towards defined contribution schemes." Professor Wilkie has no doubts that their faults will have become apparent and the pendulum will swing once again.

The same has been stated in the editorial of *The Actuary* (Sept. 1998): "The core service offered by the insurance industry is insurance, which means accepting risks rather than simply passing them on to the customer".

It seems to me that the discussion on the purpose of pensions reflects a universal pendulum between the so-called shareholder and stakeholder ideologies covering the whole society. The first mentioned (called neo-liberalism or Thatcherism or Reaganism) is now the trend. The market forces must be given free play scope, but they appreciate only economic values. Pensions are seen as annoying cost factors. It is promulgated that an individual should have responsibility to provide for the risks related to old age and other social risks concerning himself and his family. The fact is ignored that such a system has been tested in numerous countries in the course of time, and has been proved not to work. The social ills and terrible slum areas have appeared in the countries which have disregarded a decent protection against primary social risks.

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