

EXECUTIVE SUMMARY

1. In December 2004, following a discussion at the October 2004 meeting of Ministers and Governors of the Group of Ten, G10 Deputies gave a mandate to a group of interested parties to undertake work on the implications for financial markets and economic policies of pension system reform in the context of ageing populations, with a view to informing the discussion of Ministers and Governors at their 2005 meeting.¹ This work has led to the current report, whose principal conclusions and recommendations are as follows:

- changes under way in public and private pension schemes may increase significantly the influence of retirement saving and related capital flows in financial markets;
- governments could help to facilitate the development and expansion of markets for under-supplied financial instruments that will be useful for retirement savings and the provision of pension benefits;
- regulatory and supervisory developments should aim to influence and support the trend towards more rigorous risk management, greater transparency, and better governance at private pension funds, also by ensuring consistency between funding and prudential requirements and accounting standards;
- tax rules should not hinder the build-up of funding buffers by private pension funds, but should avoid the abuse of tax deferrals; and
- as risks are increasingly being shifted to individual households, protection of pension beneficiaries is an issue, and financial education and the provision of advice may need to be strengthened.

2. Because fertility and mortality rates change gradually, it has been known for some time that advanced economies face an unprecedentedly steep increase in their old-age dependency ratio owing to declining fertility, increasing longevity, and, to a lesser extent, the approaching of retirement age of the post-war baby boom generation. Moreover, past projections of life expectancy have tended to undershoot the actual upward trend in longevity, highlighting the risk that populations may age even more rapidly than currently envisaged. These demographic trends are likely to have a number of significant macroeconomic effects. A G10 report published in 1998 discussed the implications for the sustainability of public finances, as well as the impact of ageing on growth and living standards, financial markets and international capital flows. It also suggested that population ageing might result in a shifting of risk between sectors of the economy.

3. Since that time, and in line with the main recommendations of that report, policymakers in most G10 countries (and a number of others facing similar circumstances) have taken action to cope with the ageing problem, including in some cases through labour market reforms (aimed at increasing the employment ratio) and fiscal consolidation (which contributes to raising the national saving rate and creating room for future public pension outlays). In order to mitigate the direct fiscal impact, via public pension systems, of population ageing, the responses have tended to involve higher contributions, lower

¹ Representatives of the Netherlands, Switzerland, the United Kingdom, the ECB, the IMF, the OECD, and the G10 Secretariat participated in the work, which was carried out under the chairmanship of Ignazio Visco, G10 Central Bank Deputy for Italy. In addition, contact points for each G10 member provided factual material and feedback, though the responsibility for the views expressed in the report remains with the authors. Appendix A lists contributors and contact points.

replacement rates, and/or later retirement. In many G10 countries, the option of dealing with the problem solely by increasing tax/contribution rates is constrained by the already high level of such rates and the fear of negative effects on the cost and supply of labour. In several countries the response to the fiscal sustainability threat has still, however, to be completed, and achieving the necessary consensus across generations and political parties remains a major challenge for governments.

4. There have also been substantial changes in many private pension schemes in recent years. Sometimes because of government-mandated retirement savings schemes, in other cases as a result of public benefits being made less generous, there has been rapid growth of private retirement schemes in most G10 countries. Initially, the bulk of these were defined benefit (DB) schemes, but in a number of countries the emergence of funding gaps in DB plans and institutional changes have led to a rise in the proportion of defined contribution (DC) plans. On balance, these and other economic reforms have resulted in a shift of risk bearing from the government and corporate sectors to individuals.

5. While more resources are being channelled to capital markets to provide for retirement, the effect on total national savings is less clear-cut, since at least some of the increase in funded retirement saving is likely to displace other saving. There is realistically a limit on the proportion of national output that will flow to retirees, which may be reached as old age dependency ratios rise. Hence, whether retirement incomes will continue to meet populations' aspirations depends on the long-term economic growth rate, and with it the volume and efficiency of investment of overall saving. Policies to increase national saving may therefore be needed in at least some G10 countries if a dramatic fall in replacement rates in coming decades is to be avoided.

6. Much of the additional retirement-related flows to capital markets will be intermediated by pension funds, which have already become the largest institutional investor class in the G10 economies, although their importance varies considerably across countries. These funds are therefore the focus of this report, although in some countries other types of institutional investor, such as insurance companies, currently play an important role in retirement saving. Experience to date suggests that there may be scope to strengthen the transparency and governance of pension funds, and regulation and supervision may be able to play a role in encouraging moves in that direction. In the light of pension funds' growing importance, it will become increasingly important to ensure that regulation, accounting, and governance of such funds is adequate so as to safeguard both the provision of adequate retirement incomes and financial stability, thereby also avoiding large-scale contingent fiscal liabilities arising from pressures for public bailouts of failing pension funds.

7. Given the large and increasing size of pension fund portfolios, shifts in asset allocations in response to the evolution of their own investment strategies or to accounting and regulatory changes could also affect the level and volatility of asset prices. For example, in order to better match their assets and liabilities, pension funds may undertake a shift from equities to long-term bonds, potentially depressing share prices and flattening the yield curve for a time. A rapid reallocation seems unlikely, however, and the magnitude of the impact of such a shift is very uncertain. On the other hand, DB funds with funding gaps may have an incentive to invest in riskier assets to enhance returns and restore full funding of future commitments, especially given the relatively low yield of longer-term bonds in many countries at present. Also, DC funds may allow for excessive risk-taking on the part of employees (many of whom may have limited knowledge of financial products and of their implications for their retirement incomes), such as investment in the equity of the plan sponsor. Experience to date, however, suggests that the opposite possibility is more likely, that is, that workers will tend to invest too conservatively to deliver satisfactory long-term returns. Finally, the expected continued rapid growth of funded pension arrangements may result in a need to monitor the risks of herding behaviour or the use of investments with poorly understood risk profiles in order to avoid undue threats to financial stability and to the stability of pension funds themselves. These risks could be amplified by changes in international accounting standards, with a possible increase in the volatility of funding requirements and procyclical trading effects.

8. Changes in the age structure of populations may influence the conduct of monetary policy over time, but population ageing per se does not seem to require specific policy interventions or framework changes. Ageing is likely to affect potential growth rates, which has implications for the setting of policy, and may affect the transmission of monetary policy through shifts in the relative importance of wealth and bank credit. Ageing may also exert pressure on asset prices, although how central banks should react to this pressure is an open question. In many cases, it might be preferable to react via prudential policies rather than monetary policy, especially if household savings were concentrated in highly leveraged and relatively illiquid forms, as is sometimes the case with real estate, although the latter certainly has a place in retirement saving and the provision of retirement incomes. Central banks also need to be mindful of the potential for financial instability arising from the possibility of a sudden asset sell-off by large elderly cohorts, although research to date suggests that such a development is unlikely.

9. Another important question pertaining to retirement-related investment strategies is whether an appropriate range of financial instruments is or will become available. Very long-dated and index-linked bonds seem to be currently under-supplied relative to perceived or expected demand, limiting the ability of pension funds and insurance companies to hedge long-term liabilities. Furthermore, pension funds may wish to hedge their longevity risk, for instance by purchasing specific instruments which are only just beginning to be developed. In addition, payout instruments such as annuities and flexible real estate products are useful for providing retirement incomes, but in a number of G10 countries the markets for these products are thin or non-existent. Constraints on the issuance of suitable instruments include the complexity and variability of tax systems; entrenched advantages of more traditional financial products; the difficulty of measuring and pricing extreme longevity risk; the relatively limited depth and breadth of mortgage markets in some G10 countries; and the limited financial sophistication of the average household.

10. In the absence of suitable policy action, the reform of pension systems in the context of rapid population ageing poses a number of risks to financial stability and fiscal sustainability. The report's main policy conclusions can be grouped under three headings: (i) supervision and regulation; (ii) the supply of suitable financial instruments; and (iii) protection of pension beneficiaries and financial education. The three areas are inter-related, making a comprehensive approach preferable. Each area involves tradeoffs, such as between free choice of investments and effective prudential standards, or between maximising returns and ensuring secure retirement incomes. Striking the right balance between such competing objectives is to a large extent a matter of social preference, and it is not to be expected that all countries will make the same choices.

11. Policy actions that could be considered in the area of pension fund supervision and regulation include: eliminating regulatory provisions that hinder the development of instruments that facilitate risk management by providers of retirement savings; encouraging greater consistency between assumptions used for accounting, funding and tax expensing purposes; mandating regular updates of longevity assumptions; providing incentives to pension fund plan sponsors to build reasonable and prudent funding buffers to withstand adverse shocks to assets or liabilities (while limiting the possibility of overfunding appropriations as well as the accumulation of surpluses to exploit tax deferrals); strengthening prudential elements of pension fund supervision, such as the use of sensitivity analysis and stress-testing; requiring legal separation of plans and plan sponsors; and relaxing restrictions on investment of pension fund assets abroad.

12. Spurring the supply of suitable financial instruments could in some cases be facilitated by actions by public issuers. In order to help pension funds to better match assets and liabilities, governments might consider issuing sufficiently large amounts of very-long dated bonds and index-linked bonds. This might, however, involve the assumption of greater risks and perhaps also higher debt service costs on the part of the government, which would need to balance any such incremental costs against the benefits of increasing

the efficiency of the market and reducing contingent fiscal liabilities related to pension fund mismatches. Further work is warranted to define more precisely a framework to allow governments to weigh these considerations. In addition, to permit better hedging of risks – particularly “tail” risks of extreme longevity – governments might consider a variety of methods (*e.g.* issuance of longevity bonds) to facilitate their management. Nonetheless, there will likely remain longevity risks that are largely undiversifiable and therefore unlikely to be insured via the market, and governments will have to decide whether, how, and under which circumstances they may be prepared to assume such risks. Given that G10 governments already have some exposure to longevity risks, additional analysis of how such exposure compares to the optimal level would be useful.

13. Greater attention might also need to be afforded to protection of pension beneficiaries and financial education as pension-related risk continues to shift away from governments and employers onto individual employees and households. As concerns pension beneficiary protection, some countries have introduced pension guarantee funds to help insure against the risk of pension scheme failures. Their experience, as well as the inherent problems of moral hazard and adverse selection, suggest the need for careful design, including limitations on the type and amount of benefits covered and the use of risk-based premiums. Such funds also need sufficient autonomy, powers, and resources to avoid political and market interference; in some cases special treatment in bankruptcy proceedings is also suggested. While sufficiently large and well-designed guarantee funds can complement adequate funding rules, such rules nevertheless remain crucial. As to financial education, there are positive externalities associated with financial literacy, which should help to improve the efficiency of financial markets and avoid fraud, and which may raise households’ propensity to save. Hence, there is a case for governments to consider the merits of providing support to financial education programmes.

14. Reforms to pension systems are not the only response to population ageing that will have significant effects on financial markets and economic policies. In particular, for many G10 countries, the implied increase in fiscal commitments associated with the costs of health care may even be greater than that for pensions, and actions to tackle this threat to fiscal sustainability have generally lagged those on the pension side. While the financial market and economic policy implications of these reforms go beyond the scope of this report, it is clear that they are likely to be substantial, and in some cases there may be complementarities between the health and pension implications.

INTRODUCTION

The economic consequences of ageing and pension system reform

1. The demographic transition to older societies, in the most advanced economies but also beyond, is ushering in economic and financial changes. These were reviewed by the G10 in a 1998 report, *The Macroeconomic and Financial Implications of Ageing Populations*, which analysed the impact of population ageing on growth and living standards, public finances, financial markets and international capital flows. In line with some of the main recommendations of that report, pension system reforms have been undertaken since then in most G10 countries, and experience with private saving for retirement has continued to build up, with substantial and instructive differences across countries. This report examines the financial market and policy implications of the increasing importance of funded retirement saving.

Growing funded pension savings

2. Ageing populations and the desire to preserve the relative living standards of the retired create challenges of sustainability for private funded systems as well as for publicly-financed schemes. This is key for the likely continued increase in savings for retirement going into private funded pension schemes. Indeed, countries that have reformed their publicly-funded pension systems have often done so in the expectation that the resulting reduction in replacement rates will be compensated by the growth of private funded schemes. However, even where these private schemes are already well established, limiting the erosion of the relative living standard of the ageing cohorts necessarily involves an increase in the savings channelled into them. Indeed, meeting the aspirations of future retirees probably also requires increases in overall saving rates in G10 countries, in order to deliver long-term growth rates sufficient to keep the flow of resources to pensioners manageable in relation to national income. But this aspect of policies to increase national savings is beyond the scope of this report.

Policy challenges

3. While the importance of funded pension arrangements varies considerably across countries, this report concentrates on two policy challenges that all G10 members face to some degree. One relates to the financial instruments needed for an efficient collection and investment of retirement savings and an effective payout of the accumulated capital. This may also be relevant for a proper management of other implications of an ageing population, such as rising health and long-term care expenditures. The other policy challenge pertains to the regulation and supervision of pension funds, as well as to financial education for households. The policy conclusions – which recognise that in most areas there is no single best approach, since national situations and preferences may differ – are primarily addressed to the G10 countries, although many of them may have wider applicability.

Structure of the report

4. Chapter I describes the macroeconomic implications of population ageing and discusses the reasons for and extent of the growing importance of saving for retirement. The impact of increased saving by ageing workers (especially “baby boomers”) and their subsequent move into retirement and possible dissaving may have implications for asset prices and monetary policy. Chapter II analyses the investment behaviour of pension funds, including the influence of regulatory, tax and accounting policies, as well as the development of risk management practices. It also highlights existing and potential gaps in the availability of financial instruments and products needed for pension funds and households to invest better for retirement. Chapter III draws out policy recommendations, touching on the development of suitable financial instruments, on pension fund regulation and supervision, on the protection of pension beneficiaries, and on financial education.

CHAPTER I. ECONOMIC CONSEQUENCES OF AGEING POPULATIONS

Ageing is likely to entail increased private saving for retirement

1. The ageing of populations is likely to affect economies in many ways. Some of the consequences are fairly straightforward, for example as regards labour supply. Even then, changes in policy or in behaviour may at least partly offset them. Other channels are more complex, as in the case of the impact of ageing on productivity growth. Nonetheless, some tendencies emerge, in particular with respect to the increasing need, in most G10 countries, for private forms of retirement saving to complement publicly-financed pension arrangements.

I.1. Ageing populations

Dependency ratios are on the rise

2. Against the background of a secular rise in longevity coupled with lower fertility rates, and as the baby-boom generation starts to retire, the world population is ageing more rapidly than in past decades.² This shift is especially conspicuous in G10 countries,³ albeit to varying degrees, partly reflecting differences in fertility and immigration. It translates into soaring demographic old-age dependency ratios (Figure I.1), as well as a rise in the share of elderly workers (55 to 64 year-olds), whose participation in the labour force is currently low. Old-age dependency ratios are set to more than double between now and 2050 in Italy and Japan, to around 70 percent, reflecting particularly low fertility rates. In all countries, their increase over this period dwarfs that witnessed over the past half-century. On the other hand, the ensuing economic burden on those in work is alleviated somewhat by shrinking cohorts of those below working age.

I.2. Macroeconomic implications

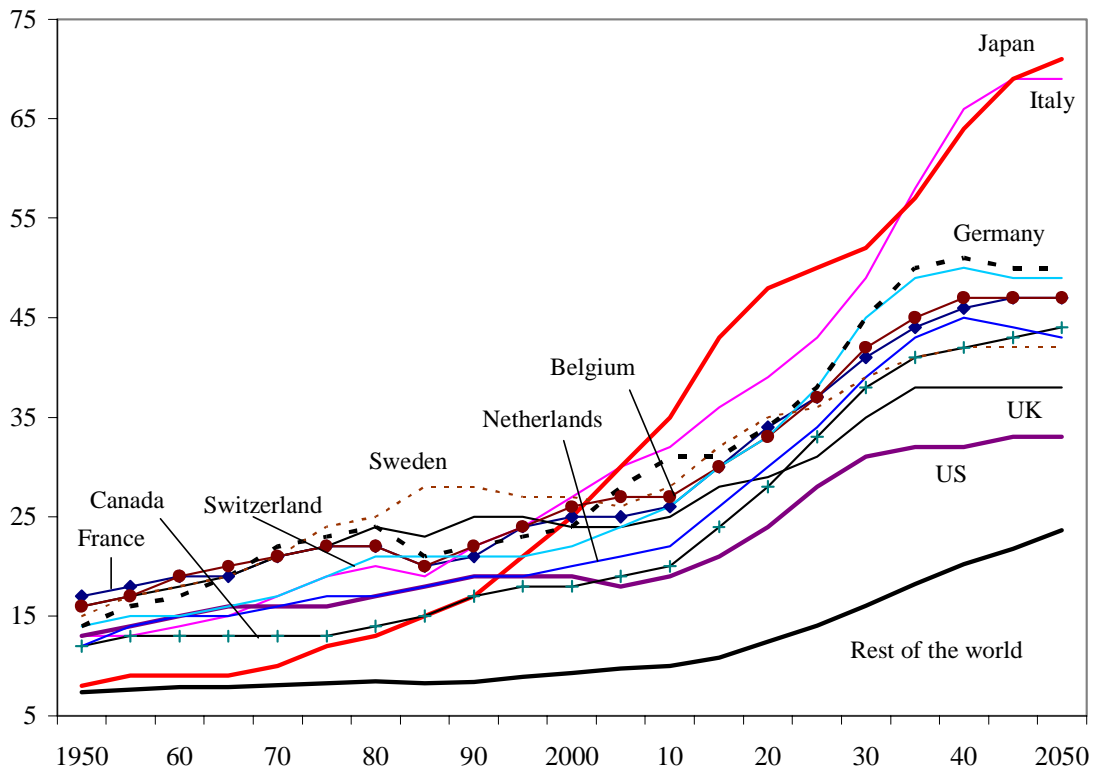
Ageing has wide-ranging macro-economic effects...

3. Ageing directly alters labour supply and more indirectly its rate of utilisation, investment, productivity, consumption patterns, external balances and cross-border capital flows. As discussed further below, it also affects fiscal flows and stocks, as well as private saving. Demographic change unfolds slowly, so that many of its implications will materialise only gradually. However, to the extent that they are already anticipated, some of them may show up ahead of the ageing process, particularly in financial markets.

² Demographic projections are of course uncertain. In many countries, forecasts of life expectancy made over the past two decades have consistently and substantially underestimated the observed rise in longevity and decline in fertility rates. The baseline projections depicted in Figure I.1 could turn out to err in the same direction, as recognised in some of the alternative scenarios presented by the United Nations, and illustrated by the significant differences between these baseline projections and those published in early 2005 for the EU countries by Eurostat. See also Schieber and Hewitt (2000) and King (2004).

³ But not exclusively; witness the case of China, whose population will be older than in the United States by 2030 (Jackson and Howe, 2004).

Figure I.1. Old-age dependency ratios are increasing sharply
(ratio of the population aged 65 years or over to the population aged 15-64, in percent)



Source: United Nations Population Division, *World Population Prospects: the 2004 Revision*.

... starting with labour supply,...

4. Lower fertility will tend to reduce labour supply in headcount terms, even if this is mitigated by endogenous and policy-induced lengthening of working lives. Indeed, there is scope for policy measures that would enhance incentives to join or stay in the labour force (see Annex I.1). Openness to immigration would work in the same direction, although mostly at the margins.⁴ So might a reallocation from physical to human investment induced by low fertility rates, as longer working lives enhance the returns on education and training.⁵ It may also be that retiring cohorts are less productive than incoming ones, which would make up for some of the decline in labour force headcount.

... on to real interest rates

5. As the baby-boom generation builds up savings in the latter part of their working lives, ageing is likely to translate into a gradual rise in the ratio of capital to labour and some concomitant trend decline in real interest rates, especially if the viability of the public pay-as-you-go pension systems – discussed below – is restored via reduced replacement rates and the expansion of private pension schemes rather than

⁴ While immigration of relatively young people boosts labour supply, immigration flows are often too small to make much of a macroeconomic difference. See Tapinos (2000) and European Commission (2003).

⁵ See the endogenous growth models in Fougère and Mérette (1999) and Futagami and Nakajima (2001).

via hikes in contribution rates or later effective retirement.⁶ Capital deepening in turn would boost labour productivity and hence real wages.

International flows will also be affected

6. Ageing will also affect the overall level of consumption and saving (see below), and therefore external balances and capital flows (see Annex I.2). The demographic shift should initially, while the current working-age population is putting aside resources to fund retirement, contribute to a build-up of net foreign assets in the G10 countries that are ageing most rapidly. This would subsequently reverse, once the currently active generation retires.⁷ The initially negative effect on consumption in G10 countries would be mitigated to the extent that investment in emerging economies, which should be characterised by more rapid growth and higher investment returns, permitted a given targeted build-up in assets to be achieved with less saving than would otherwise be needed. The magnitude of the demographically-driven effects on current and capital account flows would hinge on the extent of pension reform and fiscal consolidation, on private sector saving behaviour, and, above all, on how freely capital moves across borders and on international feedback and sharing effects.

Ageing will influence monetary policy but without requiring a change in the framework

7. Changes in population structure and growth rate should be taken into account by central banks, since they affect potential output growth and the importance of households' wealth in the transmission of monetary policy (see Annex I.3). At the same time, they may tend to pull down real interest rates over the next few decades, before the currently active generation retires. While a sharp fall in asset prices is not very likely, especially in an increasingly financially integrated world economy, an asset sell-off by relatively large elderly cohorts may cause some downward pressure on prices. How central banks and governments should react to asset price movements remains hotly debated, but recent episodes of deflationary pressure on asset prices, notably in Japan, show that they should not be underestimated. That said, even if asset price movements prompted by demographic changes could be correctly estimated, it is not obvious that it would be for monetary policy to respond. In the case of imbalances in the real estate market, say, monetary policy should take into account their impact on aggregate demand and the possible related inflationary pressures, but it might be preferable to use prudential instruments, which would lead to pricing differently the value of the collateral against which borrowing takes place.⁸ While all these factors clearly matter to monetary authorities, population ageing *per se* does not seem to require specific policy interventions or framework changes.

There may also be an impact on financial stability

8. Population ageing could also have financial stability implications. Due to ongoing pension reforms and the development of new investment products targeted at individuals wishing to invest for retirement, the allocation of savings across different financial intermediaries is likely to change in the future, albeit with important differences across countries. For example, the growth of pension funds and other institutional investors, especially in countries where their importance is currently low, may lead to further reallocation of savings away from the banking system. This could have implications for the funding and lending strategies of banks, as well as their management of risk. Such developments could affect firms' financial structure,

⁶ See Oliveira Martins *et al.* (2005). Earlier studies pointing in the same direction include Turner *et al.* (1998), Miles (1999) and McMorrow and Roeger (2004). Others, however, find more limited effects (Young, 2002).

⁷ See Turner *et al.* (1998).

⁸ See G10 (2002) and Auerbach and Hermann (2003) for example.

increasing the role of market-based instruments such as bonds and equities. To the extent that this prompts the development of a more diversified financial system, less reliant on banks, it may help to reduce the overall risk of contagion. The increased exposure to financial markets could, however, make other risks, such as market and liquidity risks, more prominent, and surveillance and monitoring by public authorities more challenging.

I.3. Publicly-financed pensions

*Ageing
depresses
general
government
revenue...*

9. As populations age, the wage bill may shrink, reducing tax receipts, although to an extent depending inter alia on the evolution of participation rates, immigration and productivity (see above) as well as on the weights, in the tax base, of consumption-based versus income-based tax revenues. This should be compensated to some extent by the foreseen increases in tax receipts associated with the drawdown of their accumulated pension assets – largely built up through tax-favoured schemes – by the elderly. However, this offset is likely to be limited to generally no more than one percentage point of GDP and will depend on the specific parameters of the tax regime, and even more importantly on how successfully such schemes will have previously boosted private saving.⁹

*... and exerts
strong
spending
pressures,...*

10. At the same time, and more unambiguously, spending pressures are mounting. OECD simulations were run based on national models (reflecting domestic idiosyncrasies) but embodying common macroeconomic assumptions (so as to ensure cross-country comparability of the results). These simulations, resting on unchanged policy parameters, point to large forthcoming increases in public pension outlays in most G10 countries (Table I.1).¹⁰ The pressures on the pension side are compounded by the foreseeable increases in health care outlays and only partly offset by lower spending on education of the young and child or family benefits (which in most cases would subtract no more than ½ percentage point of GDP). In addition, scarcer labour is likely to put pressure on governments to invest more in all forms of education, including life-long learning.

*... implying a
sizeable
implicit fiscal
gap*

11. By implication, the fiscal arrangements in place around the time of the 1998 G10 report on ageing were probably unsustainable, even if the exact magnitude of the underlying imbalance or fiscal gap is hard to pin down, given the margins of error surrounding demographic forecasts, far-flung GDP projections and tax and spending elasticities, with uncertainty increasing with the horizon being considered (Figure I.2).¹¹ Virtually all studies conducted around that time concurred in finding large contingent liabilities.¹²

⁹ See Antolin *et al.* (2004). The offset is substantially larger in the Dutch case.

¹⁰ For some countries, more recent national estimates are shown. The U.K. estimates exclude some public transfers to pensioners, amounting to around 2 percent of GDP.

¹¹ See Sefton and Weale (2005) for example.

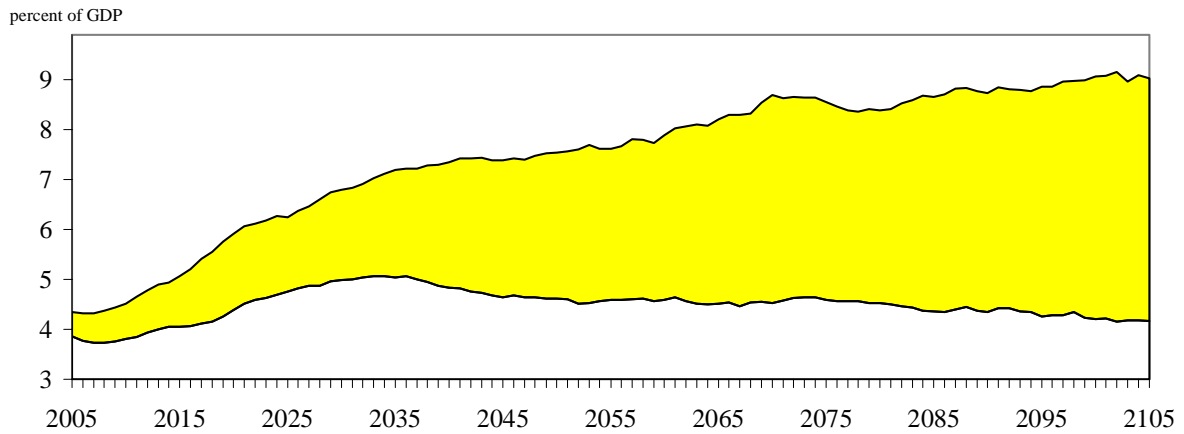
¹² For surveys of these studies, see Visco (2002) or Brooks and Razin (2005).

Table I.1. Ageing-related public spending pressures are mounting
(assuming unchanged policies as from the early or mid-2000s, in percent of GDP)

	<i>Old-age pension outlays</i>		<i>Health and long-term care spending</i>	
	circa 2000	circa 2050	circa 2000	circa 2050
Belgium	9.0	13.0	6.3	10.6
Canada	4.7	6.4	6.3	10.5
France	12.1	14.5	6.9	9.4
Germany	11.8	13.8	5.7	8.8
Italy	14.2	14.4	5.5	7.6
Japan	7.9	8.5	5.8	8.2
Netherlands	5.2	8.3	7.2	12.0
Sweden	9.2	10.8	8.1	11.3
Switzerland	7.2	10.8	5.8	10.3
United Kingdom	5.0	5.6	7.9	11.0
United States	4.4	6.2	2.6	7.0

Sources: Dang *et al.* (2001); Casey *et al.* (2003); for Belgium, Comité d'Etude sur le Vieillessement (2005); for Canada, Office of the Chief Actuary (2004 and 2005); for pensions in France, Germany, Italy and the Netherlands, European Commission (2005); for Switzerland, Schlupe (2003) and Federal Office of Public Health; for the United Kingdom, HM Treasury (2004).

Figure I.2. Uncertainty increases with the horizon
(Projected social security benefits under unchanged legislation in the United States)¹



Source: Congressional Budget Office (2004).

¹ Projections based on 500 stochastic simulations around central demographic and economic assumptions, 80 percent range from the 10th to the 90th percentile. For details on the methodology, see Congressional Budget Office (2001).

Public pension systems have started to adjust

12. Governments and parliaments have recognised the challenge. They have acted in recent years to move towards more sustainable pension systems, and some additional reforms are under consideration (Table I.2).¹³ Pension system parameters such as contribution rates and periods, benefit indexation, statutory retirement age and/or access to early retirement have been adjusted and in some cases social security trust funds have been set up, although their size to date remains limited.¹⁴ Moreover, some countries – notably Belgium – are trying to pre-fund part of future pension outlays by running a sizeable primary general government surplus. Even so, more remains to be done in at least several G10 countries to put the publicly-financed pillar of the pension system on a sound footing. To the extent that the benefits to be paid out under that pillar are to be curtailed, and given that contributions rates – which are already high in a number of G10 countries – cannot be raised without adverse consequences on labour supply, further expansion of private retirement saving is required, all else (*e.g.* retirement age) being equal.

Table I.2. Most G10 countries have recently reformed their pension systems¹

	Mandatory pensions				Last major reforms		
	Date of last major reform	Contribution rate (employer plus employee) in percent	Gross replacement rate at average earnings (2002) in percent ²	Public pension benefit ³	Mandatory private regime	Changed level of DB	Increased contribution rates
Belgium	1997	16.4	41	DB	No	Reduced	No
Canada	1997	9.9	43	DB, P	No	No	Yes
France	2003	16.5	53	DB	No	Reduced	Yes
Germany	2001	19.5	46	DB	No	Reduced	Yes
Italy ⁴	2004	32.7	79	NDC	No	Abolished	No
Japan ⁵	2004	18.3	50	DB, NF	No	Reduced	Yes
Netherlands	2004	28.1	68	DB	Quasi	Reduced	Yes
Sweden ⁶	1998	18.9	65	NDC	Quasi	Abolished	No
Switzerland	2003	23.8	58	DB	Yes	Reduced	No
United Kingdom ⁷	2004	23.8	37	DB	No	No	No
United States	1983	12.4	39	DB, NF	No	...	No

Sources: OECD (2005a); Social Security Administration (2004a, 2004b, 2005).

¹ The coverage of pension spending is less homogeneous across countries than over time.

² The wedge between gross and net replacement rates varies substantially across countries.

³ DB: Defined benefit; NDC: Notional defined contribution; NF: Nominally funded; P: Prefunded.

⁴ For people retiring after 2010. In 2004, Parliament passed a framework law allowing the government to introduce implementing legislation to reduce the fiscal burden of pensions, including reforms to encourage later retirement and to augment the main pension with a supplementary pension.

⁵ The end-point of the projection is 2025 instead of 2050.

⁶ Assumes a revaluation factor of 1.6 per cent.

⁷ The contributions also finance other social programmes.

¹³ For a world-wide perspective on pension reforms, see Holzmann, Hinz *et al.* (2005).

¹⁴ For example, in Japan, a reserve has been built up which amounted to some ¥145 trillion (29 percent of annual GDP) in FY2003. In France, the Fonds de Réserve des Retraites, launched in 1999 with a target of accumulating €1,000 billion by 2020, had built up a reserve of €16.5 billion (or 1 percent of annual GDP) at the end of 2003.

I.4. Private saving for retirement: recent developments

The importance of private pension funds varies

13. Currently, the importance of private saving for retirement differs substantially across G10 countries, both as regards pension funds of various sorts and other forms of private saving (*e.g.* life insurance, personal savings plans or investment in real assets such as housing). Occupational and other types of pension funds are particularly developed in the United States, the United Kingdom, Canada, the Netherlands and Switzerland (Table I.3). Indeed, pension funds have become the largest class of institutional investor, representing one half or more of institutionally-held assets in the Netherlands and Switzerland, over one third in the United States and the United Kingdom and about one fifth in Japan. However, the problems experienced in recent years by pension funds highlight the importance of other, complementary forms of private saving for retirement, which can provide diversification benefits for investors.

Table I.3. Pension funds' importance varies considerably across time and space
(*pension fund assets in percent of GDP*)¹

	1990	1995	1996	1997	1998	1999	2000	2001
Belgium	2	4	4	5	6	6	6	6
Canada	29	39	42	44	48	46	48	48
Germany	3	3	3	3	3	3	3	3
Italy	3	4	3	3	3	5	5	4
Japan	12	15	15	16	16	19	19	19
Netherlands	72	85	93	101	108	119	114	105
Sweden	2	2	2	3	3	3	3	4
Switzerland	56	..	80	..	98	..	105	114
United Kingdom	50	68	69	79	79	88	79	66
United States	42	57	61	67	71	74	69	63

Source: OECD (2003), Table S.2.

¹ Reported assets refer to the category "pension funds". They may not include all forms of retirement savings plans.

Some suffer from underfunding

14. While, during the 1990s, many sponsor companies reduced contributions to their pension plans, or introduced increases in pension benefits and thus liabilities (*e.g.* through indexation of post-retirement benefits), the equity market and interest rate declines between 2000 and 2003 led to sharp reductions in funding ratios (see Section II.1). Indeed, over 90 percent of pension funds in Japan, the United Kingdom and the United States were underfunded by end-2002.¹⁵ Since then, funding levels have recovered only marginally, as the impact of relatively stronger equity returns has been largely offset by that of the continuing decline in government and corporate bond yields (the latter being increasingly used to discount liabilities).

¹⁵

See IMF (2004a).

I.5. The likely rise of saving for retirement

Private saving for retirement is set to rise...

15. Demographic developments coupled with the growing need to provide for retirement privately will probably prompt an increase in the flow of saving and the stock of savings directed to fund retirement, whether or not this is accompanied by an increase in national saving rates. The shift in several countries towards pension arrangements relying more heavily on defined contributions and/or towards a more or less compulsory system of private savings accounts plays an important role in this regard. In addition, irrespective of the specific policy changes, households are likely to adjust their saving behaviour in the face of rising longevity. In some countries with an already mature private pension system – notably the United Kingdom – policies to encourage further private pension savings may be needed.

... according to econometric analysis...

16. Age and perceived life expectancy are likely to affect the propensity to consume and thus to save, but the structure of this relationship is not straightforward. Surveys suggest that consumption displays a hump-shaped profile across age groups, with households headed by prime-age individuals consuming most, but quantitative estimates seem to depend on when the surveys are taken. In addition, the extent of consumption smoothing over individuals' lifetimes is influenced by idiosyncratic generational experience.¹⁶ Recent econometric analysis shows that where public pensions provide for a high replacement rate, the saving rate among the prime-aged is lower.¹⁷ This suggests that if the parameters of public pension systems evolve in the opposite direction, the saving rate in that group may well increase.

... as well as model-based simulations

17. Forward-looking simulation analysis based on general equilibrium modelling with overlapping generations suggests that if instead of relying on increases in pension contributions to balance pay-as-you-go pension systems, contribution rates were held constant, retirement age were gradually increased, and replacement rates for new retirees were gradually reduced, savings would have to increase significantly over the next couple of decades if consumption levels were to be sustained upon retirement.¹⁸ For the United States, Germany and France, these simulations, resting on the assumptions outlined above, suggest that household saving rates would be around one percentage point higher at a fifteen year horizon.¹⁹ Correspondingly, capital deepening would be more pronounced and, other things being equal, real interest rates lower.

¹⁶ See Poterba (2004). For example, individuals who have lived through times of financial crises will presumably be more inclined to save than those who have experienced financial booms. For the same reason, the time at which survey evidence is collected matters. There is also a compositional effect, since the snapshot picture of consumption per household by age group need not coincide with the evolution of consumption over the lifetime of specific cohorts, but this effect is probably fairly small (Oliveira Martins *et al.*, 2005).

¹⁷ See Oliveira Martins *et al.* (2005). The regressions also indicate that, controlling for demographics and macroeconomic fundamentals, a lower share of public provision of health care in total health consumption tends to raise the saving rate.

¹⁸ Alternatively, individuals may decide to adjust labour supply rather than increase savings.

¹⁹ Based on the model presented in Oliveira Martins *et al.* (2005). Specifically, the simulations assume constant contribution rates from 2005 on, coupled with a 1¼ year increase per decade in the effective age of retirement, broadly in line with national forecasts of future life expectancy gains, the residual imbalance of the public pension system being covered by a decrease in the replacement rate for new retirees. Similarly, in a general equilibrium framework, Saarenheimo (2005) shows that savings rates are projected

Ageing may also affect the structure of portfolios...

18. Demographic changes may also affect the structure of households' financial portfolios, insofar as individuals belonging to different generations are likely to choose a different mixture of assets with different risk profiles. Even if some studies suggest that the share of households' portfolios invested in cash and bonds rises with age,²⁰ the empirical evidence in this area is limited and strongly dependent on the characteristics of the generations included in the samples investigated.²¹ Moreover, insofar as increased longevity is not accompanied by longer working lives, and taking into account that pensions are generally more predictable than wages, young retirees may even have greater incentives to hold risky assets than working-age households.

... further enhancing the role of institutional investors...

19. Over the past few decades, institutional investors – in particular pension funds, mutual funds and insurance companies – have enhanced their role as collectors of savings, and increased their share of institutionalised savings (Table I.4). This trend is likely to continue as retirement saving grows. Increased pension saving will augment the size of capital markets. As noted above, at present, the relative size of pension fund assets varies enormously across G10 countries, reflecting differences in social security arrangements as well as in financial systems. Thus, there is clearly scope for significant growth in most countries.

... and broadening the range of instruments

20. Against this background, there will be a growing need for a variety of financial instruments. In particular, investors' general demand for long-term fixed-income assets is likely to increase over the years to come, as a result of recent and impending regulatory and accounting changes. One illustration has been the successful revival of long-term government bond issues, including the launch of very long-term instruments – notably 50-year bonds (see Section II.4).

to increase by about one percentage point until 2010; thereafter, with replacement rates held constant, slowing labour force growth pushes saving and investment rates downwards again, to well below the current level by 2050, reflecting the negative impact of a higher retirement age on the saving rates of younger workers.

²⁰ Bakshi and Chen (1994) test the hypothesis that risk aversion rises with average population age, but their findings hinge on strong assumptions concerning the relation between consumption, age and risk aversion and part of their econometric analysis lacks robustness. See also Guiso *et al.* (2002).

²¹ See also footnote 16. In addition, Ameriks and Zeldes (2004) show how different combinations of time and cohort effects may give rise to the same relation between age and saving, but resulting from different patterns of asset accumulation.

Table I.4. The composition of household portfolios has shifted over time
(in percent of gross financial assets)¹

		1970	1980	1990	2000	change 2000-1980	2001	2002	2003
Belgium	Deposits	..	41	31	25	-16	27	30	33
	Bonds	..	33	34	22	-12	22	22	18
	Equities	..	18	22	22	4	19	13	14
	Institutions	..	8	13	29	21	31	32	35
Canada	Deposits	30	36	34	24	-11	25	26	26
	Bonds	14	7	6	4	-3	3	4	4
	Equities	24	23	18	25	3	26	25	25
	Institutions	26	25	32	41	16	41	41	40
France	Deposits	49	59	38	27	-32	29	31	30
	Bonds	6	9	4	2	-7	2	2	2
	Equities	26	12	26	34	22	29	24	25
	Institutions	6	9	26	34	25	36	39	39
Germany	Deposits	60	60	47	34	-26	34	36	36
	Bonds	8	12	17	10	-2	10	11	11
	Equities	11	5	6	16	11	14	9	10
	Institutions	15	17	21	39	22	40	42	41
Italy	Deposits	54	64	34	25	-39	26	27	27
	Bonds	19	17	31	18	1	21	23	22
	Equities	11	10	25	28	18	25	23	22
	Institutions	8	6	10	28	22	28	27	28
Japan	Deposits	..	59	47	53	-6	55	57	55
	Bonds	..	2	2	2	0	2	2	2
	Equities	..	13	17	9	-4	7	6	8
	Institutions	..	19	29	31	12	31	31	30
Netherlands	Deposits	24	32	26	19	-14	21	24	24
	Bonds	17	7	4	2	-4	3	4	4
	Equities	36	22	23	16	-6	12	6	11
	Institutions	23	39	47	61	21	62	63	58
Sweden	Deposits	..	67	46	18	-49	26	32	30
	Bonds	..	13	10	4	-9	5	5	5
	Equities	..	9	16	18	9	20	16	18
	Institutions	..	11	28	60	49	50	47	47
Switzerland	Deposits	..	..	30	18	..	20	22	23
	Bonds	..	..	15	9	..	9	9	8
	Equities	..	..	11	21	..	17	13	15
	Institutions	..	..	44	52	..	54	56	54
United Kingdom	Deposits	34	43	30	20	-23	23	27	26
	Bonds	7	7	2	1	-6	1	1	1
	Equities	24	12	19	22	10	18	15	15
	Institutions	23	30	44	53	23	54	53	54
United States	Deposits	21	23	22	15	-8	17	18	16
	Bonds	7	5	10	6	1	6	6	6
	Equities	22	13	12	21	7	17	16	18
	Institutions	17	19	29	37	18	36	36	38

Sources: National Bank of Belgium, Bank of Canada, French Ministry of Finance and Economy, Deutsche Bundesbank, Bank of Italy, Bank of Japan, Nederlandsche Bank, Statistics Sweden, Swiss National Bank, U.K. Office for National Statistics, Board of Governors of the U.S. Federal Reserve System.

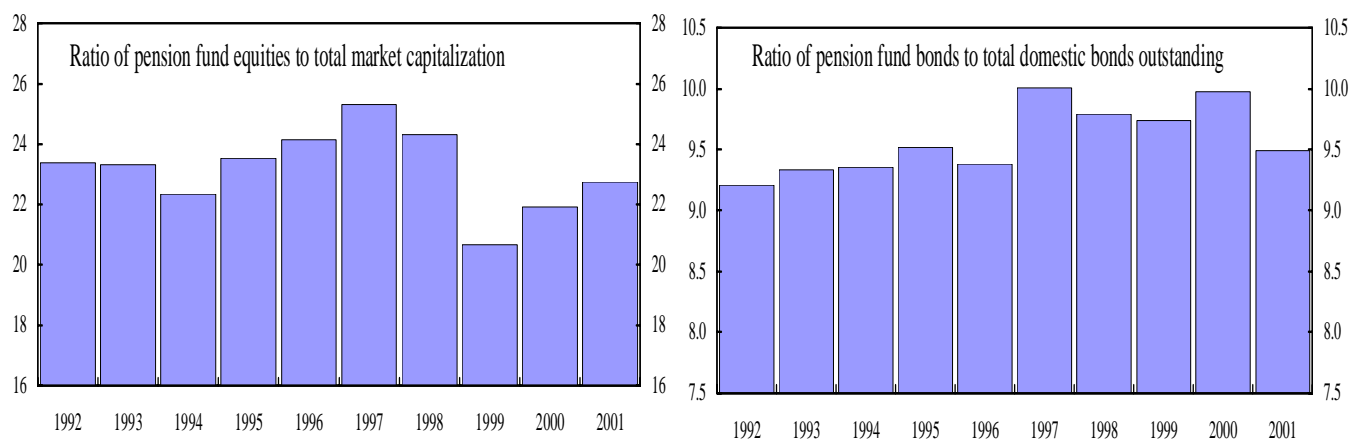
¹ "Institutions" refers to pension funds (also "collective" ones as in Sweden), insurance corporations and mutual funds. For France, data from 1970 to 1990 are from Byrne and Davis (2003). For Germany, data from 1991 onwards are based on ESA 95 financial accounting principles (earlier data corresponding to the categories "other equity" included in "equities" and "mutual fund shares" included in "institutions" were not available). For Switzerland, owing to limited data availability, the percentage of "institutions" in 2001 and 2003 has been estimated using the data for pension funds and insurance companies for the previous year (*i.e.*, 2000 data for 2001 and 2002 data for 2003). Percentages may not add to 100 because of the presence of "other financial assets" not classified in the above four categories.

CHAPTER II. AGEING, RETIREMENT SAVINGS AND FINANCIAL MARKETS

The pension fund industry is likely to increasingly influence financial markets

1. Given that ageing populations are driving a growing need for private forms of saving for retirement, the pension fund industry is likely to exert an increasing influence on financial markets. Relative to the size of financial markets in G10 countries, aggregate pension fund assets currently represent more than 20 percent and 10 percent of equity and bond market capitalisations, respectively (Figure II.1), albeit with great variability across countries (Figure II.2). In the light of this demographic shift, occupational and personal pension funds (and possibly also funded public schemes) may be expected to grow further, calling for greater attention to be paid to these institutions and their market activities. This chapter reviews recent changes in the industry and its regulatory and accounting policies, as well as risk management practices, highlighting in particular the growing focus by pension funds on asset/liability management (ALM).²² It then discusses the potential implications for pension fund investment strategies and financial markets, including changes in their asset allocation, and the increasing need for more and new capital market instruments to better manage pension liabilities. Finally, the chapter identifies the main gaps in, and obstacles to, the availability of financial instruments needed for pension funds and households to better meet retirement needs. The chapter therefore addresses both so-called Pillar 2 and Pillar 3 pension funds (see Glossary); while the discussion of the former is largely centred on defined benefit (DB) plans, as overall they still represent the larger share of pension assets, the growing role of defined contribution (DC) schemes is also considered.

Figure II.1 Pension fund assets in G10 countries as ratios to the size of domestic equity and bond markets (in percent)

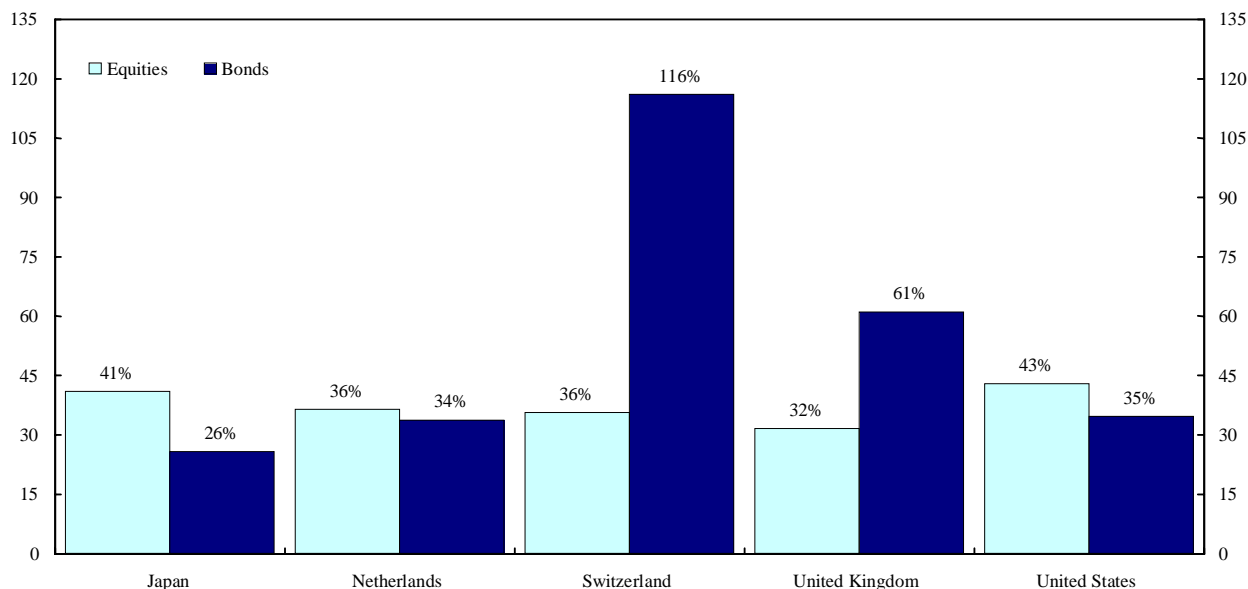


Sources: OECD (2003); Datastream, and BIS.

²²

That is to say, the management of assets to ensure that liabilities are sufficiently covered by suitable assets at all times.

Figure II.2. Pension fund holdings compared with the size of domestic market, 2003
(in percent)



Sources: Watson Wyatt; International Financial Services, London; BIS; and World Federation of Exchanges.

II.1. Recent structural and regulatory changes in the pension fund industry

Rapid equity gains may have induced relaxed liability management in the 1990s...

2. In several countries, ageing and the underfunding of DB pension plans have prompted important changes and proposals in the structure of pension systems and in regulatory and accounting frameworks. During the 1990s, as equity prices rose, the funding ratio of many DB plans increased well above 100 percent (Figure II.3.). Moreover, projections of future asset returns, based largely on recent performance, further boosted calculated funding levels by assuming that equities would earn a reasonably significant equity risk premium above projected fixed-income returns. Sponsor companies also acted to “realise” these gains, by introducing permanent increases in liabilities (through increased benefits) and taking contribution holidays, with the costs and risks further magnified by increases in longevity beyond earlier actuarial projections.

... and the subsequent fall in equity prices, together with falling bond yields, led to wide-spread under-funding

3. Between 2000 and 2002, pension funds worldwide became significantly underfunded. The equity market fall of 2000-02 sharply cut the funding ratios of pension funds which, in many cases, held equity allocations of 60 percent or more. Meanwhile, market interest rates, which were being increasingly used in some countries as the basis for discounting liabilities (see below), fell, increasing the present value of liabilities and creating the “perfect storm” for pension funds.²³ The assets held in the form of fixed-rate bonds failed to grow in value as fast as the liabilities, largely because the average holding of such assets was much smaller than aggregate liabilities and the average duration of such assets was typically much shorter than the duration of aggregate liabilities. Although the fall in equity values has attracted much attention as

23

See Hewitt Investment Group (2001) and Custis (2001).

a factor behind the underfunding, the fall in bond yields has had at least as important an effect.²⁴

... from which the pension fund industry has only marginally recovered

4. Since the equity market collapse, funding levels globally have recovered only marginally. In 2003 and 2004, the impact of relatively strong equity returns was largely offset by the continuing decline in corporate bond yields, and improvements in funding positions in 2005 were primarily the result of increased contribution rates.²⁵ Companies have also had little room to reduce recently increased benefits – in fact, they were sometimes legally constrained from scaling back benefits.²⁶

These developments contributed to a shift away from DB plans...

5. A notable trend has been the continued move in several countries from DB to DC schemes, which is modifying the risk profile of the household sector by exposing employees more directly to market and other risks. However, even before the deterioration in funding levels, there was a growing understanding that many DB schemes, as traditionally constructed, might need to be redesigned, as they had become less flexible and less suitable for more mobile employees who desire greater portability of pension benefits.²⁷

... and the development of “hybrid” pension plans

6. The reconsideration of traditional DB plans has also led to the development of “hybrid” pension schemes. Sponsor companies have sought greater flexibility to share market and other risks (including longevity risk), and to adjust benefits depending on business conditions, while often still guaranteeing a minimum benefit to employees. Such hybrid plans incorporate elements of both DB (as the sponsor makes matching contributions and often bears at least some investment or guaranteed return risk) and DC plans (as benefits are often expressed in terms of an account balance, and more responsibility may be put on the employee to decide whether to annuitise or withdraw a lump sum payment at retirement).

Underfunding has also prompted regulatory changes

7. On the regulatory front, short-run measures have been taken to address the underfunding problem, although in different ways across countries. In order to provide short-term relief to pension funds, the authorities in the United Kingdom relaxed the Minimum Funding Requirement (MFR) test in 2002. In the United States, the 30-year Treasury bond yield used as the discount factor was temporarily replaced by a corporate bond yield in 2004 and 2005. In the Netherlands, a more permanent regulatory framework has been pursued, with pension funds being asked to take concrete steps to restore their funding ratios, including by raising pension contributions, explicitly stating their indexation commitment (*i.e.*, clear conditionality) or adjusting their asset mix.

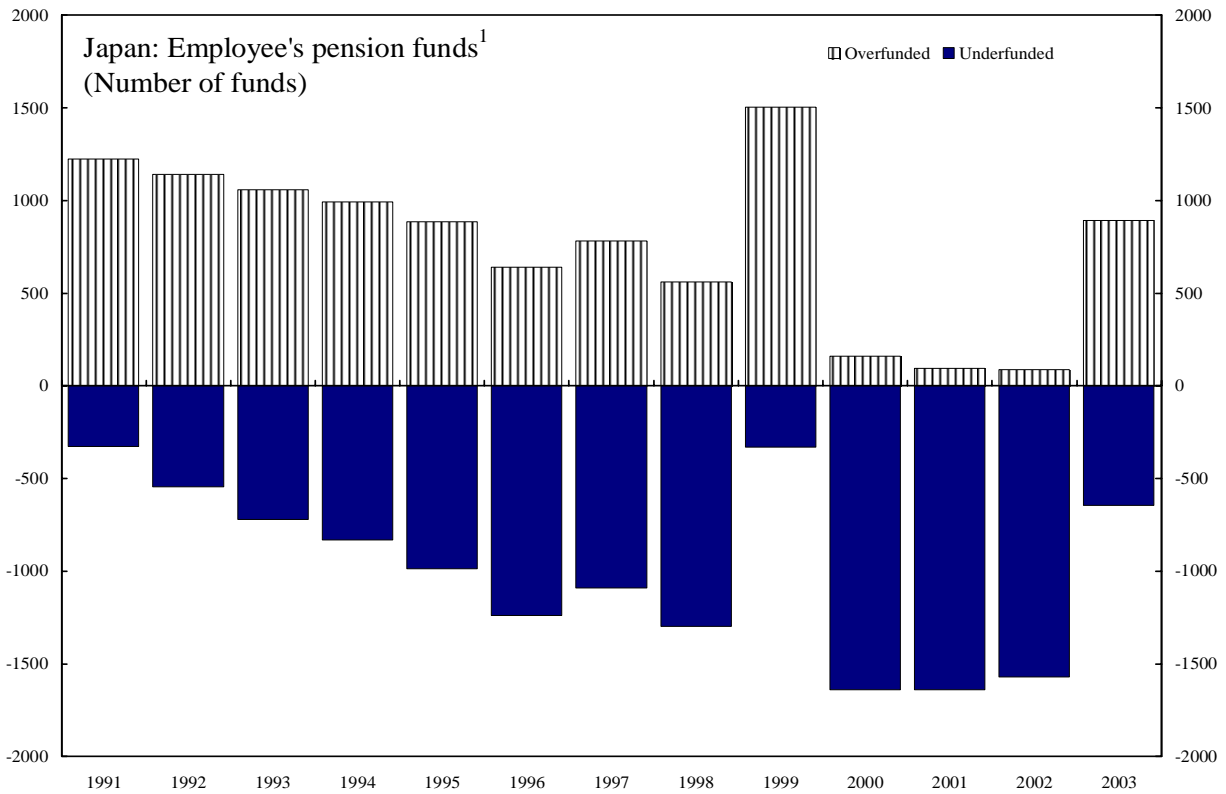
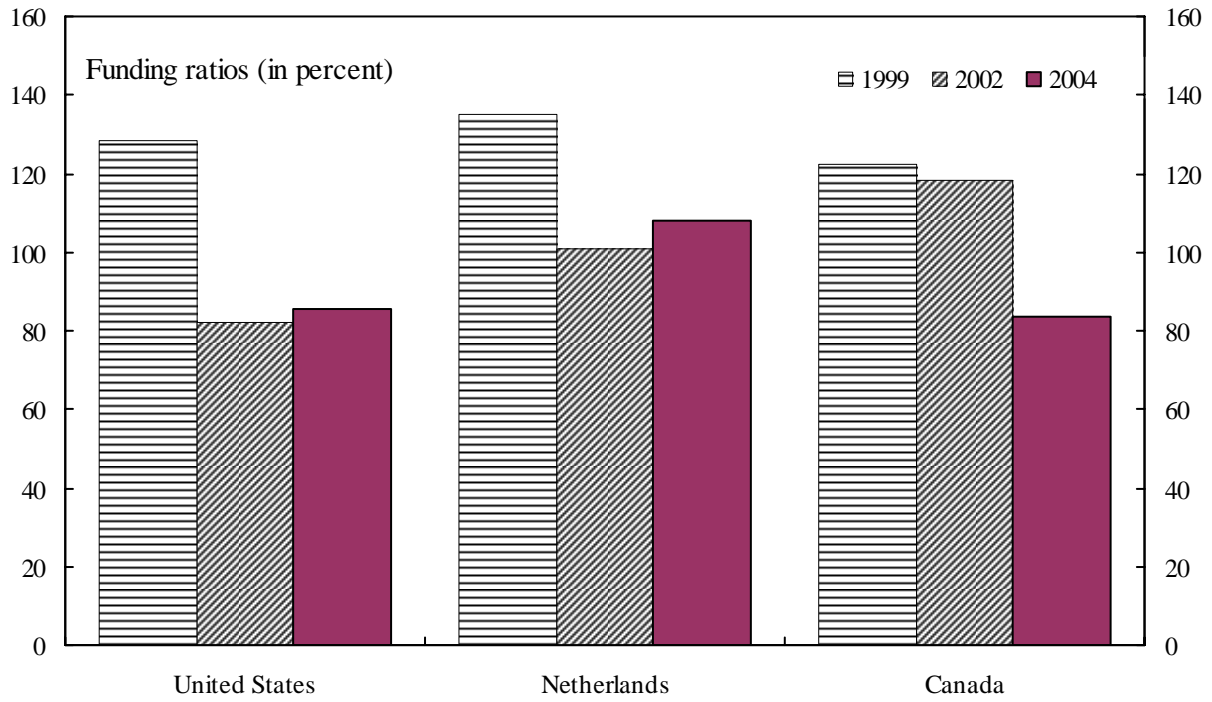
²⁴ For instance, an actuarial estimate in 2004 suggested that the aggregate underfunding of the 200 largest U.K. DB schemes would be eliminated either by a 30 percent rise in equity prices or a 1 percentage point rise in bond yields (Aon Consulting, 2004).

²⁵ In the United States, analysts estimate that the DB plans of S&P500 companies were 86 percent funded on average at year end 2004, up from 82 percent at year end 2002.

²⁶ For instance, in the United Kingdom indexation became a regulatory requirement in 1997.

²⁷ See IMF (2004a).

Figure II.3. Declining funding ratios of defined benefit plans



Sources: Netherlands Pension and Insurance Supervisory Authority; van Ewijk and van de Ven (2003); Pacific Investment Management Company LLC (PIMCO); and Bank of Canada.

***Toward more
risk-based
frameworks***

8. Some of the policy initiatives have also aimed at strengthening regulatory and supervisory oversight, and more generally at increasing the viability of DB pension systems in the longer run. For example, in the Netherlands, strengthened risk management and more rigorous ALM have been encouraged via the adoption of a new risk-based approach. Important elements of this new framework are the use of market interest rates (across the yield curve and liability profile of the pension fund) as a discount factor for pension liabilities, advanced risk modelling techniques, and the use of fair or market value measures (see Box II.1). The move toward more risk-based supervision is also visible in the United Kingdom and the United States, where market-based discount factors were already used, but with smoothing (*i.e.*, amortization over a certain period) employed to reduce the volatility of the discount factor. These countries are also considering the use of more risk-based premiums for DB plan payments to guarantee funds (*i.e.*, the Pension Benefit Guaranty Corporation in the U.S. and the Pensions Protection Fund in the U.K.), including having such premiums take account of a pension fund's asset-liability mix.

Box II.1. The new financial assessment framework for pension funds in the Netherlands

The new supervision system, which seeks to ensure that pension funds remain fully funded at almost all times, is likely to influence their risk management and investment strategies. The new framework will be mandatory for all pension funds from the moment the new Pension Act comes into force, expected in 2007. It involves strict rules for the rebuilding of funding levels according to pre-specified timescales, (*e.g.* by changing the asset mix, indexation or contributions). In particular, two parallel funding tests will be applied:

1. A solvency test, following the EU pensions directive, requiring pension funds to maintain at least a 105 percent funding ratio, even if their assets and liabilities are perfectly matched.
2. A continuity analysis, requiring pension funds to examine their financial position over a 15-year horizon, against the background of various long-term scenarios. The purpose is to assess whether, on the basis of its present financial position, the institution's strategy is in line with foreseen internal and external developments.

The solvency test introduces an innovative risk-based capital framework for pension funds. The risk parameters are to be set so as to guarantee at a 97.5 percent confidence level that – seen from a steady state position – the funding ratio will stay at or above 100 percent over one year. In other words, when the funding ratio corresponds to the required steady state level, it is only expected to fall below 100 percent once every 40 years. If it fell below the risk-based floor, the fund would be granted a period of 15 years to address this gap (through increased contributions or reduced investment risk). Like Basel II, this provides a standard risk measure set by the supervisor, while allowing funds (where appropriate) to use their own risk models and capital calculations. The supervisor estimates that a fund invested 50/50 in bonds and equities, and with a typical bond duration profile of 5 years, could be expected to have a minimum risk-based capital requirement of 130 percent of accumulated liabilities.

For the standard calculation, assets will be marked-to-market, and liabilities are discounted using a market yield curve. The volatility parameters for assets will be based on historical data, reflecting the long-run orientation of pension funds. Liability measures also are expected to take into account further increases in longevity (*e.g.* a 2-year lengthening of average life spans). Sponsor companies would also be required to state whether they have a "conditional" or "unconditional" inflation-indexation policy for pensions. If the policy is unconditional, the 105 percent regulatory floor will be based on inflation-linked liabilities. However, if the policy is conditional, liabilities need only be measured in nominal terms. Most pension funds have indicated they will opt for the conditional form. In that case, pension funds have to be consistent in their indexation promises, the financing thereof, and the allowed indexation.

Accounting changes may have a strong impact on investment and risk management

9. Accounting changes are frequently cited by pension fund managers as one of the most important factors affecting pension fund investment and broader risk management practices, as well as influencing the shift from DB to DC or hybrid schemes in certain countries.²⁸ Following recent changes in international accounting standards, such as the introduction of IFRS and market-based, fair value accounting principles, listed firms now have to incorporate pension liabilities in their financial statements (see Annex II.1). This may lead to greater fluctuations in current asset or projected liability values and therefore, unless there exist possibilities to hedge against such movements, may have a substantial impact on a firm's shorter-term earnings reports or the equity/reserve position in its balance sheet (see below). Such changes may encourage new investment styles, including greater short-term trading activity.

A greater focus on ALM by pension funds

10. In sum, current pension underfunding difficulties, as well as the structural, regulatory and accounting changes and proposals within the pension fund industry in recent years, increasingly require pension plan managers and supervisors to assess more fully the financial cost of the pension benefit promise offered to plan participants, improve risk management techniques, review pension fund investment strategies, and increasingly focus on ALM considerations.

II.2. Asset-liability management

Pension funds' role as long-term investors

11. The growth of funded pensions and the increasing emphasis on risk management should strengthen the role of pension funds as stable, long-term institutional investors. However, this requires (among other priorities) that investment strategies more fully address the specific nature and structure of pension fund liabilities, thereby differentiating pension funds from many other institutional investors.

Historically, many pension funds have focused primarily on asset returns

12. Rather than seeking to report a profit or to outperform various indices, the ultimate purpose of DB pension schemes is to meet their future pension liabilities. In particular, this requires that liabilities be covered by suitable assets (*i.e.*, an ALM focus). However, pension fund investment and risk management practices have often focused more on asset returns than the actual liability structure of the pension balance sheet. In part, this is because assets are more easily adjusted in the short term to meet changing circumstances than pension liabilities, and because full actuarial recalculations typically only occur once every three years, with partial updates (*e.g.* reviewing assumptions such as inflation and prospective investment returns) only once a year or possibly every six months. One consequence of a limited focus on liabilities and ALM is that, in practice, many pension funds have pursued investment strategies measured relative to broad market indices. Recently, some pension funds and sponsors have also given thought to ways to manage liabilities more actively, including the conditionality of pension benefits. Such flexibility would again impact pension fund investment and risk management/ALM practices.²⁹

²⁸ See for example CIEBA (2004).

²⁹ See de Nederlandsche Bank (2004).

Recent regulatory and accounting changes have shifted the focus more toward matching liabilities...

13. Recent regulatory and accounting changes, as well as market developments, have put more focus on risk management and ALM practices. For example, the choice of the discount rate for minimum funding requirements increasingly influences pension fund asset allocation and investment strategies. Pension fund managers wishing to limit the volatility of their regulatory funding ratios may hold a larger allocation of assets with a higher correlation (or matching) to the discount rate used for liabilities. Corporate bond yields are increasingly used by pension regulators as the relevant discount rate for liabilities (see Box II.2). In the United Kingdom, discount rates based on AA corporate bond yields produced a greater demand for such assets. In some countries liability matching may be required to meet return guarantees imposed by law.³⁰

... and to the various unique risks associated with pension liabilities

14. Looking ahead, a number of risks are likely to be faced more directly by pension funds as part of the pension fund ALM process.³¹ These include the duration gap between assets and liabilities, inflation, positive longevity shocks and the financial strength of the sponsor company. Pension funds increasingly need to develop investment portfolios to better manage these risks, rather than benchmarking performance against market indices. In particular, longevity bonds or other hedges may develop, reinsurance may be considered to hedge longevity and other risks, inflation-protected pension benefits may be in large part hedged by index-linked bonds and other instruments (such as inflation swaps), and sponsors may need to define more clearly their right and ability to modify or suspend certain obligations (see below). With respect to DC plans, the main risk relates to whether contribution rates over the working life and the effect of volatility during both the contribution phase, and, more importantly, at the time of retirement, will deliver adequate pension benefits.

II.3. Implications for financial markets

Growing sensitivity to market movements...

15. Policy changes in areas such as regulation and financial accounting, as described above, have increased the sensitivity of pension funds and their sponsor companies to market values and shorter-term price movements. The shift to more market-based accounting (and regulatory) principles, for example, has made the volatility of DB pension fund balance sheets more visible on sponsor companies' financial accounts. This can be expected to influence pension fund risk management and investment behaviour.

... and other factors influencing pension fund asset allocation

16. A number of other factors are also likely to influence investment strategies in the future. While attempts to address funding gaps may in the short term lead some pension funds to adjust their asset allocation, national or regional market characteristics will also play a role in determining investment preferences and styles for pension funds. For example, a limited supply of certain financial instruments in

³⁰ For example, in Belgium, employers are responsible for meeting an average annual return of 3.75 percent on employees' contributions, whether the plan is DC or DB. In Germany, all DC plans must guarantee that the amount accumulated at retirement is at least equal to the nominal value of the cumulative contributions to the plan. In Switzerland, occupational pension plans must offer a guaranteed rate of return of 2.5 percent when employees switch plans or retire (however, the guaranteed rate has been modified, reflecting in particular changes in the yield on government bonds).

³¹ See, for example, Section 3.7 of U.K. Pensions Commission (2004).

national or regional markets may limit the desired investment alternatives of pension funds to meet their specific investment needs. Similarly, domestic or regional market characteristics may also influence the availability and selection of financial instruments for households to achieve their investment objectives, which may be quite different from those of occupational or corporate pension plans.

Box II.2 Discount rates

The valuation of pension liabilities, and therefore the funding ratios of pension schemes, depends heavily on the discount rate. As the table below illustrates, the choice of discount rates for regulatory purposes differs across countries. In Belgium, Germany, and the Netherlands, a fixed discount rate is used. In France and Sweden, the discount rate is adjusted periodically to reflect changes in market interest rates. Countries that rely on market interest rates as a discount factor currently include Canada, Japan, the United Kingdom and the United States. In the United Kingdom, discount rates are based on AA corporate bond yields. In the United States, the discount rate for funding calculations was amended in 2004, for the years 2004 and 2005, to a corporate bond rate (a 4-year weighted average of long-term high grade corporate bond yields), replacing the 30-year Treasury bond yield for this period.

Using market rates implies that measured pension liabilities (and funding ratios) will be more volatile, despite the fact that pension liabilities are typically non-tradable. Nonetheless, there are good reasons to use market interest rates as a discount factor, particularly where portability, or more generally transferability, is seen as important. Indeed, transferability has become increasingly relevant due to increased employee mobility between jobs, and because the ageing process itself will reduce the proportion of active participants and may ultimately lead to more closures of pension schemes.

A shift toward greater use of market-based discount rates is observed, like for example in the Netherlands (see Box II.1), or in the United States, where new government proposals would entail a much stricter application of market-based discount rates. New regulation proposed in both the Netherlands and the United States will involve the use of market yield curves.³² Finally, whereas fixed discount rates are still used in several countries' regulatory framework, for accounting purposes the use of market discount rates is becoming more widespread (see Annex II.D).

Country	Discount rates for regulatory purposes
Belgium	Fixed (6 percent)
Canada	Market-based: a long-term government or high-grade corporate bond yield
France	The discount rate is the minimum of either 3.5 percent, or sixty percent of the average government bond yield over the past ten years
Germany	Fixed (2.75 percent)
Italy	No specific rules, the supervisor uses a case-by-case approach
Japan	Market-based: a long-term government or high-grade corporate bond yield
Netherlands	Fixed (4 percent), but this will soon be replaced by a market-based approach (using a matched yield curve)
Sweden	Different rates are used for new and old commitments. These are frequently adjusted (currently at 2.75 percent for new commitments)
Switzerland	Set according to the long-term return rate of low-risk instruments or the return potential of pension funds' asset allocation minus a safety margin (mainly for the increase in longevity)
United Kingdom	Market-based: a corporate bond yield
United States	Market-based: temporarily a corporate bond yield (historically the 30-year Treasury yield)

³²

See U.S. Treasury (2005).

ageing may lead to an increase in risk aversion and thus to a reduction of equity investments by institutional investors.³⁶

Box II.3. Bonds versus equities

There is no consensus among pension and investment experts on the optimal asset allocation for pension funds. While there are many different approaches to investment management and ALM for pensions, asset allocation philosophies often fall within two broad styles, namely primarily equity-based or primarily bond-based.¹

Many in the pension fund industry favour an investment portfolio consisting primarily of equities, on the grounds that in the long run the extra return (or risk premium) from equities will outweigh the risk associated with their short-term volatility. In their view, although equity returns can be volatile in the short run, equities are likely to outperform bonds over the longer-term average life of pension liabilities. Accordingly, they often oppose “fair value” financial accounting, arguing that it fails to reflect the longer-term nature or structure of pension liabilities and thus the economic objectives of pension investments. Many advocates of this position also view equities as a better inflation hedge than bonds, since their value reflects future expected profits, and therefore may be expected to rise with future wage and price growth in the long-term. Equities may also be seen as having a longer duration than bonds, because their dividends represent a stream of cash flows with no final maturity.

Alternatively, an increasing body of opinion favours a portfolio based wholly or primarily on fixed-income securities. The argument is that, since a pension fund’s liabilities form a future stream of payment obligations that closely resemble a portfolio of fixed-income obligations, a bond portfolio can best provide the certainty that the pension fund will meet its liabilities as they fall due. At the same time, sponsor companies should not seek or accept additional or unrelated business, leverage or investment risks through their pension fund (if shareholders seek a diversified portfolio, they can more efficiently build one themselves).

Many sponsor companies and pension funds may consider moving to a larger bond allocation if their funding ratio rebounds, moving closer to 100 percent. In the United Kingdom, the retail firm Boots moved to a 100 percent bond allocation in 2001, although more recently it announced that it intends to invest up to 15 percent in other assets, to better match very long-dated liabilities, extending beyond 35 years, and for which it has not been possible to purchase equivalent-duration bonds. Indeed, the practical difficulty of purchasing such long-duration bonds (particularly inflation-linked) may have prevented a greater shift from equity securities to fixed-income instruments by pension funds to date.

¹ See, for example, Bodie (1995), Feldstein (2005), Siegel (2002), and IMF (2004a).

*... but significant,
short-term shifts
appear unlikely*

19. A significant and sudden shift by pension funds would seem unlikely, particularly given the reluctance of many pension fund managers to move to bonds (or pursue more closely matched risk management strategies) while the funds remain substantially underfunded and rates remain at perceived low levels. Moreover, past experience suggests that pension funds tend to engage in gradual and infrequent portfolio shifts. As of early 2005, while pension funds have expressed a desire for greater fixed-income assets or alternatives, and have on the margin increased such holdings (often by allocating new contributions disproportionately into bonds), no

³⁶ See Gerber (2005), who finds a statistically significant relationship between pension funds’ liability structure and benefit levels and the share of equities in their portfolios. The higher the average age within a pension fund and the higher the benefit levels (in particular disability benefits), the smaller the equity share observed. Ageing and the strong upward trend in the number of disability beneficiaries in Switzerland may therefore reduce the ability or desire of pension funds to bear market risks. Age and benefit structures are found also to have an impact on non-equity asset holdings. Pension funds with a high level of disability, survivors and old-age beneficiaries tend to have a higher proportion of real estate investments, leading to steadier cash flows for benefit payments.

large-scale shift to bonds had been observed. In the United States, for example, a recent survey indicated that the top 200 plan sponsors did not drastically change their asset mix in 2004, continuing to hold relatively large equity portfolios.³⁷ In addition, there remains a widespread perception by pension funds that yields/rates are “too low,” making it less attractive and too expensive (they argue) to address their underfunding problem by shifting into bonds at this time. The impact of a more gradual reallocation is more difficult to assess, especially as changes in the risk management practices of pension funds may be expected to continue in the coming years.

Pension fund managers are turning to other instruments...

20. Beyond the bond versus equity debate, recent policy initiatives and changing investment views are also likely to impact financial markets. Portfolio theory suggests that a diversified investment portfolio offers the best way to balance risk and return. Pension fund managers supporting a balanced portfolio approach are increasingly diversifying their portfolios across asset classes and geographically, and looking to enhance returns through more active portfolio and asset management, including various “alternative investments” designed to provide less correlated returns (and sometimes inflation hedges), such as private equity, real estate, commodities, infrastructure projects, and more recently hedge funds. In fact, for pension funds, real estate is a traditional way of improving portfolio risk diversification.

... including hedge funds

21. Hedge funds are being increasingly considered, even though, to date, aggregate amounts invested into hedge funds remain relatively limited (few pension funds have made hedge fund allocations above 5 percent of their total portfolio), and no dramatic change is foreseen in the near term. In the United States, many corporate and public pension funds reportedly intend to devote 10 to 15 percent of their assets to these alternative investments (*i.e.*, real estate, private equity, commodities, hedge funds, etc.). In Japan, the percentage of institutional investors using hedge funds more than doubled from 18 percent in 2003 to nearly 40 percent in 2004; however, in absolute terms, the investments remain small.³⁸

The financial strength of the sponsor company may be an additional determinant of pension fund investment strategies

22. The financial strength and flexibility of the sponsor company is another, often overlooked, factor in the analysis of pension fund investment and risk management practices. It is particularly important in assessing the ability of a pension fund to meet its projected benefit obligations (PBO) as a going concern (while the strength of the pension fund as a stand-alone entity may be more important to assess the ability to meet accumulated benefit obligations (ABO), in the event of financial distress at the plan or sponsor level). The sponsor companies’ financial strength may also influence the pension fund’s investment strategy and portfolio mix, or the degree of duration matching. For example, financially strong companies in growing industries may have more flexibility to take investment risk and manage short-term funding shortfalls. On the other hand, firms in older or mature industries, often with a high proportion of retirees to active workers and relatively large pension funds, may have less flexibility to increase contributions if investments fall short or funding gaps otherwise emerge or grow.

³⁷ See Pensions & Investments (2005).

³⁸ See Greenwich Associates (2004).

Risk is being reallocated in the financial system, and increasingly transferred to households

23. Reforms in the pension industry are relevant from a financial stability perspective, both due to the large size of pension funds relative to other investor groups and the financial markets, as well as the implied transfer of risk through the markets and (increasingly) towards the household sector.³⁹ As noted, the move from DB to DC schemes, in particular, is associated with an increased transfer of financial and other risks from sponsor companies to their employees. This raises questions regarding the capacity of households to understand and to manage these risks, and the possible need for additional investment products to meet household needs (see below). In addition, some of these risks, such as longevity, may not be diversifiable or efficiently hedged in the financial markets, which may suggest a role for governments in helping to manage them, at least in part (*e.g.* extreme old age, tail risks), similar to its role in other extreme or undiversifiable risk events (*e.g.* hurricanes, earthquakes, terrorism, etc.). Finally, employee participation in DC plans has also become an issue in some countries, with automatic DC plan enrolment increasingly shown to have a potentially large effect in raising scheme participation rates.⁴⁰

II.4. Financial instruments

The range of investment instruments for both pension funds and households has grown

24. As pension funds focus more on ALM (particularly the relative duration of assets and liabilities), pension fund managers routinely stress that additional financial instruments (new instruments, and a greater supply of existing securities) are needed to help them better manage and hedge certain risks, such as duration, inflation and longevity risks.⁴¹ These instruments certainly include long-dated bonds (30 years and longer) and inflation-linked instruments. The availability of such instruments is seen as an essential complement to a more market-oriented or risk-based regulatory framework, which is likely to encourage pension funds to better match their assets and long-term liabilities. There has also been significant growth and diversification in the range of investment products available to individuals for retirement.

Instruments for institutional investment

Increasingly useful instruments include long-dated bonds...

25. In most mature markets, authorities have given greater consideration to the need to further develop longer-dated bond markets, which remain small relative to the size of pension fund and insurance company portfolios, and thus potential demand (see Table II.1).⁴² While the market for long-term bonds is deepest in the United States, even there the size of the market for maturities beyond 10 years is relatively modest.⁴³ Switzerland has a long tradition in government bonds with a

³⁹ See IMF (2005).

⁴⁰ In the U.S., Choi *et al.* (2004) have shown that participation rates under automatic enrolment are between 86 percent and 96 percent after six months of tenure at companies that introduced automatic enrolment to their 401(k) plans. Before this shift, participation rates were between 26 percent and 43 percent.

⁴¹ See United Kingdom Debt Management Office (2004).

⁴² See Schich (2004).

⁴³ In August 2005, the U.S. Treasury Department announced that it would resume issuing 30-year bonds in 2006.

maturity of more than 30 years. In early 2005, a few other European countries started issuing very long-dated bonds, namely France (50-year bonds issued in February) and the U.K. (50-year gilts issued in May and July). In addition to governments, corporate issuers desiring longer-term funding exist in most mature markets, such as capital-intensive industries, utilities, and financial services (banks and insurers). However, corporate issuance of long-term bonds may have been hampered by a variety of factors, including the price uncertainty resulting from the lack of public benchmarks, tax disincentives in some countries for very long issuance (*i.e.*, beyond 30 years), as well as more cyclical factors, such as the current strong liquidity position of many corporate balance sheets worldwide and the very low cost of shorter-term credit. At present, even a relatively modest reallocation by institutional investors into these markets would overwhelm outstanding supply, and the lack of liquidity in many outstanding long-dated issues could lead to significant short-term price volatility. As such, the planned and proposed new issues and supply are welcome.

*... index-linked
bonds...*

26. As with long-dated bonds, the market for index-linked bonds (ILBs) remains small relative to potential demand (see Figure II.5).⁴⁴ The scale of the shortage of indexed securities is illustrated by occupational pension funds and life insurance companies in the United Kingdom already holding 80 percent of outstanding long-dated and index-linked gilts. This holds even with an asset allocation to bonds at many funds of only 20-30 percent of their total portfolio. ILBs have been issued by the U.K. government since 1981, the Canadian government since the early 1990s, and the U.S. Treasury since the late 1990s. The largest ILB market is in the United States, with nominal amounts outstanding of more than \$220 billion at end-2004, against about \$150 billion in the United Kingdom, and less than \$100 billion in France. The German authorities have announced their intention to issue their first inflation-linked bond in 2005. In Japan, the authorities issued index-linked bonds with a 10-year maturity in 2004, and plan to increase the amount of issuance to 2.0 trillion yen in 2005.

*... as well as
derivative
products...*

27. As a result of the limited supply of long-dated fixed-income securities, derivative instruments have also attracted some pension fund managers seeking to increase asset duration, or to obtain some form of protection against inflation or interest rate risks. Interest rate and inflation swap markets (or swaptions – *i.e.*, options on interest rate swaps) can be more liquid and may provide greater flexibility to tailor duration and cash flow profiles to match the specific needs of a pension fund, thereby helping reduce balance sheet mismatches at relatively low cost and credit risk (on a collateralised basis).⁴⁵ In some cases, investment strategies have included adding a full swap overlay to the bond portfolio of a pension fund in order to reach a duration target reflecting a given pension liability structure. Furthermore, the development of more liquid cash markets for index-linked bonds should deepen these inflation derivative markets.

⁴⁴ See Bank of England (2004).

⁴⁵ In February 2004, the Chicago Mercantile Exchange launched CPI futures contracts. More broadly, the inflation swap market has grown rapidly in recent years (Bank of England, 2004). See also Fornari (2005).

Table II.1. Selected G10 countries: potential demand for long-term and inflation-linked bonds not matched by supply
(in billions of U.S. dollars; amount outstanding)

		Current supply		Potential demand	
		Corporate and government long-term bonds ¹	Inflation indexed government bonds ²	Pension fund assets (at end-December 2001) ³	Pension fund assets, assuming a 75 percent allocation to bonds, as a percent of long-term and inflation-indexed bonds ⁴
United States	2000	1,143	115		
	2004	1,266	223	6,136	309
United Kingdom	2000	144	99		
	2004	241	155	954	181
France	2000	74	12		
	2004	178	92	...	...
Italy	2000	81	...		
	2004	241	28	47	15
Japan	2000	250	...		
	2004	427	22	711	119

Sources: U.S. Department of Treasury, Board of Governors of the Federal Reserve System; U.K., Debt Management Office; Agence France Trésor; Italy, Ministry of Economics and Finance; Japan, Ministry of Finance; Merrill Lynch; and OECD (2003).

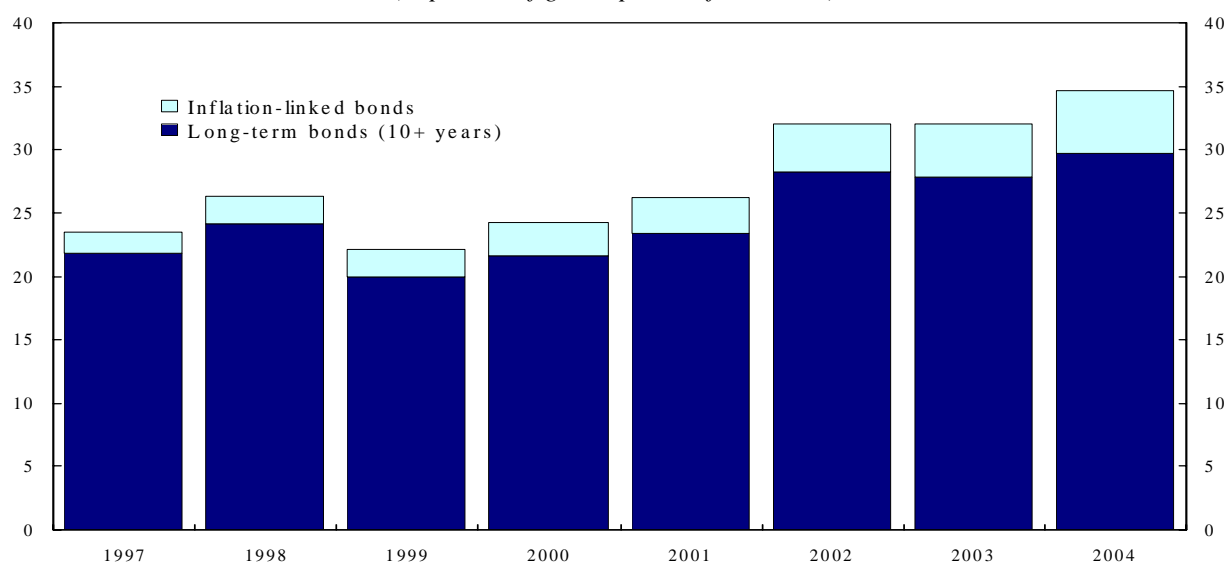
¹Total amount of ten-year and above maturities. For United Kingdom, France, and Italy, government bonds only.

²For France and Italy, also includes bonds indexed on euro area inflation. For the United States, 2004 data refer to end-September 2004.

³For the United States, the pension fund assets represent September 2004 data. For other countries, data are as of 2001.

⁴We assume a 75 percent allocation to fixed-income securities based on the belief that the vast majority of pension funds would continue to seek diversified returns, and we draw on the experience of the U.S. insurance industry, which holds substantial fixed-income assets, typically approximately 70-80 percent of their portfolio.

Figure II.5. Size of the G10 long-term and inflation-linked bond markets
(in percent of global pension fund assets)



Sources: Watson Wyatt; International Financial Services, London; OECD (2003); Barclays; Merrill Lynch; and IMF staff estimates.

Box II.4. Longevity bonds

The European Investment Bank (EIB), working with others and at the suggestion of the European Parliament, has been seeking to create a capital markets instrument to help pension funds address the challenges of ageing populations. The bond, as currently designed, would provide a long-term, tradable instrument that aims to hedge longevity risk by scaling payouts according to future longevity. The United Kingdom is a logical market in which to initiate this product, since the U.K. authorities require that at least 75 percent of DC or personal pensions be annuitised by age 75, and there are relatively few U.K. annuity providers.

Although the EIB would be the issuer of the proposed bond, the ultimate recipient of the longevity risk embedded in the bond would be PartnerRe. The EIB would undertake a swap with BNP Paribas, with the EIB receiving floating-rate sterling funding. In turn, BNP Paribas would reinsure the longevity risk with PartnerRe, leaving BNP Paribas with interest rate exposure, and PartnerRe insuring the longevity risk.

As currently structured and proposed, the bond would have a 25-year maturity, and would make annual payments related to an index, representing the number of men in England and Wales who were 65 years old at the time of the bond's issue, and who are living at each payment date. Payments on the bond would decline over its life depending on the longevity of the indexed pool (from about 9 percent to below 3 percent of the bond's initial market value, based on current actuarial estimates). There would be no separate interest or principal payments in addition to the indexed payments. The 25-year maturity indicates that the bond would not cover the most extreme longevity risk (or tail-risk).

Such a bond may expand reinsurance capital available for annuity products. The risks involved in instruments based on wide population groups, such as that defined by the EIB bond, are understood to be somewhat more efficiently measured and managed by insurers than the risks related to specific populations of an individual pension fund or group of annuity beneficiaries, that bilateral insurance deals typically involve. As such, insurers may be prepared to commit relatively larger amounts of capital to the annuity and longevity markets.

The success of such transactions and the scope for bond issues of this type remain uncertain at this stage, with the constraints on future issuance likely to include the capacity of insurers and reinsurers to take on longevity risk, and investors' ability to price and realise material portfolio benefits from these relatively small transactions (the EIB issue would approximate £600 million).

... longevity bonds

28. Financial instruments which could help pension funds and insurance companies better manage longevity risk (and reinvestment risk) may also increase the supply of annuity products, by encouraging insurance and reinsurance companies in particular to allocate additional capital to their annuity businesses (see below). For example, longevity bonds, such as the one proposed by the European Investment Bank (EIB), are potentially promising instruments in this regard (see Box II.4). The U.K. Government indicated that, while it did not envisage issuing longevity bonds in 2005-06, it may revisit the subject at a later date, and has been seeking comments from the market regarding long-dated bonds and other instruments.⁴⁶

... and "macro-swaps"

29. Another, at present hypothetical, alternative may be the development of "macro-swaps", through which (for example) the pension fund and health care industries may swap their complementary exposures to longevity. Indeed, such swaps would allow pension funds to reduce their exposure to unexpected increases in longevity by transferring the "increased" liabilities to health care companies,

⁴⁶

See United Kingdom Debt Management Office (2004).

whose higher revenues from increased age-related health care expenses would allow them to meet these liabilities. Governments could encourage such long-term swaps by introducing appropriate incentives for the health care industry (*e.g.* incentives for longer-term financing related to R&D for certain products or services targeted to elderly consumers), with payments to pension funds corresponding to the longevity of an indexed population.

Instruments for personal (Pillar 3) pension plans

As growing household needs are to be met...

30. The availability of a variety of retail products, ranging from savings and investment to payout strategies, and broader liability management products is increasingly important for individuals and households, as they become more responsible for managing their own retirement savings.

... new retail products have emerged, such as lifecycle funds,...

31. “Life cycle” products have been developed to address certain “operational risks,” such as the perceived need to reallocate or rebalance portfolios in line with individuals’ theoretically reduced risk tolerance as they age.⁴⁷ While their use has expanded in recent years in the United States and Europe, these products still represent a limited portion of the overall market for retirement savings, and there may be increased scope for their inclusion among the investment (or even default) options for self-directed pension plans.

... structured products...

32. In some countries, structured products also offer a variety of risk/return profiles, including capital or performance guarantees. These products have become increasingly popular in Asia and continental Europe since the equity market downturn in 2000-02, and in response to the prolonged low interest rate environment. However, the use of complex hybrid products, such as equity-linked and structured credit notes, may raise consumer protection issues, where households may not fully understand all the underlying risks and costs of these products.

... and products that provide access to diversified asset classes

33. Going forward, retail investment products that provide access to diversified or less correlated asset classes (*e.g.* hedge funds, commodities, or private equity) may also be sought as, like other investors, households may seek to invest in asset classes that provide diversification benefits.⁴⁸ Some of these asset classes are generally unavailable to households today. A significantly greater household exposure to hedge funds (for example) would likely give renewed impetus to the debate about the regulatory framework for such investment vehicles, and a stronger regulatory approach would seem appropriate for retail distribution (as opposed to institutional investor involvement).

Annuities

34. A crucial element of household saving and investment plans is the ability

⁴⁷ Such life cycle products are mutual funds which gradually and automatically adjust asset allocations to a more conservative profile (*e.g.* increasing fixed-income investments) as an individual approaches retirement (or another savings goal, such as education costs), thereby reflecting an individual’s assumed evolving risk tolerance.

⁴⁸ See Greenwich Associates (2003).

markets remain underdeveloped, or at least potentially underutilised by households...

to convert long-term savings into a dependable income stream after retirement by using an instrument such as an annuity, which is a financial contract that pays out a periodic amount for as long as the annuitant is alive, in exchange for an initial premium.⁴⁹ Annuities can take many different forms, depending in particular on the income payment (fixed or variable) and the pay out period (*e.g.* equal to or greater than the remaining life of the annuitant, immediate or deferred period, etc.). Empirical estimates show that the welfare gains of buying an annuity can be substantial, with some studies estimating such gains between 25 and 45 percent across countries.⁵⁰ However, annuity markets are generally underdeveloped (particularly for individuals) and, in several countries, the number of institutions providing annuity products has declined in recent years.⁵¹ A number of factors may explain this, including: the existence of annuitised resources from (public or private) DB plans; bequest motives; lack of understanding of annuity products by households;⁵² and, real or perceived cost issues, due in part to adverse selection effects, although these can be partly overcome via mandatory annuitisation, as suggested by the U.K. and Italian experience.⁵³ Tax disincentives may also often played an important role. In Belgium and France, for example, the tax regime historically encouraged workers to take lump-sum withdrawals instead of annuities. This changed in France in 2004, with the introduction of pension products with mandatory annuities at retirement and a generous tax treatment. The tax disadvantage of annuities was also eliminated in Belgium in 2004. In Germany, annuity premiums have experienced rapid growth since the tax treatment of annuitised schemes was moved to EET.⁵⁴

⁴⁹ See Brown *et al.* (2001)

⁵⁰ Since retirees tend to maintain precautionary savings due to the uncertainty regarding their longevity, buying annuities may improve their welfare by allowing them to consume more out of their accumulated assets. Such welfare gains have been assessed by computing the additional amount of assets required at the time of retirement to leave an individual that does not insure as well off as an individual that buys an annuity (OECD, 2005a).

⁵¹ For a discussion of the underdevelopment of annuity markets in Europe, see Fornero and Luciano (2004). The United Kingdom has a long history of mandatory annuitisation during retirement. In particular, DC pension funds are currently required to provide 75 year old retirees with 75 percent of pension assets in the form of annuities. However, increasingly fewer insurers are willing to offer such products (see Murthi *et al.*, 1999). In the United States, the majority of DC plan sponsors do not offer annuitisation options at retirement (see Yakoboski, 2005).

⁵² Financial literacy is also a problem in countries with relatively developed annuity markets. In the United Kingdom, which has the world's most developed annuity market, a large majority of retirees continue to choose bond-backed annuities, which may not be appropriate investments given the fact that they may be spending 20 years or more in retirement (see Cardinale *et al.*, 2002).

⁵³ Such adverse selection reflects the fact that annuitants have significantly higher survival probabilities than the general population. As a result, annuity providers may set premiums that reflect the greater longevity of typical annuitants, making annuities less attractive to the general population. See Mackenzie and Schrage (2004).

⁵⁴ A tax system in which contributions are exempt from tax (the first E), the accrual return on the investment is also exempt (the second E), but the pension benefits are fully taxed (T).

Box II.5. Retirement and real estate

Residential property is generally the largest asset in household portfolios in industrial countries, including in the Netherlands, the United Kingdom and the United States, where house prices have risen much faster than nominal income in recent years. Since this trend has often been accompanied by a parallel growth in mortgage debt, real estate dominates both the asset and liability sides of many households' balance sheets.⁵⁵

Housing can be an attractive investment vehicle for retirement for various reasons. First, it leads to a gradual accumulation of wealth over households' life cycle. Second, the low correlation between housing value and households' other investments generally provides portfolio diversification benefits (particularly for high-income households with relatively large financial asset holdings). Third, it can be used as a source of liquidity and consumption through mortgage equity withdrawal.

In markets such as the Netherlands, the United Kingdom and the United States, flexible refinancing practices and a wide range of mortgage products have enhanced households' ability to manage their debt position and interest rate exposure, and extract equity from their home. Reverse mortgages (or home equity conversion mortgages) target older homeowners, and offer a variety of cash flow profiles. Payments to households are structured similarly to an annuity, and repayment is not required as long as the borrower uses the home as his or her principal residence. However, in most countries, these instruments are still scarcely used, including because they require a relatively high degree of household financial education. Even in the United States, where the reverse mortgage market has developed rapidly in recent years, it remains very small (Figure II.6).

Investment in real estate and mortgage products may also entail risks. Middle-income households' wealth (and debt) may be heavily concentrated on their home, so that they do not have the diversification benefits mentioned above. In addition, demographic shifts may in some countries have a significant impact on demand and supply conditions in the coming decades, with a fall in prices possible if many retirees realise capital gains by selling their homes simultaneously. However, analyses of the possibility of substantial effects on real estate prices related to the ageing process do not appear to strongly support such an outcome (see Annex I.3).

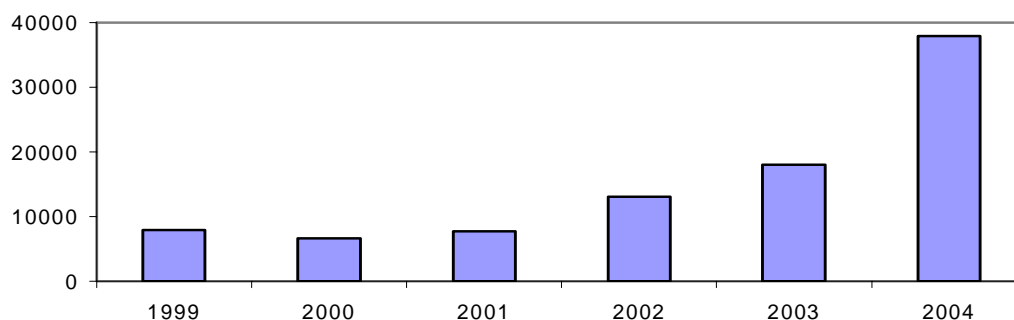
***... as do markets
for home equity
release products
and other real
estate instruments***

35. Given the generally large share of housing assets in household net worth, the availability of home equity release products may help households to more easily realise this form of long-term savings (without moving) and obtain an annuity-like income stream. More generally, since housing is for households both a major savings vehicle and a currently consumed asset, financial instruments that help support these two functions may have an important role to play (Box II.5). For example, instruments that provide hedges against house price movements may facilitate residential real estate investment by both existing homeowners (and institutions) and prospective purchasers (saving to buy a home). A major challenge is to develop products that would allow investors to hedge price risk as specifically as possible, based on regional or more local market indices, yet provide liquidity as well. One interesting approach is being developed in the United States through a government-sponsored project to provide house price insurance in very localised areas (based on zip codes).⁵⁶ Housing indexed products may also be very useful for potential homebuyers (particularly first-time buyers), by increasing their ability to save for a particular property or to invest less than the savings needed to purchase a home as they continue to save for a house. Other countries are looking to develop broader housing products, including more conventional real estate investment trusts for residential property.

⁵⁵ See IMF (2005).

⁵⁶ See Case and Shiller (2003). Information on the pilot project is available at www.realliquidity.com.

Figure II.6. Reverse mortgages remain rare even in the United States
(number of federally-insured reverse mortgage loans, fiscal years)



Sources: U.S. Department of Housing and Urban Development; U.S. Mortgage Bankers Association.

II.5. Factors impeding market development

Several factors may hold back the development of certain instruments...

36. The above discussion outlines a number of areas where improved regulations and other policies may encourage pension funds and households to pursue greater risk management practices and long-term investment strategies. In particular, the development and increased supply of certain capital markets and financial instruments are important requirements that need to be met for the successful implementation of such strategies.

... including taxation...

37. A number of initiatives have been pursued by governments to encourage more stable and long-term savings, and to help overcome households' general inertia or risk aversion, through tax-advantaged vehicles. These include IRAs and 401(k) plans for pension savings and 529 plans for college savings in the United States, and preferential tax treatments for certain accounts and life insurance products in other countries (e.g. in Belgium, France, and Germany). Nevertheless, tax systems are often criticised for being too complicated and subject to frequent change, which may not facilitate the promotion of long-term saving and investment instruments.⁵⁷ With regard to pension funding levels, tax systems have also introduced disincentives to prudent, continuous funding policies. For example, one of the key reasons for the contribution holidays in the late 1990s, in many countries, was the loss of preferential tax treatment (or even tax penalties) applied to further contributions once pension funds became overfunded; the inability to build a funding cushion left many funds more exposed to a market downturn. An important element of the recent U.S. Administration proposal on pension reform is to increase the amount of tax-deductible contributions that may be made to pension plans in order to build such a funding cushion, up to 130 percent of their funding targets, and to allow for pre-funding of salary and benefit increases.⁵⁸

... the importance of other savings

38. In some countries, including countries where an "equity culture" or fund management industries are relatively less developed, insurance companies have

⁵⁷ See Section 6.5 of U.K. Pensions Commission (2004).

⁵⁸ See Pension Benefit Guaranty Corporation (2005), as well as United States Government Accountability Office (2005) on changes to U.S. pension funding rules more generally.

vehicles... traditionally played an important role in providing fixed-income based savings products (often offering minimum return guarantees). As household demand for products related to retirement savings or income expand, and in particular with the expected increase of funded pension schemes, the role of life insurance companies and products, and more broadly of the asset management industry, may evolve. In such countries, like France and Germany where insurance companies and products already play an important role in the savings market, policymakers may seek to expand these products as well as develop new products that help households secure a sufficient retirement income level.

... the inability to hedge extreme (tail) risks... 39. As noted above, there is substantial demand for long-dated and inflation-linked bonds in order to provide pension funds and insurance companies with a greater ability to hedge their long-term liabilities, including longevity risk.⁵⁹ One obstacle to the development of such markets is the difficulty to price and manage extreme longevity risk, which remains an important and costly tail risk for insurers.

... a lack of equity release products in mortgage markets... 40. Further analysis of the factors holding back the development of more flexible mortgage markets, and in particular home equity release products, would also be useful. The use of reverse mortgages, in particular, may be limited by supply and demand factors, but also possibly by the insufficient availability of financial instruments to hedge the associated risks, such as house price movements and longevity risk.

... and households' limited financial education 41. Saving for retirement is a long-term and challenging exercise for households, and individuals may make significant and systematic errors over time. Surveys of households frequently show a substantial lack of knowledge about their own arrangements for retirement savings.⁶⁰ Household financial behaviour suggests that large numbers of individuals do not currently take a comprehensive approach to financial management, are often slow to act, and may underestimate the level of savings required and the increased obligations and risks that they need to address in order to reach the living standards they expect at retirement. Similarly, the vast majority of households receive little or no financial advice from product providers.

⁵⁹ See Association of British Insurers (2005).

⁶⁰ For example, 65 percent of Dutch households are unable to provide an estimate of their pension income upon retirement (de Nederlandsche Bank, 2003). In the United Kingdom, 44 percent of the population reported a basic knowledge of pensions in 2004, down from 53 percent in 2000 (Pensions Commission, 2004). In the United States, 47 percent of workers who have not saved at all still report themselves confident that that they will have enough money for retirement (Helman and Paladino, 2004).

CHAPTER III. POLICY CHALLENGES AND ACTIONS

The development of private pension systems raise many policy challenges

1. The recommendations in this chapter focus on policy actions which may be considered in dealing with the development of private pension systems in the framework of our current financial markets and in helping households manage retirement income risks. Four types of policy intervention may be especially worthwhile for policymakers to consider. First, they can provide incentives for later retirement and the development of private pension systems. Second, they can facilitate the development of markets for the transfer and pooling of investment and longevity risk between private agents and assist in the strengthening of the financial market infrastructure. Third, they can ensure appropriate oversight of pension providers to promote solvency and good performance and develop proper mechanisms to monitor the macroeconomic and financial stability impacts of population ageing and private pension systems. Fourth, they can address agency risks through the protection of pension beneficiaries and financial education programmes. These four policy areas in turn are complemented by more general economic policies, such as the promotion of an environment of financial stability and economic growth through sound fiscal and monetary policies.

Policies should be regularly reviewed

2. These policy suggestions are primarily aimed at addressing possible market failures arising from information problems. It is however very important to highlight from the beginning that such actions should be balanced and regularly assessed to avoid any unnecessary disruptive and crowding out impacts on market mechanisms.⁶¹ The scope and intensity of these policies is also likely to vary from country to country depending on the role played by private pension systems in retirement income provision. Ultimately, each country will need to determine its own balancing point between prudential control and free initiative.

III.1. Encouraging funding and private pension savings

Higher statutory retirement ages would help

3. As outlined in Chapter I, reforms in G10 countries are needed to offset the possible negative effects of ageing on living standards and fiscal balances. Such reforms should therefore encourage economic growth and the efficient use of resources.⁶² Policies that promote the supply of labour and increase its productivity are essential. Governments should also consider pursuing measures that would increase saving and its efficient allocation, such as relaxing regulations restricting the amount of foreign assets held by domestic pension funds. Reforms to public pension systems will also play an important role in this regard as they affect both labour and savings decisions. In particular, the expected decline in replacement rates (at a given retirement age) from public pension systems may be compensated by later retirement and higher private savings. There is no guarantee, however, that individuals on their own will

⁶¹ This is especially important as private pensions are often voluntary. Against this background, pension rules should provide an adequate regulatory framework for these systems to function efficiently, but they should avoid creating disincentives to employer participation and the development of private pensions in general (see Laboul and Yermo, 2005).

⁶² As concluded also in the 1998 G10 report on the macroeconomic and financial implications of ageing populations.

work longer or save more. Incentives are essential, especially in countries where replacement rates from public plans are set to decrease significantly over time. Old-age labour market participation is likely to increase if further reforms are implemented to eliminate the incentives for early retirement that still exist in some G10 countries. Further increases in statutory retirement ages may also be required. While most of the G10 have equalised the age of retirement for men and women, only the United States is raising the statutory retirement age above 65 years, to 67. A relatively modest increase in statutory retirement ages of one year every ten to fifteen years (in line with increasing life expectancy) would substantially reduce fiscally driven pressure to cut public pension benefits.

Private pensions coverage could be increased in some G10 countries

4. Some countries may nevertheless prefer to diversify the retirement income system and increase the relative size of private pension arrangements, as recommended in both the G10 and OECD 1998 reports.⁶³ Given this objective, an important policy challenge is how to broaden the coverage of private pension systems. Sweden and Switzerland have made private pensions mandatory. In the Netherlands, collective bargaining agreements and government rules concerning mandatory participation in industry-wide arrangements ensure a high degree of coverage. In other G10 countries, on the other hand, private pension plans cover at best around half the labour force. As mandatory solutions may be excluded in some countries, governments need to find other ways to promote participation in private pension systems so that households can reach adequate retirement income levels.

Industry-wide pension arrangements are being promoted in some countries

5. One route that has been tried successfully in Belgium and Germany in recent years is to further increase the coverage of industry-wide occupational pension plans. Some industry-wide plans have also been established in Italy, which has helped to increase the coverage of private pensions to around 11 per cent of the workforce. Multi-employer arrangements for sponsoring companies in different lines of business also exist in the United States. On the other hand, such arrangements are not permitted by tax rules in the United Kingdom.

Automatic enrolment to private plans can increase participation and contributions

6. An important difference between DB and DC plans is that the former are usually provided automatically as part of the labour contract while the latter sometimes have to be actively joined by workers. Extending automatic enrolment to DC plans, but through appropriate mechanisms favouring the rights of the beneficiaries, would help increase coverage rates. Automatic enrolment in some 401 (k) plans in the United States seems to have led to a significant extension of the coverage of those plans.⁶⁴ A major element of the Italian pension reform proposed in 2004 is the default transfer of severance contributions to occupational pension plans for new workers. The U.K. government is considering whether to require automatic enrolment in private pension plans.⁶⁵ Carefully designed default options could also lead to higher contributions to these arrangements.

⁶³ Policymakers may also find less opposition to expanding private pension systems (even mandatory ones) than to increases in statutory retirement ages. See G10 (1998) and OECD (1998).

⁶⁴ For example, Choi et al (2004) provide evidence for three large firms of the increase in take-up rates after automatic enrolment is introduced.

⁶⁵ See First Report of the Pensions Commission (2004), Table 7.1.

Governments could help to create new savings through financial incentives

7. Tax policy may also help to develop greater retirement savings, but careful design is required to minimize the risk of tax deductions for voluntary contributions to private pension plans being used primarily by richer workers to shuffle existing savings. Governments may provide additional tax incentives to encourage uncovered employees to join private pension plans, but it may be difficult to attract lower income workers, who benefit less from tax deductions (as they face lower tax rates) and are generally less informed about their availability and implications than richer ones. One option to attract such individuals is through subsidies or tax credits that match contributions from individuals, as is done in Germany in the so-called Riester pensions. For such subsidies to work, the procedures for requesting them must be relatively simple.

Tax treatment holds back the development of some private saving instruments

8. Tax treatment should promote a level playing field between different products that meet retirement income objectives. Some retirement products, such as annuities and reverse mortgages, are unlikely to take off in some countries unless they are offered tax advantages similar to those enjoyed by other retirement products. Further consideration should also be given to discouraging lump-sums, as they may be quickly consumed, compromising retirement income security. In some cases, such as where private pension plans provide a substantial part of retirement benefits, the payment of at least part of benefits in the form of annuities could be made mandatory. Most G10 countries have already moved in this direction or are expected to do so.⁶⁶

Greater awareness of the need to increase savings is necessary

9. More generally, further awareness on the need to increase private savings, when relevant, should be promoted, through appropriate education and information mechanisms. Households also need to be aware of the income they may be expected to receive from social security systems so that they can better plan their savings and retirement decision. The annual statement provided by the Swedish social security administration to every worker is exemplary in this regard as it sets out an estimate (based on future GDP growth) of the amount to which a worker will be entitled when he or she retires at the statutory age as well as how early and later retirement would affect his or her retirement income.

III.2. The development of financial instruments and associated infrastructure

Long-term matching securities are needed

10. Risk management in funded pension arrangements requires a regular evaluation of the plan's liabilities and an assessment of the investment strategy's consistency with those liabilities. This basic exercise is as important in DB as in DC plans, though in the latter case the investment strategy and the liabilities (the targeted benefit or replacement rate) should ideally be determined at the level of the individual member. As argued in Section II.2, the increasing use of ALM techniques in both types of plans is leading to a revision of investment strategies, with a resulting growing appetite among pension funds for long-dated and inflation-linked bonds (ILBs). While supply should eventually be forthcoming to meet the emerging demand, in this area governments may have some natural advantages over other issuers, as the risk of G10 governments ceasing to service their bonds is generally perceived to be lower than the risk of corporates who issue very long-term bonds ceasing to service them at some point during the life of the bonds. In addition, the relationship between inflation and

⁶⁶

See Lindeman and Yermo (2002) for a review of the annuities markets in OECD countries.

revenue may give the government a hedge for ILBs. Governments may therefore have a role to play in facilitating the creation of deep and efficient markets for such instruments. Life insurance companies are also likely to benefit from increasing liquidity and depth of these markets as it would facilitate the hedging of annuity products and policies providing return guarantees, two products that are increasingly used in pension plans, especially DC arrangements. More recently, attention has focused also on longevity risk. Longevity-indexed bonds (LIBs), which would pay coupons linked to the mortality experience of a particular cohort, may ease the hedging risk for pension providers. Insofar as markets do not respond to this demand by issuing LIBs, there may be a role for governments to assist market-building.

Developing markets for inflation-indexed and ultra-long fixed income securities

Greater policy focus would help promote the market for inflation-indexed bonds

11. As a result of investor interest and significant benefits for governments, the global market for ILBs is expected to expand rapidly over the coming years. Yet the market is still relatively young and restricted to a few countries. More direct efforts to encourage secondary market development may be needed, such as promoting the role of market makers, as well as regular assessments of the auction process to identify possible weaknesses. Governments are expected to continue playing a central role in this market as they may benefit from the correlation between inflation and tax revenue.

The benefits of ultra-long bonds for debt management purposes should be carefully assessed

12. Recently, some G10 governments have also started to issue ultra-long bonds (more than 30 years), as observed in Section II.4. Intermediaries have indicated that there is also a substantial underlying demand for these products. The discussion about what the role of governments may be in providing high-quality investment vehicles that would allow pension funds and annuity providers to match their long-term liabilities may be seen against the background of a more intensified discussion of the question of how wide the set of objectives of public debt management should be. While cost-effectiveness of instruments is an important criterion for governments to undertake public debt issues, governments have also indicated that the objective of their issuance strategies goes beyond the minimisation of borrowing costs.

Governments could also consider other aspects of market conduct

13. Governments may also consider the role of public debt issues in making markets more efficient by, for example, making the term structure of the government fixed-income market more complete. Governments also need to be prepared for potentially large swings in the demand for these instruments by pension providers as a result of changes in funding regulations and accounting standards and an increasing emphasis on liability-based risk management. Those responsible for regulatory reform, and in particular, the shift to risk-based supervision, should therefore engage in close dialogue with treasury departments and central banks in order to avoid creating unnecessary volatility in the market.

Developing markets for longevity risk

There are few “natural”

14. Unexpected developments in longevity, and in particular sudden drops in mortality among the elderly (creating a “fat tail” in the frequency distribution), can

***underwriters
of longevity
risk in the
private sector***

place a heavy burden on pension funds and life insurance companies.⁶⁷ As described in Section II.4, new capital market solutions that transfer longevity risk may be starting to emerge. However, it remains to be seen whether this proves to be the beginning of a large-scale market in longevity products. The fundamental problem is that although many parties wish to offload longevity risk (pension funds, insurance companies, governments) there are few natural buyers of longevity (some exceptions are long-term health care businesses, as observed in Section II.4) and none of any size yet.⁶⁸ There may also be some scope for long-term longevity swaps (and options) within the life insurance industry, whereby parties with offsetting longevity exposure (for example, an insurance company that provides mainly annuities and another that underwrites mainly life insurance) would enter into a contract that transfers their exposure to longevity risk.

***Is there a role
for
governments?***

15. Where markets are underdeveloped or absent altogether, as is the case with longevity bonds, price uncertainty and information costs can make transaction costs high for potential issuers, hindering the development of a market. In such a case, it may be that government's playing a catalytic role in developing the market would yield efficiency gains. At a minimum, governments could improve the framework conditions, by making sure that mortality statistics are up-to-date so as to facilitate the pricing of bonds that specify payments as a function of mortality or longevity parameters. Government issuance in the early stages of the development of a market would not only provide a benchmark but might spur interest in improving mortality tables and mortality projections in order to develop better indices. The government could also be selective in the sort of longevity risk it underwrites, concentrating on those where market failures make the emergence of a private market least likely. For example, governments could issue securities that protect the holder against greater-than-expected longevity improvements, especially at older ages (protecting the holder against extreme old-age or undiversifiable "tail" risks).

***LIB issues do
not have
obvious net
benefits for
government
debt policy***

16. These considerations, however, may not be sufficient for public debt managers to commence issuing longevity-indexed debt. Debt managers have other criteria for measuring the net benefits of LIBs based on the potential contribution of LIBs to meeting the central debt management objective of raising, managing and retiring debt at the lowest possible cost subject to an acceptable risk level. From the point of view of the government as a whole, the expected efficiency gains of facilitating a deep longevity bond market would have to outweigh any additional expected risk-adjusted public debt service costs in order to justify issuance. In general, the potential contribution of LIBs to meeting debt management objectives is less obvious than for ILBs, as higher life expectancy at old ages tends to increase public expenditure more than tax revenues (while the reverse tends to be true of inflation). In

⁶⁷ For younger workers it can be argued that unexpected increases in life expectancy could be borne individually by working longer or higher savings. Older workers and retirees normally have less flexibility to correct their savings and work decisions.

⁶⁸ For a discussion of why the supply of insurance for long-term risks may be deficient, see Cutler (1996).

addition, it would be necessary to address a number of potential market practicalities related to indices, types of indexation and selling techniques.⁶⁹

The benefits of inter-generational sharing of extreme old-age risk may also need to be considered

17. From a purely public debt management perspective, therefore, the prospects for the development of a large government LIB market may not be favourable at this stage. Yet, governments need to consider households' possible demand for insurance of longevity risk in addition to that provided by social security systems. This is especially important in countries where public pension benefits are being cut drastically or replaced by private pension arrangements. The burden of large, unexpected surges in longevity among the very old should in principle be spread over as many generations as possible, as it is not possible to hedge or insure this risk within a given generation. This gives governments a clear advantage over the private sector as an underwriter, even if it does not have a natural hedge for longevity.⁷⁰ There may be scope for the government, in its role as insurer of last resort, to participate in the management of such an extreme or undiversifiable risk via new forms of extreme old-age social security insurance (*e.g.* top-up social security benefits for the longest-lived), general guarantees on funded pension providers (described in Section III.4), and longevity risk reinsurance. For example, the additional cost for DB plans and annuity providers of a cure for cancer or other terminal diseases that affect a large percentage of the elderly could be met partly by the state through a reinsurance facility. Similar interventions are observed for example as part of the broader market for catastrophe risk, where government bodies participate as insurers or reinsurers of earthquake and hurricane risks in Japan, the United States (*e.g.* California and Florida), and elsewhere, often using private institutions and the capital markets to diversify or hedge these risks.⁷¹ A potential advantage of LIBs over these arrangements is that they could combine efficient intergenerational risk-sharing with market discipline and might spur further risk transfer within the private sector. Unfortunately, sharing such intergenerational risk via the issuance of explicit debt (LIBs) may not be consistent with the debt policy objectives of minimising borrowing costs at a prudent level of risk. Further evaluation of the pros and cons of different options is clearly needed.

III.3. Improving the prudential regulation and supervision of pension providers

Regulation should provide the right incentives for prudent ALM

18. Pension funds are the main providers of private sector occupational pension plans in most G10 countries. In some countries, insurance companies are also important players, especially in the small company occupational pension market and as providers of personal pension plans. Compared to banks and insurance companies, however, pension funds in some countries are subject to less supervisory oversight. This section discusses key policy issues that may be considered in national reform projects in order to provide the right incentives for prudential management of pension funds, which will in turn strengthen market participants' confidence in the system. The

⁶⁹ These indices need to be simple and transparent. Another practical problem is related to the difficulty in developing stochastic mortality models to predict future mortality, especially given the possibility of large, one-off increases in longevity as a result of medical progress

⁷⁰ See King (2004).

⁷¹ Their objective being to restore the market for catastrophe insurance by providing a public reinsurance backstop for commercial property-liability insurers.

recommendations draw on national experiences in the context of ongoing reforms aimed at improving the stability of Pillar 2 of the pension system and enhancing prudential regulation and supervision. They also reflect recent work at the international level to identify common, basic standards for pension regulation and supervision, as represented by the 2004 OECD Recommendation on Core Principles of Occupational Pension Regulation,⁷² the Guidelines for Pension Fund Governance,⁷³ and the Guidelines for the Protection of the Rights of Members and Beneficiaries⁷⁴ (see Box III.1).

Box III.1. International principles and guidelines for occupational pension regulation

The OECD has been developing principles and guidelines for occupational pension regulation since 1998. Its “Recommendation on Core Principles for the Regulation of Occupational Pensions” was released in 2004, with six main core principles addressing both prudential aspects and the rights of members and beneficiaries, covering the following areas:

- Conditions for effective regulation and supervision
- Establishment of pension plans, pension funds, and pension fund managing companies
- Pension plan liabilities, funding rules, winding up, and insurance
- Asset management
- Rights of members and beneficiaries and adequacy of benefits
- Supervision

Additional detailed guidelines set out basic good practices in regulation that aim at providing incentives for the management of pension funds in the best interest of plan members and beneficiaries. The governance guidelines stress the role of internal controls and external monitoring by auditors and actuaries (through their whistle-blowing function), while the guidelines on the rights of beneficiaries aim at bridging the information gap between plan members and pension providers by establishing basic protective measures such as vesting and portability rights on top of disclosure requirements. Currently, the OECD is preparing a set of guidelines on pension fund asset management and on funding and benefit security. These guidelines will be published in the course of 2005.

The work of the OECD in this area is now complemented by the supervisory activities to be carried out by the newly created International Organisation of Pension Supervisors (IOPS), which will work in partnership with the OECD in developing further guidelines in the pensions field.

Reforming funding rules

Market-based valuations for funding purposes are generally desirable...

19. The emergence of large pension funding gaps raised major concerns for financial policy makers. Given the risk of company bankruptcy, underfunded pension plans are a threat to plan members’ benefits. For this reason, most G10 countries have funding rules in place that require pension plans to reach a certain ratio of assets to liabilities and to take corrective action when the funding ratio falls below this target level. Certain features of regulatory systems have, however, failed. Funding rules for

⁷² The Recommendation is available in <http://www.oecd.org/dataoecd/14/46/33619987.pdf>.

⁷³ See OECD (2002).

⁷⁴ See OECD (2004).

DB plans have been sometimes too lax and failed to promote the build-up of buffers against market downturns. Several structural problems related to funding call for an adaptation of existing regulatory frameworks. Reforms have been proposed in the Netherlands and the United States that would lead to funding requirements that focus on the nature of the plan's liabilities. The proposals also introduce a necessary degree of consistency between the valuation of assets and liabilities, relying on market or fair values and prudent actuarial assumptions. In some G10 countries that set specific discount rates for calculating liabilities (see Section II.2), recent downward adjustments in line with the decline of bond yields also highlights the regulators' objective to promote valuations of liabilities that reflect market conditions and provide a realistic picture of the solvency of a pension fund from a plan termination perspective. Plan beneficiaries should also be aware of the extent of funding of their pension plan in case of plan termination.

... but have raised some concerns

20. As observed in Section II.1, however, the move towards market valuation of pension liabilities may increase the volatility of funding requirements, including procyclical effects (see also Annex II.1). This could in turn lead to increased volatility in financial markets, as the squeeze on companies' cash flows from higher pension contributions could further dent asset values.⁷⁵ As noted below, a degree of regulatory forbearance, closely monitored to avoid negative incentives that could exacerbate the problem, could soften the impact of underfunding on volatility.

Recovery periods for eliminating funding gaps should not be too onerous

21. Funding rules themselves should promote prudent funding levels for ongoing plans. The funding target could also be set in relation to the termination liability (similar to the accountants' ABO), in order to reduce the likelihood that a fund is unable to meet its commitments if it is wound up (because of, for example, the insolvency of the plan sponsor). When underfunding occurs, plan sponsors (or the pension funds, if there is no claim on the employer) should be required to state clearly how they plan to restore full funding. In general, recovery periods for eliminating underfunding may be related to the duration of the plans' liabilities (or average length of remaining service of plan members), with a fixed period for plans that consist only of retirees (*e.g.* five years). Sufficiently long recovery periods (with a defined upper limit) may also reduce the need for liability and asset valuation smoothing and amortisation techniques to minimise the volatility in funding contributions, an important concern for sponsoring employers.

Better disclosure of mortality projections is needed

22. Better valuations of pension liabilities will also require a revision of mortality estimates, including better modelling of the uncertainty around these projections. Regulators should promote transparent disclosure of mortality and disability projections and pension actuaries should determine the extent to which these projections reflect actual plan experience and how they model and allow for the uncertainty surrounding these estimates in their funding strategies.

Reasonable buffers should be built in good times

23. Policymakers also need to provide incentives (and possibly even make it compulsory) for pension funds to hold buffers above the full funding level (if measured on a plan termination basis) to withstand adverse changes in assets and liabilities. This capital requirement for pension funds may depend on the investment strategy of the fund, the degree of the sponsor's backing of the promises (and its credit quality), and

⁷⁵

See Schich (2005) and Bank of England (2005, Box 4).

the extent of flexibility to raise contributions from plan members, among other factors. A funding target based on the ongoing liability, taking into account future salary growth, and using fair valuation methodologies and prudent actuarial assumptions would normally offer a sufficiently large cushion to protect plan benefits, making underfunding on a termination basis a relatively rare event. The funding target will also depend on the extent to which pension funds can (or are required to) insure themselves against the insolvency of the plan sponsor. In the United Kingdom, the Pensions Regulator plays a central role in monitoring these funding targets through the so-called statement of funding principles that DB plan trustees must prepare.

Maximum funding rules should be consistent with prudent funding objectives

24. Such a goal of additional buffers calls for greater policy coherence between minimum funding requirements and maximum funding rules set by the tax authorities to limit the extent of deductibility of pension contributions. Tax rules should provide sufficient flexibility to pension plans to build a level of assets significantly higher than the termination liability (*e.g.* two or three years of “normal” contribution rates) or a fair value of the ongoing liability while preventing the abuse of surplus build-up to obtain additional tax deferrals. There also needs to be further discussion on the ownership of any surplus in DB plans and the extent to which asymmetric guarantees, where sponsors bear downside risk but do not benefit from overfunding (as, following legislation, they often cannot claim ownership over the fund’s “surplus”), may be also partly responsible for insufficient funding. However, if sponsors have easy access to the surplus, funding levels could also be put at risk. One possible solution is to allow access to the surplus only above a minimum level of overfunding. Reversions to employers should also be linked to their share of contributions to the plan.

Convergence in valuation assumptions for funding and accounting purposes is desirable

25. Reforms of funding rules should also consider developments in international accounting standards applying to DB pension plans (IAS19, IFRS, FAS87). In particular, accounting and funding standards use a different measure of liability. As argued above, for funding purposes, policymakers are increasingly concerned about the termination liability. International accounting standards, on the other hand, have established the projected benefit obligation (PBO; see also Annex II.1) as the relevant measure of DB liabilities (a measure of the ongoing liability in which benefits are valued on the basis of salary levels estimated at the time of provision of the benefit). While the funding measure itself may differ, convergence in discount rates, mortality tables, and smoothing and amortisation rules is desirable. Having different assumptions for measuring liabilities increases administrative costs and hinders transparency and accountability. Establishing common assumptions for both funding and expensing purposes should therefore be one of the key objectives of any future reform to international accounting standards and funding rules, calling for closer cooperation between accounting standard setters, the actuarial profession, and pension regulators.

The range of options in accounting standards should be reduced

26. International accounting standards also contain a new amortisation option (introduced in December 2004 to accommodate the United Kingdom’s FRS17 standard) that permits plan sponsors to recognise actuarial gains and losses immediately through a special account below the income statement. Hence, plan sponsors now have various options with regards to pension expensing, which limits the comparability of valuations across countries. Eventually, accounting standards should move towards a single measure, making balance sheets more transparent, especially for employers with pension plans in different countries.

Strengthening pension fund governance

The pensions governance deficit has many facets

27. The goal of prudent pension fund management requires a solid and transparent governance framework that is sometimes lacking in occupational pension arrangements. Some of the challenges faced recently by occupational pension plans in some countries, such as the limited attention to the plan's liabilities and the consistency of the investment strategy with those liabilities, are to some extent related to a deficit in pensions governance. Weaknesses that have been identified in some countries include lack of clear accountability and personal liability as a result of the involvement of multiple fiduciaries, lack of adequate knowledge by members of the governing body of a pension fund, and lack of clarity over the role of actuaries, auditors and external asset managers. Regulatory initiatives should focus on suitability requirements for members of governing boards, clear monitoring responsibilities for actuaries and auditors (a strengthening of so-called "whistleblowing" functions), and disclosure requirements that promote members' role in overseeing the administration of pension plans.⁷⁶

Supervisors should review governance frameworks

28. These regulatory initiatives need to be complemented at the pension fund level by regular review of risk control, reporting and IT systems and the assessment of conflict-of-interest situations. Supervisors should evaluate the extent to which pension funds are strengthening these aspects of good governance as part of their on-site monitoring tasks. Where possible, these initiatives should also be extended to public pension funds, as they sometimes also lack transparent and accountable governance frameworks.⁷⁷ Improving pension plan governance may also require a consolidation of scarce resources through more multi-employer arrangements, which also have the advantage of facilitating the supervisors' monitoring tasks.

Reforming investment regulations

More reliance on the prudent person principle is needed in some G10 countries

29. Investment regulations in some G10 countries are still based on a quantitative framework that sets limits on the percentage of the portfolio that may be invested in different asset classes and individual securities. While some of these rules seem justifiable (e.g. limits on investment in securities issued by the plan sponsor), others can constrain the design of optimal investment strategies. For example, the *Pensionskassen* in Germany (a type of pension fund regulated as an insurance undertaking) face quantitative limitations in their investment in equities and foreign securities, while Italian pension funds have limits on investment in securities issued outside the OECD area. The introduction of the pension fund directive in the EU will change investment regulations for member countries, as they will now be required to follow largely a prudent person approach, with some basic quantitative limits to ensure diversification (e.g. the self-investment rule described above).⁷⁸ This trend is also in

⁷⁶ See the OECD guidelines for pension fund governance referred to in Box III.1 and Marossy and Yermo (2002).

⁷⁷ Integration into the national regulatory and supervisory framework (as in the Netherlands) may provide a venue for more effective oversight of public pension funds as they would then be on a par with private sector pension funds. Another route for improving the governance of such plans and limit political risk may be to rely on external asset managers and actuaries, bringing in market experience, as is increasingly the case for social security reserve funds.

⁷⁸ Galer (2002) provides a description of the evolution of the prudent person rule in the U.K. and the U.S.

line with the OECD Principles and Guidelines described in Box III.1. The move towards the prudent person principle will require a strengthening of governance, as described above, as well as enhanced risk management models to assess portfolio risks.

Better disclosure is required

30. Policymakers should also promote risk management and asset allocation strategies that take due account of the nature of pension plan liabilities. Through their statement of investment principles, pension fund governing bodies can be required to explain how their investment strategy is expected to meet the performance and benefit targets or commitments of the pension fund, including the extent to which they are to invest in less liquid asset classes such as private equity, hedge funds, and real estate. This statement should also cover the mechanisms for evaluating performance of the different asset classes. For DC plans with individual choice, regulations should also require clear disclosure of the composition and costs of the different investment options.

Towards sound supervision

Basic principles of sound supervision should be promoted

31. The existence of incentives for prudential management of pension plans in the regulatory framework should be complemented with effective, proactive supervision, thereby strengthening confidence in the funded pension system and fostering its stability. Prerequisites for sound supervision are: (i) the goals of supervision must be focused and precise; (ii) there must be a well-defined division of labour with other financial sector supervisory bodies to avoid overlaps and legal uncertainty; (iii) the supervisory authority must be adequately equipped with staff and know-how to ensure high supervisory standards and equal enforcement for all types of providers; and (iv) the agency should be legally and financially independent to prevent undue political interference in its operational tasks.⁷⁹ The supervisory authority should act in a way to prevent pro-cyclical market behaviour. It must be able to exercise strong prudential supervision in order to ensure the financial soundness of the pension system. This requires the continuous monitoring of the markets and proper risk management methods as well as sufficient legal scope to sanction. An effective supervisory framework also requires regular communication among pension and financial sector supervisors in different countries.

Sensitivity analysis and stress testing should be applied

32. Ideally, effective supervision should rely on a risk-based framework which aims at identifying the main weaknesses in the funded pension system through the use of financial indicators that take into account the different risks to which pension plans are exposed. In particular, risk-based supervision of pension funds should also rely on sensitivity analysis, stress testing and other risk monitoring techniques applied to financial institutions such as banks and insurance companies. As is the case for banks under the Basel accord framework, pension funds should be allowed to develop their own internal risk management models, which can then be validated by the supervisory authority. As explained in Box II.1, the Netherlands is expected to implement a comprehensive risk-based supervision framework for all pension funds starting in 2007. While extending this approach to all pension funds in countries with dispersed funded pension systems may not be realistic, supervisors could still provide a signal to the market by using it to monitor selected funds, in particular the largest ones and those

⁷⁹

See OECD (2004b) for a development of these principles and country examples.

facing financial difficulties. In this respect, sensitivity analysis and stress testing of funding levels could be encouraged as a self-evaluation tool for pension funds, integrated into a sound risk management process that measures and seeks to appropriately control portfolio risk and the matching between assets and liabilities. These risk management methods should take into account the extent of risk sharing with employers (and hence the role of companies' capital as buffers) and employees and the extent to which benefit promises are "hard" rather than conditional on a particular event.

Financial stability considerations

The growth of private pensions may impact on financial stability...

33. As noted in Sections I.4-I.5, pension funds are already the largest investor class in a number of G10 countries, and while they remain almost negligible in others, ongoing pension reforms suggest that their importance will rise in these countries as well. Policymakers should therefore consider the possible implications of the growth of private pension systems for financial stability. The enhanced savings intermediation role that non-bank financial institutions may play, while positive in terms of risk diversification, may make it harder for supervisors and policy makers to assess accurately who is bearing which risk and the possible threats to the stability of the financial system.

... via pension funds' risk management and trading strategies, as well as policy changes

34. In the case of pension funds, risk management techniques and trading activity do not seem to have had negative implications for the stability of financial markets. Indeed, the growth of pension funds is likely to enhance the breadth, depth and efficiency of financial markets, and their longer-term investment strategies may help dampen rather than amplify volatility. Even if, on the risk management side, the development of dynamic hedging techniques and the use of complex derivative instruments for hedging purposes have been identified as a factor in increasing volatility,⁸⁰ this should not be necessarily identified with higher risks of financial instability, although many markets (*e.g.* credit risk transfer and structured finance) have not yet been tested in an environment of high volatility. As to trading activity, one type of potentially destabilising behaviour results from market participants taking similar positions (so-called "herding" behaviour).⁸¹ Historically, pension funds' investments have been quite stable, reflecting their long-term orientation, but similarity of investment approaches may nonetheless create a risk of herding under particular circumstances. Policy changes designed to improve risk management and prudential standards should do so with a view to maintaining this long-term perspective, while not being a source of potential instability, as instead may be the case of some regulatory and accounting changes which, as noted in Chapter II, may lead to greater short-term trading activity and pro-cyclical investment behaviour. Overall, the limited impact on system-wide stability of major corporate bankruptcies in recent years (involving also the failure of these companies' pension schemes) as well as the bankruptcy of some pension funds, testify to the resilience of the global financial system and the efficiency of global risk sharing, even if some ramifications of the stock market decline of the early 2000s may have taken time to be fully revealed.

⁸⁰ See Jacobs (1998) and CMF (2002).

⁸¹ Sharfstein and Stein (1990) discuss incentives for asset managers to herd.

... warranting careful and coordinated monitoring

35. Policymakers should review regularly investment trends in the pension industry, including the monitoring of moves towards ALM and the impact of accounting and regulatory changes. The latter should foster the development of better risk management and investment strategies better aligned with the liability structure of pension funds. Their potential impact on asset prices and the overall liquidity of particular markets has been recognised. In order to foster better monitoring of cross-border activity and international comparability of the impact of private pension systems on financial markets, G10 policymakers should promote the collection of standardised data, following the lead of international organisations such as the OECD in this area.⁸²

III.4. Protection of pension beneficiaries and financial education

Policy intervention to protect plan members can take many forms

36. Prudential regulations need to be complemented with efforts to promote plan members' ability to protect themselves against mismanagement and to help them make appropriate choices in the increasingly popular DC arrangements. Governments could also review financial education programmes and, where necessary, attempt to raise their effectiveness in increasing the financial awareness and education of the population. In some countries, these basic policies are buttressed with public or quasi-public guarantees, such as schemes to protect benefits against bankruptcy of the plan sponsor or against fraud. The implicit role of the state as insurer of last resort is the subject of controversy in some G10 countries.

How much protection do DB plans need against sponsor bankruptcy?

Prudent funding should be the main protection

37. Bankruptcy of the plan sponsor (or simply its inability to cover pension deficits) is one of the most important risks to which DB and hybrid plans are exposed.⁸³ This risk can be mitigated by requiring legal separation and promoting prudent levels of funding. To some extent, this is the logic behind the reforms to funding rules recently proposed in the Netherlands and the United States. An additional back-up protection measure is to introduce a collective pension guarantee fund, as the Pension Benefit Guaranty Corporation in the United States or the newly established Pension Protection Fund in the United Kingdom. To the extent that premiums charged by guarantee funds adequately reflect the risks to which they are exposed to, such arrangements could theoretically achieve similar levels of aggregate funding and solvency as well-designed funding rules. An efficient insurance arrangement would charge risk-based premiums that take into account not only the extent of underfunding of a pension plan, but also the creditworthiness of the sponsoring employer and the investment strategy of the pension fund. For some countries, however, well-designed funding rules may seem sufficient.⁸⁴

⁸² OECD (2005b).

⁸³ DC plans are by definition fully funded at all times as their liabilities equal the market value of the assets. However, one can consider that funding shortfalls can still occur, in the sense of it becoming impossible to provide the targeted level of benefits with the accumulated assets. In such cases adjustments at the individual level are required.

⁸⁴ Certainly in countries like the Netherlands even the old version of funding rules was historically rather successful at ensuring very high levels of protection against sponsor bankruptcy by promoting adequate funding levels.

Guarantee funds require careful design

38. Some of the problems of guarantee schemes can be alleviated, but require very careful design. Moral hazard can be reduced by limiting the type and amount of benefits covered. The guarantee fund of the Canadian province of Ontario, for example, excludes insurance for benefits granted prior to insolvency in the three year period prior to plan wind up, and has a relatively low ceiling for the absolute amount of insured benefits. Unwarranted cross-subsidies can be avoided by charging risk-based premiums, that is, taking into account the insolvency risk of the plan sponsor, the extent of the pension plan's underfunding and its investment policy. Risk-based premiums, however, might prove prohibitively expensive for some of the weaker sponsors and, like excessively onerous funding rules, can drive firms into bankruptcy or force them to close DB plans. The investment of guarantee funds may also need to ensure a good duration match with their liabilities. Guarantee funds may also need special treatment such as calls on collateral from the plan sponsor (as in Sweden) and priority in bankruptcy proceedings (or a strong position at the negotiating table, as in Germany). They also require a broad contribution base. Finally, guarantee funds need to have adequate powers, resources and autonomy to work effectively and avoid undue political and market interference.

Priority creditors' rights could be considered

39. An additional, or alternative way to protect the assets of pension beneficiaries is to grant pension obligations priority status within bankruptcy procedures.⁸⁵ Granting priority rights for all pension obligations, however, may disrupt the availability and cost of credit within the economy, and make it difficult for companies restructuring under bankruptcy protection to secure exit financing. Countries, however, could at least grant priority rights to due and unpaid contributions.⁸⁶

Improving risk sharing between members and plan sponsors

Plan transformations should be monitored

40. As DB plans are being closed down to new entrants and replaced by DC plans or transformed in various ways (*e.g.* into cash balance plans or from final salary to career average plans), policymakers may consider eliminating obstacles to a smooth transition from one plan to another, such as tax penalties, as long as the new plans meet the stipulated objective of retirement income security. In particular, regulations (including tax rules) should discourage the take-up of all benefits in the form of lump-sums, favouring instead a more gradual pay-out phase. Policymakers should also closely monitor the market for private annuities and other products offering guaranteed, regular income streams until death. These products will become increasingly important with the growing role of hybrid or DC plans in retirement income provision.

Statutory return guarantees should be avoided

41. In general, governments should avoid setting performance or benefit obligations for private pension arrangements, except perhaps where such arrangements substitute for social security arrangements. Such performance and benefit targets or guarantees can be promoted through financial education programmes or even tax incentives, but they should generally be left to the discretion of pension providers and

⁸⁵ Although some OECD countries do extend priority protection to pension beneficiaries (*e.g.* Norway), G10 countries do not, despite protecting other employment-related claims such as wages. Pension beneficiaries therefore rank alongside all other unsecured creditors.

⁸⁶ As suggested by the OECD Draft Guidelines on Funding and Benefit Security in Occupational Pension Plans (see Box III.1).

plan sponsors, as in the increasingly popular cash balance plans in the United States or the industry-wide plans in Denmark and Iceland. Legislating guarantees may be an inefficient way of promoting benefit security as regulatory processes are slow in adapting to new market conditions.

Regulating DC plans

Member investment choice allows the factoring in of individual risk profiles

42. DC plans, where members bear both investment and longevity risk (at least during the accumulation stage) are increasingly common in some G10 countries, like Italy, the United Kingdom and the United States. The introduction of investment choice in these plans appears to be a logical response to the shifting of market risks from employers to employees, allowing employees to take into consideration their individual risk profiles and preferences. In general, individual choice is more extensive and broader in personal pension plans than in occupational DC plans. Some countries also permit workers to move from an occupational DC plan to personal arrangements (e.g. the United Kingdom since 1986, Australia since July 2005) while still working for the sponsoring employer. Other countries, like Switzerland do not allow this form of portability. In plans where members bear risks individually, choice of provider can be as important as the choice of retirement product or investment portfolio. It can enhance competition and efficiency, reduce impediments to labour mobility and avoid some conflicts of interest between employers and the pension funds they sponsor.

Investment in plan sponsor securities should be limited

43. DC plans normally permit plan members to choose between different investment options, as it would be impossible for a single portfolio mix to satisfy workers differing in risk preferences, age and work flexibility.⁸⁷ One form of investment restriction that is common to all G10 countries except the United States are limits on investment in securities issued by the sponsoring employer.⁸⁸

⁸⁷ In Italy, most pension funds offer a choice between three to five portfolio options. 401(k) plan members in the United States choose from among an average of ten different options. In contrast, Swedish workers can choose from among a list of more than 600 mutual funds in the mandatory individual account system.

⁸⁸ While DB plans are subject to a 10 percent self-investment limit, U.S. workers can often invest as much as they want in securities issued by their employer in DC plans.

Limiting the number of options may ease choice

44. While choice is a worthy goal, there is ample evidence from G10 countries showing low levels of financial literacy. Studies in behavioural finance also show a significant tendency for people to treat risk in different ways depending on how options are “framed”, which may lead to misinterpretations and wrong choices.^{89 90} Workers also seem to be overwhelmed by the amount of choice and prefer to simply opt out of the system altogether. The U.S. pensions literature has recently noted a negative effect of the number of choices on plan participation.⁹¹ In Sweden, over 90 percent of participants end up in the default fund. The notion of diminishing marginal utility therefore seems to apply also to the number of portfolio choices offered. Limiting options to a manageable number may simplify decisions by individuals and provide incentives to save more for retirement, apart from lowering administrative costs. In addition, DC plans should have a default option which, in general, presumes a reasonable level of risk aversion on the part of plan members and should take into account the pension benefits that members are expected to receive from public pension systems.⁹²

Adequate contributions rates should be promoted

45. Beyond issues related to investment choice, the adequacy of the level of contribution rates to DC plans may also be a major concern. As mentioned in Section III.1, mechanisms developed through automatic enrolment can help in this respect but more importantly it is the awareness and education of the pension members which need to be developed further in order to promote contribution levels which will assure adequate retirement income. A final concern is how to deal with households that due to faulty strategies or even just bad luck end up with severely insufficient funding for their retirement; if no appropriate market solution can be devised, consideration should be given to when and how some targeted government intervention could take place.

Conflicts of interest should be disclosed, and fees should be made transparent

46. Better information disclosure is also required to assess the extent to which financial intermediaries/advisers act in investors’ interests. Non-professional investors may simply be unaware of the potential conflicts of interests that might prejudice any investment advice they receive. For example, they might perceive insurance products as a close substitute for bank deposits and misjudge the risk involved. Part of this problem may be resolved by asking for more transparency in the information provided by financial institutions and for a full disclosure of (possible) conflicts of interests from

⁸⁹ MacFarland *et al.* (2003) study the link between psychological attitudes towards money and retirement planning. The authors find that in their sample more than half of the participants have no strong retirement goals and lack the discipline to set and adhere to goals, consider financial matters to be a source of stress, anxiety, and confusion, or are uninterested in the future.

⁹⁰ Apart from pure irrationality, behavioural economics also suggests a number of reasons why even rationale individuals may undersave. Akerlof (2002) summarizes this literature, which suggests *inter alia* that automatic enrolment with an automatic default contribution level and investment allocation can dramatically raise contribution levels relative to “opting in” schemes, and that savings will be higher if workers are given the chance to commit to save out of future wage and salary increases than only out of current salary.

⁹¹ See Iyengar *et al.* (2003).

⁹² Life-cycle funds that automatically become more conservative as the member ages have been proposed in some countries. Yet market instruments providing capital protection or absolute return targets (or guarantees) may be more appropriate default options as they combine the upside return potential of higher risk assets with the downside protection of long-term inflation-indexed bonds and derivatives products. Where public pension benefits are low, a deferred annuity may be suggested as the default option as it also offers protection against longevity risk.

the part of financial intermediaries. Fees of different savings products should also be made more transparent and comparable.⁹³

Distributors and sales agents should be subject to high fiduciary standards

47. Finally, the regulation of distribution of retirement products should be reviewed. The misselling of pensions in the United Kingdom, and the various scams and fraudulent investment products to which consumers have fallen prey over the years should alert governments to the need to better protect consumers from unscrupulous sales forces and financial institutions. More generally, the high costs paid for personal pension plans in most G10 countries are a cause for concern. Recent regulatory initiatives in some countries have achieved substantial cost reductions (*e.g.* the United Kingdom since 1999). An important aspect of cost, especially in personal pension plans, is marketing and distribution expenses. Sales agents and financial advisors are not always subject to the necessary due diligence that is applied to other plan fiduciaries and to executives of financial institutions in general. Codes of conduct and adequate remuneration which do not create perverse incentives should be encouraged.⁹⁴

Making financial education programmes more effective

Improving financial literacy is worthwhile

48. Financial education can be defined as “the process by which financial consumers/investors improve their understanding of financial products and concepts and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial opportunities, to make informed choices, to know where to go for help, and to take effective action to improve their financial well-being”.⁹⁵ Some findings from behavioural economics cast doubt on whether financial education is sufficient to ensure adequate saving for retirement: even well-informed individuals will often save less than they determine to be optimal. Nonetheless, there is a general agreement among policymakers that financial education programmes are worthwhile and should be encouraged.⁹⁶ The urgency of promoting financial education is compounded by the growing role of DC pension plans.

Financial education programmes may make a useful contribution...

49. Financial education programmes can help consumers avoid abuses and fraud, improve their investment choices, and raise their contributions to private pension plans. This impression has been confirmed by recent evaluations in the United States showing that financial education offered by employers, whether in the form of brochures or seminars, increases both the number of individuals with 401(k) retirement savings accounts and the average amount of savings. Such assessments, however, are absent in

⁹³ This has been achieved in some countries by permitting only asset-based fees, as in the stakeholder plans in the United Kingdom or the mandatory individual account plans in Sweden. Yet even in these countries there is evidence that workers are not sensitive to charges, and fees have been capped. Better disclosure is also needed on the costs and benefits of financial products such as annuities and reverse annuity mortgages. Information on the cost of products sold by alternative providers should also be readily available.

⁹⁴ Further thought should also be given to the problems created by polarisation in the United Kingdom, where advisors must either be tied to one particular company or offer all products available.

⁹⁵ See OECD (2005c).

⁹⁶ See Smith (2004) and Maddaloni and Pain (2004).

most other G10 countries. Financial education programmes would seem to be most effective when targeting specific choices by consumers and when those choices are themselves simplified. A cost-benefit analysis would seem to be necessary to determine the choice of programme that a government may wish to support.

*... following
international
good practices*

50. As financial markets become increasingly sophisticated and as households assume more of the responsibility and the associated risks for financial decisions, especially in the field of retirement savings, financially educated individuals are increasingly necessary to ensure sufficient levels of investor and consumer protection as well as the smooth functioning of the economy. Although high levels of financial education generate such benefits, surveys of financial literacy conducted in recent years in G10 countries show that consumers also lack the awareness of the need to be financially educated. Hence, further developments of international guidance to improve financial education and awareness, along the lines of the recent OECD Principles and good practices, could be helpful.^{97 98}

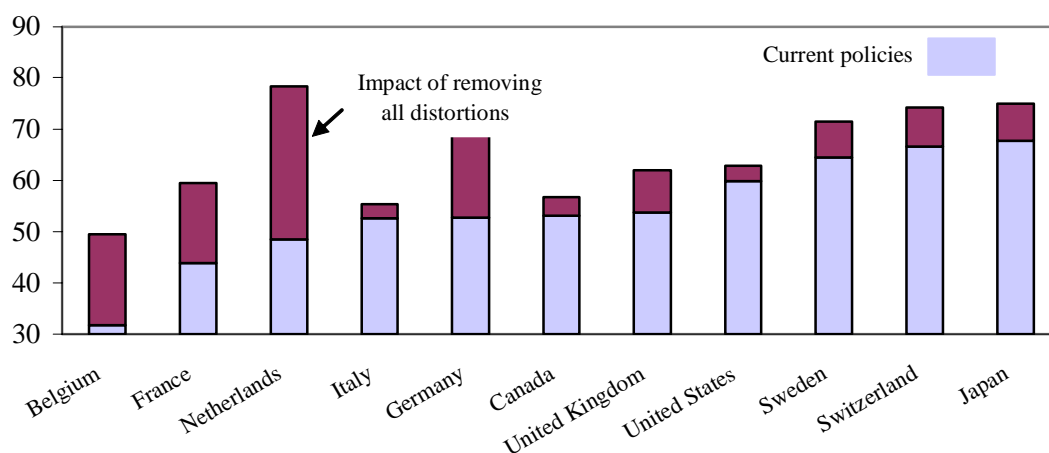
⁹⁷ The OECD will publish in 2005 the first major international study on financial education. This report finds that while many countries offer a variety of financial education programmes, there has been little evaluation of the effectiveness of these programmes.

⁹⁸ To help policymakers design and implement effective programmes, the OECD has developed principles and good practices for financial education and awareness, drawing on its own research on financial education and on consultations with government representatives in OECD countries. The good practices include suggestions on how governments can increase both public awareness of financial issues and the dissemination of financial information, on how financial institutions can provide objective and unbiased information on financial products, and on the issues providers need to consider in determining the content and delivery of financial education programmes (see OECD 2005b).

Annex I.1. The partially offsetting effect of higher participation rates on the impact of ageing on labour supply

1. Economic dependency ratios may not worsen in step with demographic ones if policies (or spontaneous individual responses) lead more people to join or to remain in the labour force. Participation rates for 55-64 year-olds in per cent of the labour force vary enormously at present across G10 countries, from the high twenties to the low seventies. OECD simulations suggest that a comprehensive overhaul of pension and transfer schemes closing avenues to early retirement and removing any implicit taxes on continued work would raise these participation rates – in most cases substantially – from what they would otherwise have been by 2025 (Figure I.2).⁹⁹

Figure A.I.1. Further pension reforms would raise participation rates of older workers
(simulated level of labour force participation of workers aged 55-64 in 2025, in percent)



Source: Duval (2003).

2. Similarly, although less intricately connected to ageing, policy measures encouraging prime-age female participation (such as a more neutral tax treatment of second earners, the development of child-care facilities or changes to family benefits) would boost labour supply and help contain the rise in economic dependency ratios.¹⁰⁰ Enhancing employment incentives for youths would contribute as well. The combined effect of possible reforms targeting these three categories might in fact suffice to stabilise average participation rates in most G10 countries over the next two decades, although not beyond,¹⁰¹ meaning that labour supply would not shrink as rapidly as under unchanged policy settings.

⁹⁹ The estimate of the gain in the Dutch case is overstated insofar as the modelling refers to a “typical” early retirement (VUT) scheme. In some sectors, these schemes have been transformed since the early 1990s into less generous, fully-funded ones.

¹⁰⁰ See Jaumotte (2003).

¹⁰¹ See Burniaux *et al.* (2004).

Annex I.2. Demographic trends and international capital flows¹⁰²

1. This annex reviews empirical and model-based attempts to examine how demographic shifts affect saving and investment, international capital flows and exchange rates. It reaches two conclusions. First, the balance of empirical research supports the theoretical presumption that demographics should be an important contributor to the historical evolution of current account balances. Other things being equal, it is found that countries with high youth and old age dependency ratios tend to run current account deficits, while “middle-aged” countries experience surpluses. This suggests that population ageing is initially associated with a shift into surplus, as ageing workforces save for retirement. Second, the model-based literature incorporates this insight to examine how current account balances will change as population ageing sets in around the world in the decades ahead. The conclusion is that industrial countries will experience shifts towards surplus, while younger developing countries will draw in this capital. These findings are of course subject to caveats. Particularly important is that model-based approaches fail to replicate exactly the current constellation of current accounts around the world—most notably the large U.S. current account deficit. This anomaly, which may have a number of explanations, does not contradict these models’ prediction of a qualitative shift that will take place in the years ahead. Ageing populations in industrial countries will tend to move current accounts towards surplus, while developing countries will be recipients of resulting capital flows.

2. The G10 countries are set to age rapidly in the decades ahead, with old-age dependency rates expected to nearly double by 2050 (Table A.I.2). However, at first glance the association between saving rates, the current account, and old-age dependency for the G10 as a whole may seem counter-intuitive, since the economy-wide saving rate has fallen steadily, even as old-age dependency has risen (Figure A.I.2). However, this cannot be seen as evidence that demographics is not an important fundamental. First, population ageing in the G10 has been relatively benign so far. As a result, its effects on saving have likely been overshadowed by other factors, such as greater ability of households to borrow as financial markets have deepened and, especially in recent years, wealth effects from rising stock market and housing prices.

Table A.I.2. Old-age dependency ratios
(65+/15-64, in percent)

	World	G10	China	Latin America	India	Africa
2005	11	23	11	9	8	6
2050	25	42	37	29	22	10

Source: United Nations Population Division, *World Population Prospects: the 2004 Revision*.

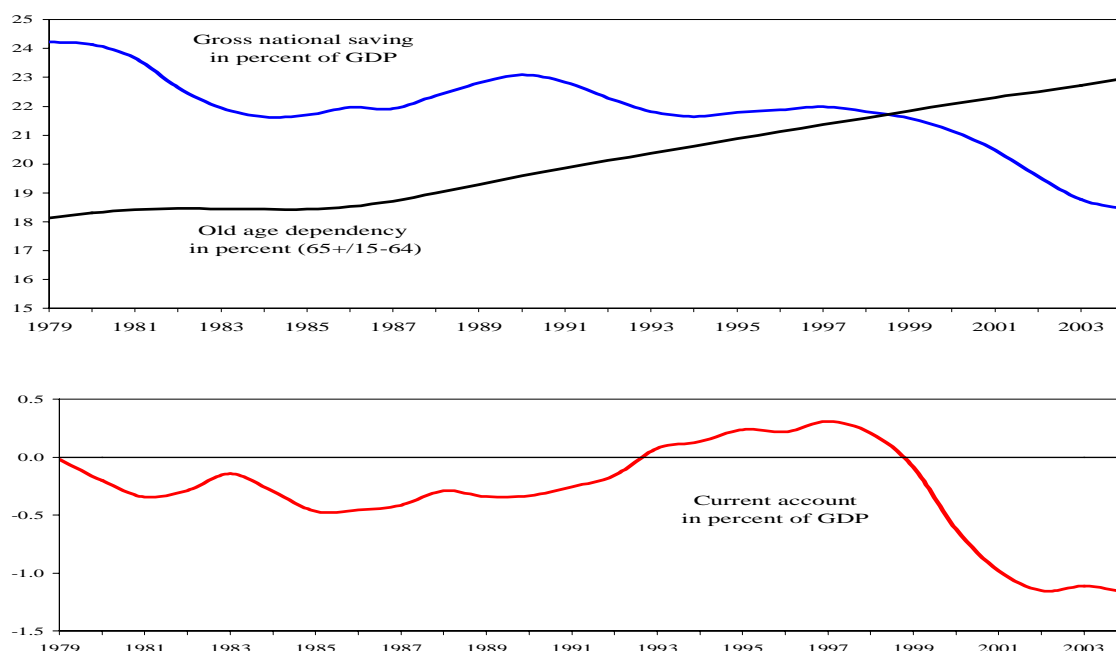
3. Looking forward, ageing in the G10 is projected to accelerate dramatically, so that demographics could become a more dominant factor. The G10 countries as group have formed a relatively closed ensemble in the past, with a current account close to balance (Figure A.I.2). Historically, demographic effects on current account balances and net foreign asset positions should therefore be most apparent among the G10 members rather than for the G10 block *vis-à-vis* the rest of the world. But this is likely to change. For one thing, the current account deficit of the G10 in recent years denotes greater trade and financial integration with the rest of the world, notably emerging markets. For another, old-age dependency in the G10 will rise substantially above that in some other regions. With greater trade and financial openness, ageing G10 households may invest in emerging markets.

¹⁰²

Prepared by R. Brooks, International Monetary Fund.

4. Empirical work suggests that there is a systematic association between demographics and saving and investment. Higgins (1998) uses data for 100 countries and reports that national saving is negatively related to youth and old-age dependency. He concludes that youth dependency tends to depress saving, as households divert resources to raise offspring, while the negative effects from old-age dependency are consistent with older households running down at least some wealth in retirement. Separately, Higgins finds that investment is positively related to the younger tail of the age distribution. These results have been confirmed elsewhere (Brooks, 1998, Chinn and Prasad, 2003, and Lüthmann 2003). Overall, this literature suggests a clear hierarchy. Young countries should experience current account deficits, as investment demand outstrips domestic saving. So should old countries, as retirees drive domestic saving below investment. Middle-aged countries instead should see current account surpluses, supplying capital to the first two groups of countries.

Figure A.I.2. Saving, current account and old-age dependency trends in the G10 countries as a whole
(three-year moving averages)



Source: IMF World Economic Outlook Database.

5. IMF (2004b) confirms these results, based on the empirical relationship between demographics and saving and investment for 115 countries from 1960 to 2000, and explores how projected population trends may affect current account positions going forward. It finds that in advanced countries, population ageing will in general result in deteriorating current account balances. For Japan, the effect could be on the order of 2.5 percent of GDP by 2050. For Europe, it would be smaller, at under 0.5 percent of GDP over the same period. The major exception is the United States, where demographic effects are predicted to boost the current account by over 1 percent of GDP. Elsewhere, demographic change could contribute to an improvement in Africa (close to 3 percent) and the Middle East (around 0.5 percent), but a deterioration in central and eastern Europe (around 1 percent) and emerging Asia (under 0.5 percent).

6. This type of empirical analysis, however, suffers from the fact that each variable is considered separately, rather than as part of an economic system, and that historical correlations may not reflect

causality. To address these issues, IMF (2004b) uses a multi-region macroeconomic model capturing the interactions between variables and across countries within an integrated and consistent framework. The model disaggregates the world economy into six regions: North America, Europe, Japan, and three developing country regions. It explicitly incorporates the population age structure and assumes that households accumulate wealth as they work to finance consumption in retirement. Capital is assumed to be perfectly mobile across borders. The model suggests that population ageing will cause current accounts in Europe and Japan to fall by 8 percent of GDP by 2050 from current levels. In North America, where population ageing is less severe, the current account would improve by 6 percent of GDP over the same period. The developing country regions register surpluses over the same period, repaying investments made earlier by European and Japanese households through exports.¹⁰³

7. The model-based literature is subject to several caveats. First, it typically assumes perfect capital mobility and perfect foresight, ignoring the presence of capital account restrictions and political risk in developing countries. As a result, the magnitude of flows to and from developing countries is likely overstated. Another common assumption is that labour is not mobile, which again tends to overstate the role of capital flows. Second, the magnitude of current account swings depends importantly on how governments respond to population ageing. On this, the multi-region model in IMF (2004b) provides some guidance. It shows that a reduction in the replacement rate of pay-as-you-go pension systems in Europe would boost the European current account substantially relative to the baseline scenario, as it forces households to save more for retirement, which spills over into increased net foreign asset accumulation. Third, and perhaps most important, these models generally fail to explain the current constellation of external balances. Notably, they tend to suggest that the U.S. current account should be moving into surplus, when in fact there is a widening deficit. This is in part due to omitted factors, such as monetary and fiscal policies, but it also reflects the deeper problem that at best these frameworks provide an incomplete description of actual saving behaviour.

8. The significance of the saving-investment balance as a medium-term determinant of exchange rates is captured by the macrobalance approach (Isard *et al.*, 2001). It looks at the difference between the saving-investment balance for a given country and its cyclically-adjusted current account position. Using trade elasticities with respect to the exchange rate, it then calculates the required exchange rate adjustment to close this gap. This approach predicts that real effective exchange rates of advanced countries should weaken in the years ahead, to bring current account positions into line with rising saving-investment balances. For developing countries, the reverse should be the case.

¹⁰³

These results are broadly consistent with other model-based attempts to examine the effects of demographics on saving and investment. The most closely related is Brooks (2003), which divides the world into eight regions. Feroli (2003) focuses on the G-7 countries, Fehr *et al.* (2004) on the United States, the European Union and Japan, Börsch-Supan *et al.* (2001) on flows from Germany to several regions, and Attanasio and Violante (2000) on North-South flows.

Annex I.3. Ageing, asset prices and the transmission of monetary policy

1. Demographic changes will affect variables of importance for monetary policy makers, as well as the way in which their decisions are transmitted through the financial system, be it via wealth effects or the credit channel. In addition, as individuals' saving for retirement will be more exposed to inflation risk, pressure on central banks to keep inflation low should rise, broadening the constituency for low inflation, even if households might hedge this risk by investing in inflation-protected financial instruments – insofar at least as they are available (see Chapter II).

2. To the extent retirees sell their financial assets to a smaller middle-aged generation in order to fund consumption, an increasing old-age dependency ratio may translate into downward pressure on asset prices. Calibrated intertemporal general equilibrium models have been used to assess whether this scenario – sometimes referred to as that of an “asset meltdown” (Poterba, 2001) – may be plausible. The size of the simulated impact largely depends on the specifics of the model and on the chosen values of the parameters. Even the studies finding a relatively large impact (*e.g.* Geanakoplos *et al.*, 2004) suggest that it would be two to three times smaller than the peak-to-trough price swings observed in the past, suggesting that factors other than demography may dominate. In addition, the results are subject to numerous caveats.¹⁰⁴ Besides, empirical work based on historical data offers only very limited support for a link between asset market returns and demographic variables, be it for the United States (Poterba, 2004) or elsewhere (Ang and Maddaloni, 2005, Davis and Li, 2003 and Geanakoplos *et al.*, 2004).¹⁰⁵

3. Changes in financial structure may influence the credit channel (Angeloni *et al.*, 2003). Pension reforms – a move towards DC systems and/or towards more or less compulsory private savings accounts – and the desire to save for retirement will partly change the channels of financial investments. As households are likely to divert part of their savings towards long-term financial vehicles targeted at funding retirement, the relative importance of bank deposits compared to products offered by other institutions (like pension funds and insurance corporations) could shrink, primarily in countries where the relative importance of financial institutions other than banks is lower, like most European countries and Japan. In financial systems where banks are also the main providers of funds to households and enterprises, the decrease in bank deposits could affect the supply of loans to the corporate sector, although – as has happened in Sweden, for example – banks may opt to increase the share of bond financing in their liabilities. When the currently active generation retires and if downward pressure on asset prices materialises, the reduction in loans' supply may compound the impact of falling asset prices on corporate balance sheets. Lower asset prices could affect firms' ability to borrow, since they would change the loan-to-value ratio on which banks base their lending decisions. Thus, these developments could encourage corporations to turn toward equity and especially bond financing, boosting the supply of financial securities and reducing the demand for bank loans (although the downward pressure on asset prices due to

¹⁰⁴ First, they assume that investors perfectly foresee demographic changes far into the future (even though those changes are themselves quite uncertain), while in practice, market participants do not seem to fully factor in the demographic changes beyond a five to six-year horizon (Della Vigna and Pollet, 2005). Second, differences in financial systems but also culture and traditions (*e.g.* the parameters of the social security system or the strength of the bequest motive) may influence portfolio decisions. Third, the interaction over time of the saving rate and/or the supply of capital with demographic changes and their possible indirect effect on asset allocations are typically ignored. Finally, the results usually rest on a closed-economy assumption, whereas financial liberalisation and deregulation have weakened the link between domestic movements in asset prices and domestic demographic changes given the increased opportunities for global assets allocation (see Annex I.3).

¹⁰⁵ The size of any impact varies considerably across countries, probably due to differences in financial system structure and in social security arrangements.

population ageing is likely to affect firms' ability to borrow from the market as well). The overall importance of the credit channel for the transmission of monetary policy could thus decline.

4. Ageing may affect the credit channel in yet another way. In a number of G10 countries, current accounting standards for corporate pensions require that pension liabilities be priced on a fair-value basis. Unless the duration of pension funds' assets and liabilities is perfectly matched, a decrease in interest rates may thus deteriorate corporate balance sheets and hamper capital spending. Indeed, empirical research on Japanese corporations shows that because of their much longer duration the value of pension liabilities affects capital investment more than that of other liabilities such as bank loans, meaning that the traditional transmission mechanism of a monetary policy impulse is weakened (Sasaki, 2005).

5. Alongside financial wealth, much of household saving is tied up in real estate. Demographic changes seem to affect house prices as well and, through their impact on housing wealth, may also change other channels of transmission of monetary policy. Over the long run, the impact of demographic changes on real estate prices via the demand for housing should depend on the number of households, which is linked to population growth (Capozza *et al.*, 2002). Several studies based mainly on U.S. and U.K. data have suggested that as the population ages and the fraction of people in their "buying-years" shrinks, housing demand and consequently house prices would decline as well (Mankiw and Weil, 1989, and Holly and Jones, 1997). However, subsequent studies have shown that when the effect of age is disentangled from other characteristics – like income, marital status and education – the demand for housing tends to be stable or actually rises slightly with age (Green and Hendershott, 1995). All in all a clear relation between age and house prices seem difficult to derive.

6. Changes in house prices are important because they can directly affect consumption. When house prices increase, consumption may be supported as households' perceived wealth increases as well, and this relaxes borrowing constraints. The ability to consume housing wealth reflects mainly structural factors such as mortgage market arrangements and taxation, which tend to be different across countries (see Catte *et al.*, 2004). Recent studies (see Campbell and Cocco, 2005) have found evidence that the propensity to consume out of changes in housing wealth is also linked to age. A rise in house prices has a much bigger effect on older homeowners' consumption, while the impact is almost null for younger cohorts. Thus, although there is no firmly established relationship between population ageing and housing wealth, there is evidence that the consumption response to changes in house prices is positively related to average population age, and current demographic changes are therefore likely to affect the transmission of monetary policy through the wealth channel.

Annex II.1. Accounting changes in the pension fund industry

1. Accounting is frequently cited as the most important factor affecting pension fund management, and the shift from DB to DC or hybrid schemes.¹⁰⁶ Pension obligations can introduce volatility in the sponsor company's financial statements, depending on how they are measured and recorded. Indeed, industry observers frequently assess that a move to market-based, fair value accounting principles, would significantly increase the shift away from DB pension plans and may encourage greater short-term, trading and investment styles.

Current practices

2. In most countries, the impact of short-term pension gains and losses on the financial accounts of sponsor companies are smoothed over several periods. Historically, a variety of smoothing practices have been applied to various components of a pension sponsor's financial statements, including investment returns (actual against expected), and actuarial gains and losses (*i.e.*, changes in liability values). The current international accounting standard (IAS 19) and national accounting standards in most of continental Europe, Japan and the United States, incorporate various smoothing mechanisms (see Box A.II.1).

3. Another important accounting principle is the choice of the discount rate used to measure pension liabilities.¹⁰⁷ This rate has a significant influence on the measurement of the obligation, as a higher rate reduces the present value of pension obligations. Indeed, some analysts have suggested that the rate selected or movements in rates have a greater influence on pension fund balance sheets than asset performance, given the typically long average duration of liabilities. Some countries have allowed the same discount rate to be used for liabilities as for expected returns on assets, thus further smoothing the impact of market movements (such as the projected yield on equities). However, in accordance with IAS 19, many countries now require a rate approximating a high quality (AA or equivalent) corporate bond yield. In other countries, as shown in Box II.2, the discount rate is fixed by the authorities and only rarely adjusted.

Recent trends

4. The trend among standard setters is toward limiting the scope for pension fund smoothing, by introducing more market sensitive or fair value principles. The United Kingdom has moved toward a fair value approach with the introduction of a new accounting rule (FRS 17). Under this rule, although the "headline" profit and loss account continues to show the actuarial version of pension gains and losses, the unsmoothed mark-to-market version of the gains and losses is shown in a separate *Statement of Total Recognized Gains and Losses* (Box A.II.1). The IASB has also introduced changes in its pension accounting standards that will permit reporting according to fair value principles in a form similar to the United Kingdom – EU countries agreed to adopt IAS 19 in January 2005.

5. In many countries, steps are also being taken to ensure greater disclosure of a pension fund's financial condition. Pension liabilities are increasingly reflected like other debt obligations of the sponsor company. Japan began recording pension liabilities as debt obligations of the sponsor in 2000 – previously Japanese companies were required only to recognize annual contributions as an expense in the profit and loss account. This move has forced many SMEs to terminate their pension plans due to the sudden reporting of large funding gaps in their balance sheets.

¹⁰⁶ See for example CIEBA (2004).

¹⁰⁷ The discount rate used in the financial accounts is not always the same as the discount rate used for regulatory purposes.

Potential impact

6. The use of fair value accounting principles would address the arbitrariness that characterises traditional pension fund accounting practices. It is widely recognized that the various smoothing mechanisms used in the accounting for pension plans introduce an arbitrary and inconsistent application of current accounting standards, which some argue substantially limits the usefulness of financial reports. In particular, the use of subjective assumptions, which frequently vary between companies, may hamper comparative analysis, and the financial risks borne by the sponsor companies may be underestimated.¹⁰⁸

7. However, it is also argued that by potentially generating greater volatility in sponsor companies' balance sheets, fair value accounting principles may sometimes misrepresent (*i.e.*, over- and understate) a pension fund's financial condition and accelerate the shift away from DB plans. Recent experience in the United Kingdom indicates that fair value principles may accelerate moves to DC and hybrid plans, which allow companies to de-risk their pension obligations and transfer investment and market volatility to employees/beneficiaries. Similar effects can be seen in Japan and the United States. Greater sensitivity to market price volatility may also in future encourage fund managers to focus on short-term asset management strategies, or alternatively to seek to immunise themselves from short-term accounting volatility by reallocating their portfolios from equities to bonds.

Box A.II.1. Comparison of U.S. GAAP, U.K. FRS 17 and proposed IAS standards

Approaches to pension accounting differ significantly across countries. The differences largely relate to the degree to which the accounting permits smoothing in consideration of uncertainties associated with pension-related costs and obligations, the subjective and complex process of estimating the obligations and the long-term nature of the obligation. This box compares three pension accounting regimes, namely, U.S. FAS 87, U.K. FRS 17 (which came into effect in January 2005), and proposed IAS requirements (IAS 19, effective January 2005).

How pension assets and obligations are measured and presented in corporate balance sheets

Under all three regimes, the sponsor company recognises pension obligations net of pension assets. However, in measuring pension assets and liabilities, the U.S. regime (FAS 87) allows more smoothing than FRS 17. Both IAS 19 and FAS 87 permit amortisation of unrecognised gains or losses over the remaining working life of active employees, but also permit more rapid, and even immediate, recognition. Under IAS 19 and FRS 17, pension assets are measured by market values. Under FAS 87, pension assets are measured at either market value or a calculated value that recognises changes in fair value over not more than five years (referred to as "market-related value"). Under all three regimes, liabilities are measured by the projected benefit obligation (PBO). PBO is a going-concern measurement, which is meant to capture the impact of future wage increases and vested benefits, actuarial assumptions and discount rates determined as of the current measurement date. Pension liabilities, under FAS 87, are measured based on the PBO with a requirement to recognise an additional minimum liability if the accumulated benefit obligation (ABO), which represents essentially a liquidation value, exceeds the fair value of plan assets. Both the ABO and PBO amounts are disclosed in the notes to the financial statements.

If there is a net surplus in the pension fund, the sponsor company may record all or part of it as an asset. While FAS 87 sets no explicit limit on the amount that may be recognised, IAS 19 and U.K. FRS 17 limit it to the amount that would be recoverable by the sponsor through a refund or a reduction of future contributions.

Regarding the discount rate to be applied to pension liabilities, IAS 19 prescribes yields of high-quality corporate bonds; U.S. FAS 87 gives a choice of either high-quality corporate bonds or insurance annuity rates; and U.K. FRS 17 recommends AA or equivalent corporate bond yields.

¹⁰⁸

See Shilling (2003).

Smoothing principles in the profit and loss account

In general, when evaluating pension fund investment results, sponsors may take a long-term view by smoothing short-term performance volatility. For this purpose, IAS 19 and U.S. FAS 87 reflect expected returns rather than actual returns on pension assets. The difference between actual and expected returns is subject to amortization in future periods, or at times may be entirely deferred if it does not exceed a minimum threshold. The rate of expected return reflects each company's view about the future performance of its pension portfolio.

Under IAS 19 and U.S. FAS 87, smoothing also exists in actuarial gains and losses (*i.e.*, projected liabilities), which are also amortised and reflected in earnings over future periods. If the difference between actual and expected returns, together with other actuarial gains or losses, are within a range of 10 percent of the higher of plan assets or liabilities (the "corridor"), they are not required to be amortised. Under IAS 19 and FAS 87, plan sponsors may elect a systematic method of amortisation that must be applied consistently (see box below).

The United Kingdom's FRS 17 also uses expected returns; however, the differences between expected and actual returns, as well as actuarial gains and losses, are recognised in the period in which they are incurred in a separate *Statement of Total Recognized Gains and Losses* (STRGL). Use of the separate account, instead of direct reporting in the profit-and-loss statement, is an attempt to avoid introducing excessive volatility into headline income figures. Recently, the IASB has issued a proposal on the possible introduction of a separate account to allow companies to report the annual cost (with or without smoothing). It should be noted that IASB and U.S. FAS 87 also allow immediate recognition of the difference between actual and expected returns at the company's option.

Important Differences in the Three Accounting Standards

	IAS 19	U.S. FAS87	U.K. FRS 17
Measurement of pension obligations	PBO	PBO ABO (minimum recognition): PBO and ABO are reported in the notes to the financial statements	PBO
Measurement of pension plan assets	Fair market value: no smoothing allowed	Market-related value: companies are permitted to use fair market value or a calculated value that smoothes up to five years for purposes of determining the asset value for use in the return on assets and 10 percent corridor computation. The value of assets disclosed in the notes is the fair market value	Fair market value: no smoothing allowed
Smoothing of gains or losses in earnings statements	Unamortized past service costs are amortised over the remaining service period Actuarial gains or losses within a "corridor" may be ignored (the higher of 10 percent of the present value of the obligation or 10 percent of the market value of assets) Actual gains or losses over a "corridor" may be amortised over the remaining working life of active employees (immediate recognition is permitted)	Unamortized past service costs are amortised over the remaining service period Actuarial gains or losses within a "corridor" may be ignored (the higher of 10 percent of the present value of the obligation or 10 percent of the market-related value assets) Actual gains or losses over a "corridor" may be amortised. The minimum required amortisation is based on the remaining working life of active employees	Unamortized past service costs are amortised over the period in which the benefits vest The difference between actuarial gains, losses, and adjustments, is recognised in the period incurred in a separate note in the financial statement (STRGL), <i>i.e.</i> , not smoothed
How future investment returns are calculated	Long-term estimates of expected returns	Long-term estimates of expected returns	Long-term estimates of expected returns. However, the difference between expected and actual returns is recorded in STRGL

Sources: Standard and Poor's (2003) and Financial Accounting Standards Board.

REFERENCES

- Akerlof, G. (2002), "Behavioral macroeconomics and macroeconomic behavior", *American Economic Review*, Vol. 92, No. 2.
- Ameriks, J. and S. Zeldes (2004), "How do household portfolio shares vary with age?", *mimeo*, Columbia University Graduate School of Business.
- Ang, A. and A. Maddaloni (2005), "Do demographic changes affect risk premiums? Evidence from international data", *Journal of Business*, Vol. 78, No. 1.
- Angeloni, I., A. Kashyap and B. Mojon, eds (2003), *Monetary Policy Transmission in the Euro Area*, Cambridge, Cambridge University Press.
- Antolin, P., A. de Serres and C. de la Maisonneuve (2004), "Long-term budgetary implications of tax-favoured retirement plans", OECD Economics Department Working Paper No. 393.
- Association of British Insurers (2005), *The Pension Annuity Market: Further Research Into Supply and Constraints*, London, February.
- Attanasio, O., and G. Violante (2000), "The demographic transition in closed and open economies: a tale of two regions", IADB Working Paper No. 412.
- Auerbach, A. J. and H. Hermann (2003), *Ageing, Financial Markets and Monetary Policy*, Springer, Berlin.
- Bakshi, G. and Chen, Z. (1994), "Baby boom, population aging and capital markets", *Journal of Business*, Vol. 67, No. 2.
- Bank of England (2004), "Inflation-protected bonds and swaps", *Quarterly Bulletin*, Summer.
- Bank of England (2005), *Financial Stability Review*, June.
- Bean, C. (2004), "Global demographic change: some implications for central banks", in Federal Reserve Bank of Kansas City, *Global Demographic Change: Economic Impacts and Policy Challenges*, Jackson Hole Symposium.
- BIS (2005), "International banking and financial market developments", *Quarterly Review*, March.
- Bodie, Z. (1995), "On the risks of stocks in the long run", *Financial Analysts Journal*, Vol. 51, No. 3.
- Börsch-Supan, A., A. Ludwig and J. Winter (2001), "Aging and international capital flows", NBER Working Paper No. 8553.
- Bridgewater Daily Observations (2005), "Too Many Promises, Not Enough Money", February 4.
- Brooks, R. (1998), *Asset Market and Saving Effects of Demographic Transitions*, Ph.D. Dissertation, New Haven, Connecticut, Yale University, Department of Economics.
- Brooks, R. (2003), "Population aging and global capital flows in a parallel universe", *IMF Staff Papers*, Vol. 50, No. 2.
- Brooks, R. and A. Razin, eds (2005), *Social Security Reform: Financial and Political Issues in International Perspective*, Cambridge, Cambridge University Press.
- Brown, J., O. Mitchell, J. Poterba and M. Warshawsky (2001), *The Role of Annuity Markets in Financing Retirement*, Cambridge, MA, MIT Press.

Burniaux, J.-M., R. Duval and F. Jaumotte (2004), "Coping with ageing: a dynamic approach to quantify the impact of alternative policy options on future labour supply in OECD countries", OECD Economics Department Working Paper No. 371.

Byrne, J. and P. Davis (2003), *Financial Structure*, Cambridge, Cambridge University Press.

Campbell, J. and J. Cocco (2005), "How do house prices affect consumption? Evidence from micro data", NBER Working Paper No. 11534.

Capozza, D., P. Hendershott, C. Mack and C. Mayer (2002), "Determinants of real house price dynamics", NBER Working Paper No. 9262.

Cardinale, M., A. Findlater and J. Orszag (2002), *Paying Out Pensions, A Review of International Annuities Markets*, Watson Wyatt, Research Report.

Case, K. and R. Shiller (2003), "Is there a bubble in the housing market? An analysis", *Brookings Papers on Economic Activity*, No. 2.

Casey, B., H. Oxley, E. Whitehouse, P. Antolin, R. Duval and W. Leibfritz (2003), "Policies for an ageing society: Recent measures and areas for further reform", OECD Economics Department Working Paper No. 369.

Catte, P., N. Girouard, R. Price and C. André (2004), "Housing markets, wealth and the business cycle", OECD Economics Department Working Paper No. 394.

Chinn, M. and E. Prasad (2003), "Medium-term determinants of current accounts in industrial and developing countries: an empirical exploration", *Journal of International Economics*, Vol. 59, No. 1.

CIEBA – Committee on Investment of Employee Benefit Assets (2004), *The U.S. Pension Crisis. Evaluation and Analysis of Emerging Defined Benefit Pension Issues*, Bethesda, MD, Association for Financial Professionals.

Choi, J., D. Laibson, B. Madrian and A. Metrick (2004), "For better or for worse: default effects and 401(k) savings behaviour", in Wise, D. (ed), *Perspectives in the Economics of Aging*, Chicago: University of Chicago Press.

Comité d'Etude sur le Vieillissement (2005), *Rapport Annuel*, Conseil Supérieur des Finances, Brussels.

Conseil des Marchés Financiers (CMF) (2002), *The Rise in Equity Market Volatility*, Paris, December.

Congressional Budget Office (2001), *Uncertainty in Social Security's Long-Term Finances: A Stochastic Analysis*, Washington DC.

Congressional Budget Office (2004), *Long-term analysis of the Diamond-Orszag Social Security plan*, Washington DC.

Custis, T. (2001), "Defined benefit plans face the 'perfect storm'", Milliman USA, December 19.

Cutler, D. (1996), "Why don't markets insure long-term risk?", Harvard University, *mimeo*.

Dang, T.T., P. Antolin and H. Oxley (2001), "Fiscal implications of ageing: projections of age-related spending", OECD Economics Department Working Paper No. 305.

Davis, E. P. (2003), "Institutional investors, financial market efficiency and financial stability", Pension Institute Discussion Paper PI-0303.

Davis, E. P. and C. Li (2003), "Demographics and financial asset prices in the major industrial economies", Brunel University Department of Economics and Finance Discussion Paper No. 03-07.

Della Vigna, S. and J. Pollet (2005), "Attention, demographics, and the stock market", NBER Working Paper No. 11211.

Duval, R. (2003), "Retirement behaviour in OECD countries: impact of old-age pension schemes and other social transfer programmes", *OECD Economic Studies*, No. 37.

European Commission (2003), *Communication on Immigration, Integration and Employment*, Brussels, COM (2003) 336 final.

European Commission (2005), "Some recent analysis of DG ECFIN on the economic and budgetary impact of ageing populations", Brussels, *mimeo*, June 28.

Fehr, H., S. Jokisch and L. Kotlikoff (2004), "Fertility, mortality, and the developed world's demographic transition", CESifo Working Paper No. 1326.

Feldstein, M. (2005), "Structural reform of social security", *Journal of Economic Perspectives*, Vol. 19, No. 2.

Feroli, M. (2003), "Capital flows among the G-7 nations: a demographic perspective", Federal Reserve Board, FEDS Working Paper No. 2003-54.

Fougère, M. and M. Mérette (1999), "Population ageing and economic growth in seven OECD countries", *Economic Modelling*, Vol. 16, No. 3.

Fornero, E. and E. Luciano (2004), *Developing an Annuity Market in Europe*, Cheltenham, Edward Elgar.

Fornari, F. (2005), "The rise and the fall of interest rate volatility in the United States: evidence from swaptions", *BIS Quarterly Review*, June.

Futagami, K. and T. Nakajima (2001), "Population aging and economic growth", *Journal of Macroeconomics*, Vol. 23, No. 1.

G10 (1998), *The Macroeconomic and Financial Implications of Ageing Populations*.

G10 (2002), *Turbulence in Asset Markets: The Role of Micro Policies*.

Galer, R. (2002), "Prudent person rule standard for the investment of pension fund assets", *Financial Market Trends*, No. 83.

Geanakoplos, J., M. Magill and M. Quinzii (2004), "Demography and the long-run predictability of the stock market", *Brooking Papers on Economic Activity*, No. 1.

Gerber, D. (2005), "How demography impacts asset allocation and costs: evidence for the pension fund industry in Switzerland", Swiss Federal Finance Administration, *mimeo*.

Goldman Sachs (2004), "Corporate defined benefit plans: the potential consequences of current reform initiatives", March 15.

Green, R. and P. Hendershott (1995), "Age, housing demand, and real house prices," *Regional Science and Urban Economics*, Vol. 26, No. 5.

Greenwich Associates (2003), "As funding gaps resist rally, U.S. investment plans shop for smarter strategies", February 9.

Greenwich Associates (2004), "Hedge funds: the end of the beginning?", December.

Guiso L., M. Haliassos and T. Jappelli (2002), *Household Portfolios*, Cambridge, MA, MIT Press.

Helman, R. and V. Paladino, (2004), "Will Americans ever become savers? The 14th Retirement Confidence Survey, 2004", EBRI Issue Brief, No. 268, Washington, DC, Employee Benefit Research Institute, April.

Hewitt Investment Group (2001), "The perfect storm: how pension funds should navigate through troubled waters", October,

Higgins, M. (1998), "Demography, national savings and international capital flows", *International Economic Review*, Vol. 39, No. 2.

HM Treasury (2004), *Long-Term Public Finance Report: An Analysis of Fiscal Sustainability*, The Stationary Office, London.

Holly, S. and N. Jones (1997), "House prices since the 1940s: cointegration, demography and asymmetries," *Economic Modelling*, Vol. 14, No. 4.

Holzmann, R., R. Hinz *et al.* (2005), *Old-Age Income Support in the 21st Century: An International Perspective on Pension Systems and Reform*, World Bank, Washington DC.

IMF (2004a), "Risk management and the pension fund industry", *Global Financial Stability Report*, September.

IMF (2004b), "How will demographic change affect the global economy?", *World Economic Outlook*, September.

IMF (2005), "Household balance sheets", *Global Financial Stability Report*, April.

Isard, P., H. Faruquee, R. Kincaid and M. Fetherston (2001), *Methodology for Current Account and Exchange Rate Assessments*, IMF Occasional Paper No. 209.

Iyengar, S., W. Jiang and G. Huberman (2003), "How much choice is too much? Contributions to 401(k) retirement plans", Pension Research Council, Wharton School, University of Pennsylvania, Working Paper No. 2003-10.

Jackson, R. and N. Howe (2004), *The Graying of the Middle Kingdom: The Demographics and Economics of Retirement Policy in China*, Washington, DC, and Newark, NJ, CSIS and Prudential Foundation.

Jacobs, B. (1998), "Option pricing theory and its unintended consequences", *Journal of Investing*, Spring issue.

Jaumotte, F. (2003), "Labour force participation of women: empirical evidence on the role of policy and other determinants in OECD countries", *OECD Economic Studies*, No. 37.

King, M. (2004), "What fates impose - facing up to uncertainty", Eighth British Academy Annual Lecture, London, The British Academy..

Laboul, A. (1998a), "The financial security of private pension systems (Part I)", *Financial Market Trends*, No. 70.

Laboul, A. (1998b), "The financial security of private pension systems (Part II)", *Financial Market Trends*, No. 71.

Laboul, A. and Yermo, J. (2005), "Regulatory principles and institutions" in Clark, G., A. Munnell and J. Orszag (eds), *Oxford Handbook of Pensions and Retirement Income*, Oxford University Press.

Lindeman, D. and Yermo, J. (2002), "Private annuity markets", *Financial Market Trends*, No. 83.

Lührmann, M. (2003), "Demographic change, foresight and international capital flows", MEA Working Paper No. 38-03, University of Mannheim.

MacFarland, D., C. Marconi and S. Utkus (2003), "'Money attitudes' and retirement plan design: one size does not fit all", Pension Research Council, Wharton School, University of Pennsylvania, Working Paper No. 2003-11.

Mackenzie, G. and A. Schragger (2004), "Can the private annuity market provide secure retirement income?", IMF Working Paper No. 04/230.

Maddaloni, A. and D. Pain (2004), "Corporate 'excesses' and financial market dynamics", ECB Occasional Paper No. 17.

Mankiw, N. and D. Weil (1989) "The baby boom, the baby bust and the housing market", *Regional Science and Urban Economics*, Vol. 19, No. 2

Marossy, A. and Yermo, J. (2002), "Pension fund governance", *Financial Market Trends*, No. 81.

McMorrow, K. and W. Roeger (2004), *The Economic and Financial Market Consequences of Global Ageing*, Berlin, Springer.

Miles, D. (1999), "Modelling the impact of demographic change upon the economy", *Economic Journal*, Vol. 109, No. 452.

Morgan Stanley (2004), "Pension missiles: is the cure worse than the disease?", March 25.

Murthi, M., J. Orszag and P. Orszag (1999), "The value for money of annuities in the U.K.: Theory, experience and policy", Centre for Pensions and Social Insurance, Birkbeck College, Working Paper No. 9-99.

de Nederlandsche Bank (2004), "Dutch pension sector: Sustainability under pressure", *De Nederlandsche Bank, Quarterly Bulletin*, December.

OECD (1998), *Maintaining Prosperity in an Ageing Society*, Paris.

OECD (2002), "Guidelines for pension fund governance", *Financial Market Trends*, No. 83.

OECD (2003), *Institutional Investors – Statistical Yearbook, 1999-2001, 2003 Edition*, Paris.

OECD (2004a), "Guidelines for the protection of rights of members and beneficiaries in occupational pension plans", *Financial Market Trends*, No. 87.

OECD (2004b), "Supervising private pensions: Institutions and methods", *Private Pension Series* No. 6.

OECD (2005a), *Pensions at a Glance*, Paris.

OECD (2005b), "Global pension statistics project: data update", *Financial Market Trends*, No. 88.

OECD (2005c), *Improving Financial Literacy*, Paris, forthcoming (November).

Office of the Chief Actuary (2004), *Actuarial Report (21st) on the Canada Pension Plan: As at 31 December 2003*, Ottawa.

Office of the Chief Actuary (2005), *Actuarial Report (7th) on the Old Age Security Program: As at 31 December 2003*, Ottawa.

Oliveira Martins, J., F. Gonand, P. Antolin, C. de la Maisonnette and K.-Y. Yoo (2005), "The impact of ageing on demand, factor markets and growth", OECD Economics Department Working Paper No. 420.

Pension Benefit Guaranty Corporation (2005), "Impact on contributions, funded ratios, and claims against the Pension Insurance Program of the Administration's pension reform proposal", Policy, Research & Analysis Department White Paper, April 6.

Pensions Commission (2004), *Pensions: Challenges and Choices, The First Report of the Pensions Commission*, London.

Pensions & Investments (2005), "The 2005 P&I 1,000", Special Report, January 24. Available on the internet at <http://www.pionline.com/page.cms?pageId=248>

Poterba, J. (2001), "Demographic structure and asset returns", *Review of Economics and Statistics*, Vol. 83, No. 4.

Poterba, J. (2004), "The impact of population aging on financial markets", NBER Working Paper No. 10851.

Saarenheimo, T. (2005), "Ageing, interest rates, and financial flows," Bank of Finland Research Discussion Papers, February 2005

Sasaki, T. (2005), "Pension liabilities and investment", Nikko Financial Intelligence, Institute of Pension Research, *mimeo*.

Shilling, A. (2003), "Pension profits become corporate costs", *Business Economics*, October.

Schich, S. (2004), "Ageing and financial markets", *Financial Market Trends*, No. 86.

Schich, S. (2005), "Corporate pension fund liabilities and funding gaps", *Financial Market Trends*, No. 88.

Schieber, S. and P. Hewitt (2000), "Demographic risk in industrial societies: independent population forecasts for the G-7 countries", *World Economics*, Vol. 1, No. 4.

Schlupe, K. (2003), *Finanzierungsbedarf in der AHV (inkl. EL)*, Beiträge zur Sozialen Sicherheit, Forschungsbericht Nr. 10/03. Bern, Bundesamt für Sozialversicherung, Research programme on the long-term future of old age pension provision.

Sefton, J. and M. Weale (2005), "Fiscal implications of demographic uncertainty for the United Kingdom", NIESR Discussion Paper No. 250.

Sharftein, D. and J. Stein (1990), "Herd behavior and investment", *American Economic Review*, Vol. 80, No. 3.

Siegel, J. (2002), *Stocks for the Long Run*, third edition, New York, McGraw-Hill.

Smith, B. (2004), "Financial education report: overview and analysis of selected non-school financial education programmes", OECD, DAF/CMF(2005)12.

Social Security Administration (2004a), *Social Security Programs Throughout the World: The Americas, 2003*, Washington DC.

Social Security Administration (2004b), *Social Security Programs Throughout the World: Europe, 2004*, Washington DC.

Social Security Administration (2005), *Social Security Programs Throughout the World: Asia and The Pacific, 2004*, Washington DC.

Standard and Poor's (2003), *Navigating the International Pension Accounting Maze*, May.

Tapinos, G. (2000), "The role of migration in moderating the effects of population ageing", Paris, OECD.

Turner, D., C. Giorno, A. De Serres, A. Vourc'h and P. Richardson (1998), "The macroeconomic implications of ageing in a global context", OECD Economics Department Working Paper No. 193.

UBS (2003), "Should pension funds invest in equities?", UBS Investment Research, September.

United Kingdom Debt Management Office (2004), *Issuance of Ultra-long Gilt Instruments*, Consultation Document, December 2.

United States Government Accountability Office (2005), "Private pensions? Recent experiences of large defined benefit plans illustrate weaknesses in funding rules", Washington, DC, May.

United States Treasury (2005), "Creating a corporate bond spot yield curve for pension discounting", White Paper, Washington, DC, Office of Economic Policy.

van Ewijk, C. and M. van de Ven (2003), "Pension funds at risk", *CPB Report* 2003/1, April.

Visco, I. (2002), "Ageing populations: economic issues and policy challenges", in Siebert, H. (ed), *Economic Policy for Aging Societies*, Berlin, Springer.

Yakoboski, P. (2005), "Annuitization: what individuals say, what individuals do", TIAA-CREF Institute, policy brief, July.

Young, G. (2002), "The implications of an ageing population for the U.K. economy", Bank of England Working Paper No. 159.

GLOSSARY

Accrued benefit	Amount of accumulated pension benefits of a pension plan member.
Accumulated benefit obligation (ABO)	Present value of pension benefits promised by a company to its employees, at a particular date and based on current salaries.
Annuity	A form of financial contract mostly sold by life insurance companies that guarantees a fixed or variable payment of income benefit (monthly, quarterly, half-yearly, or yearly) for the life of a person (the annuitant) or for a specified period of time. It is different from a life insurance contract which provides income to the beneficiary after the death of the insured. An annuity may be bought through instalments or as a single lump sum. Benefits may start immediately, at a pre-defined time in the future, or at a specific age.
Asset/liability management (ALM)	The management of assets to ensure that liabilities are sufficiently covered by suitable assets at all times.
Balance sheet mismatch	A balance sheet is a financial statement showing a company's assets, liabilities and equity on a given date. Typically, a mismatch in a balance sheet implies that the maturities and/or currency denomination of the liabilities differ from those of the assets.
Contribution holiday	A period when the contributions to a pension scheme are put on hold, the most common reason for this being a situation of overfunding.
Defined benefit plan	Pension plan in which benefits are determined by such factors as salary history and duration of employment. The sponsor company is responsible for the investment risk and portfolio management.
Defined contribution plan	Pension plan in which benefits are determined by returns on the plan's investments. Beneficiaries bear the investment risk.
Dependency ratio	Typically defined as the ratio of those of nonactive age to those of active age in a given population.
Derivatives	Financial contracts whose value derives from underlying securities prices, interest rates, foreign exchange rates, market indexes, or commodity prices.
Emerging markets	Developing countries' financial markets that are less than fully developed, but are nonetheless broadly accessible to foreign investors.
Funded pension plan	Pension plan that has accumulated dedicated assets to pay for the pension benefits.
Funding gap	The difference between the discounted value of accumulating future pension obligations and the present value of investment assets.
Funding ratio	Ratio of the amount of assets accumulated by a defined benefit pension plan to the sum of promised benefits.

Hedge funds	Investment pools, typically organized as private partnerships and often resident offshore for tax and regulatory purposes. These funds face few restrictions on their portfolios and transactions. Consequently, they are free to use a variety of investment techniques—including short positions, transactions in derivatives, and leverage—to raise returns and cushion risk.
Hedging	Offsetting an existing risk exposure by taking an opposite position in the same or a similar risk, for example, by buying derivatives contracts.
Individual Retirement Account (IRA)	In the U.S., tax-deferred retirement plan permitting all individuals to set aside a fraction of their wages (additional contributions are possible on a non-deductible basis).
Mark-to-market	The valuation of a position or portfolio by reference to the most recent price at which a financial instrument can be bought or sold in normal volumes. The mark-to-market value might equal the current market value—as opposed to historic accounting or book value—or the present value of expected future cash flows.
Occupational pension scheme	Pension plan set up and managed by a sponsor company for the benefit of its employees.
Overfunded plan	Defined benefit pension plan in which assets accumulated are greater than the sum of promised benefits.
Pension pillars	<p>The definition of the three pension pillars used in this report is based primarily on the source of savings—government, employment or individual:</p> <ul style="list-style-type: none">• Pillar 1 – the State, often a combination of a universal entitlement and an earnings-related component;• Pillar 2 – occupational pension funds, increasingly funded, organized at the workplace (<i>e.g.</i> DB and DC, and newer hybrid schemes);• Pillar 3 - private savings plans and products for individuals, often tax-advantaged. <p>These definitions are commonly used by industry participants and analysts, and are particularly suitable for our focus on risk transfer. Other definitions used in pension studies, particularly for emerging markets, include the definition introduced by the World Bank, describing Pillar 1 as “non-contributory state pension”, Pillar 2 as “mandatory contributory”, and Pillar 3 as “voluntary contributory”. This definition has been most useful for considering questions of social safety nets, redistribution of income, and related issues.</p>
Pension benefit	Benefit paid to a participant (beneficiary) in a pension plan.
Pension contribution	Payment made to a pension plan by the sponsor company or by plan participants.
Private pension plan	Pension plan where a private entity receives pension contributions and administers the payment of pension benefits.
Projected benefit	Present value of pension benefits promised by a company to its employees at a

obligation (PBO)	particular date, and including assumption about future salary increases (<i>i.e.</i> assuming that the plan will not terminate in the foreseeable future).
Public pension plan	Pension plan where the general government administers the payment of pension benefits (<i>e.g.</i> Social security and similar schemes).
Replacement rate	The ratio of an individual's (or a given population's) (average) pension in a given time period and the (average) income in a given time period.
Risk aversion	The degree to which an investor who, when faced with two investments with the same expected return but different risk, prefers the one with the lower risk. That is, it measures an investor's aversion to uncertain outcomes or payoffs.
Sponsor company	Company that designs, negotiates, and normally helps to administer an occupational plan for its employees and members.
Tail events	The occurrence of large or extreme security price movements, that, in terms of their probability of occurring, lie within the tail region of the distribution of possible price movements.
Trustee	Private entity (person or organisation) with a duty to receive, manage and disburse the assets of a plan.
Underfunded plan	Defined benefit pension plan in which assets accumulated are smaller than the sum of promised benefits.
Unfunded benefit liability	Amount of promised pension benefits that exceeds a plan's assets.
Vesting	Right of an employee, on termination of employment, to obtain part or all of his accrued benefits.
401(k)	U.S. tax-deferred retirement plan that allows workers to contribute a percentage of their pre tax salary for investment in stocks, bonds or other securities. The employer may match all or part of employees' contributions.

**APPENDIX. WORKING GROUP ON AGEING AND PENSION SYSTEM REFORM:
IMPLICATIONS FOR FINANCIAL MARKETS AND ECONOMIC POLICIES**

Chairman: Ignazio Visco (G10 Central Bank Deputy for Italy)

Netherlands	J. Kakes
Switzerland	D. Gerber
United Kingdom	D. Stanton
European Central Bank	A. Maddaloni
International Monetary Fund	T. Groome
	N. Blancher
	G. Barnard
Organisation for Economic Cooperation and Development	V. Koen
	A. Laboul
	J. Yermo

* * * * *

Contact Points

Belgium	V. Perilleux
Canada	J. Armstrong
France	J.-L. Schneider
Germany	M. Weth
Italy	F. Panetta
Japan	Y. Yamashita/S. Watanabe
Netherlands	P. Jansen/S. Holle
Sweden	M. Persson
Switzerland	D. Gerber
United Kingdom	G. Young
United States	L. Stedman
Bank for International Settlements	K. Tsatsaronis
European Central Bank	G. Pineau
European Commission	D. Costello