The development of pension funds—an international comparison

Pension funds—financial intermediaries which collect and invest funds on a pooled basis for eventual repayment to members in pensions—are of major importance in certain national financial markets. For example, in the United States pension funds hold a fifth of equities, and in the United Kingdom they account for a quarter of personal sector assets. But in other countries, such as Germany, pension funds are of minor importance.

This article[1] examines the economic reasons for these differences and their implications for financial markets. The first part describes the growth and status of pension funds in the United Kingdom, the United States, Germany, Japan and Canada in relation to the framework for pension provision in each country. The article then assesses aspects of the behaviour of funds in national financial markets. It compares portfolio distributions and relates them to asset returns, capital market structure, the nature of liabilities and regulation. Some qualitative effects on capital markets are also discussed.

Determinants of the growth of pension funds—an international survey

The figures in Table A show a contrast between the role of pension funds in the Anglo-Saxon countries (the United Kingdom, the United States and Canada), where they account for a sizable part of personal sector saving and wealth, and those in continental Europe;[2] Japan occupies an intermediate position, with assets that are sizable in total but small in relation to personal wealth or GNP.

The proportion[3] of personal sector financial wealth[4] accounted for by pension fund assets has increased in all the countries illustrated, though by different amounts (Chart 1).

Table A
Pension fund assets [a]

$ billions; *percentages in italics*

	Stock of assets (end-1988)	Per cent of personal sector assets	Per cent of GNP	Total net investment	Per cent of personal sector saving	Per cent of GNP
UK(b)	387.8	*23.2*	*46.0*	15.7 (d)	*70.0* (f)	*1.8*
US	1646.7	*13.2*	*33.8*	72.6 (d)	*49.9*	*1.5*
Canada	130.9	*14.1*	*26.7*	11.4 (e)	*38.8*	*2.4*
Japan(c)	134.1	*2.1*	*4.6*	17.0 (e)	*19.5*	*0.6*
Germany(c)	41.1	*2.4*	*3.5*	4.0 (e)	*3.9*	*0.3*
Memorandum item:						
France	27.7	*3.1*	*3.0*	1.0 (d)	*1.5*	*0.1*

(a) The table covers only independent funded schemes, which are the main subject of the article, and hence excludes pension funds managed by life insurers, which in 1988 had assets of $100 billion in the United Kingdom, $628 billion in the United States, $80 billion in Japan and $6 billion in Germany.

(b) The data included for UK pension funds are known to be understated following a recent review by the Central Statistical Office, which showed the quality of estimates had deteriorated because of the age of the sample and rapid changes in the industry. Revised data will be included in the *United Kingdom National Accounts 1991 Edition*, to be published by the CSO in September.

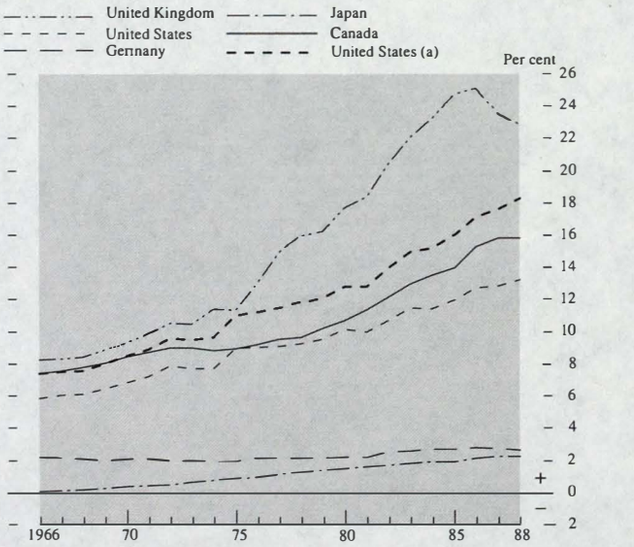
(c) The data exclude unfunded Japanese and German pension reserves held directly on the balance sheet of the sponsoring firm (booking). In 1988 these amounted to $87 billion in Japan and $100 billion in Germany.

(d) Flow.

(e) Difference of stock (ie may include some revaluations).

(f) The large balancing item in the United Kingdom national accounts means this ratio may be inaccurately measured.

Chart 1
Share of pension funds in personal sector assets



(a) Including pension reserves managed by life insurers.

(1) Prepared by E P Davis in the Bank's Economics Division.

(2) Funds in the Netherlands are the main exception to this pattern, having large funded schemes as in the United Kingdom, the United States and Canada.

(3) It is important to stress that pension funds are not the only private means to provide for retirement income—all forms of saving, including purchase of residential property, are in principle substitutes. But one of the closest substitutes is life insurance—and indeed many life insurers offer pension schemes themselves (typically 'defined contribution') as well as managing funds for others. For these reasons, it is important also to be aware of the size of the life insurance sector, which in 1988 accounted for 22% of personal sector financial assets in the United Kingdom, 9% in the United States, 15% in Germany, 12% in Japan and Canada and 11% in France.

(4) The article does not discuss *long-term saving* in detail, although that clearly determines the size of total wealth of which pension wealth forms a part. It is likely to depend on factors such as income growth (old age security appears to have a large income elasticity of demand), demographic factors (the proportion of the population in the high-saving groups aged 35–65) inflation and social security provisions. The OECD (Dean A, Durand M, Fallon J and Holler P, 'Savings trends and behaviour in OECD economies', OECD Working Paper No 67, 1989) suggest high saving in countries such as Japan is explicable in terms of these factors.

What accounts for these differences? The majority of pension fund members are affiliated as a consequence of their employment, and such fund membership is often compulsory. Therefore *rates of return* on pension funds do not attract investors in the same way as do those on other types of financial asset.[1] On the other hand, the *nature of the benefits* offered may provide an incentive to work for a particular firm, making it attractive for that firm to offer a particular type of scheme (see the discussion of employee retirement insurance on page 382). For employees, pensions have often been a subject for *collective bargaining* (particularly in the United States). The more generous the benefits offered, and the wider the coverage, the more assets a pension fund will require.

It can be suggested, therefore, that the growth of pension funds in the United Kingdom and the United States and Canada has been partly related to the *benefits* offered. In the United Kingdom the nature of benefits has changed since the 1960s. Defined benefit plans (see the note on page 382), often with provisions for a degree of inflation indexation, cover all public sector and the majority of private sector beneficiaries. Indeed, indexation of benefits up to an inflation rate of 5% may soon become mandatory.[2] Defined contribution plans declined in popularity during the mid-1970s, an era of high inflation and low real rates of return to investment. Defined benefit plans are obviously vulnerable to deficits during periods of securities market weakness, such as the 1970s, and firms had to make large 'topping-up' payments in the late 1970s. More recently (since 1981), asset growth has reflected the strength of capital markets, and many schemes became overfunded, with firms taking contribution holidays. And the advent of personal pensions has accompanied a resurgence of defined contribution plans. In the United States too, most primary[3] pension coverage is in defined benefit schemes (which account for two thirds of pension assets) and there are often discretionary pension increases to compensate for inflation after retirement, although explicit indexation for inflation is rare. In Canada even discretionary increases of benefits to allow for inflation are less common; a fixed income is promised in retirement.

In Germany most pension funds promise a fixed amount dependent largely on duration of employment; final salary schemes are less common than in the Anglo-Saxon countries. In Japan benefits tend to relate to years of service and final salary, but the ratio to the latter tends to be less than in the Anglo-Saxon countries; (such benefits are often taken as a lump sum).[4] These factors may help to explain the lesser growth of schemes in Germany and Japan.

One of the main determinants of the scale of benefits and advantages of pension funds as a means of saving is *taxation*. In the United Kingdom, employees' and employers' contributions and all returns on investments are free of tax, and employers' pension contributions, unlike wages, are not subject to national insurance contributions.[5] The tax treatment[6] of pension funds is broadly similar in the United States, Canada and Japan. However, in Japan other forms of saving such as life insurance also enjoy tax privileges, and unfunded liabilities are partly tax deductible.[7] In Germany, employee contributions to independent pension funds (and direct insurance) are treated as current income and are subject to wage tax (deferred taxation is absent). This makes *direct commitments* (ie pension liabilities held on the books of the sponsoring firm)—which are fully tax-deductible—more attractive and they are the dominant form of private pension obligation, accounting for 60% of pension liabilities, compared with 30% for funded independent pension funds and provident funds.[8]

The principal alternative to a private pension fund is the state social security pension scheme. Therefore, not

Table B
Percentage of population over 65

	1990	2020	Percentage change
US	12.2	16.2	32.8
UK	15.1	16.3	7.9
Germany	15.5	21.7	40.0
Japan	11.4	20.9	83.3
Canada	11.4	18.6	63.2
France	13.8	19.5	41.3

Source: OECD.

(1) Although legislation in the United Kingdom outlawing compulsory membership may make the situation more fluid there.
(2) In practice, it has been announced that the requirement for indexation will not be brought into effect until the implications of the European Court judgment on equal pension ages (the 'Barber Judgment') have been clarified.
(3) However, a large number of workers also have supplementary defined contribution plans.
(4) In Japan, tax qualified pension plans (TQPPs), authorised in 1962, are similar to Anglo-Saxon funded pension plans. In 1989 they covered 28% of the private sector workforce and held assets of $76 billion. Employee pension funds (EPFs) (1966) enable the private plan to replace social security (and hence the firm can contract out of earnings-related social security contributions). Benefits are in the form of an annuity equal to the social security pension plus the excess—typically taken as a lump sum. These cover 26% of the work force and have assets of $143 billion. These plans co-exist with traditional unfunded retirement bonuses. See also Turner J A and Daily L M, *Pension policy; an international perspective*, United States Department of Labour, Washington DC, 1990.
(5) In addition, up to one and a half times an employee's salary (up to £150,000) may be taken out at retirement as a tax-free lump sum. Recently limits have been imposed on tax-free contributions.
(6) Economically such exemption of funds from tax is akin to an expenditure tax and is hence often seen as economically desirable (see Meade J E, *The structure and reform of direct taxation*, Report of a committee set up by the Institute of Fiscal Studies, London: Allen and Unwin, 1978). But to the extent such an exemption is not fully introduced by abolishing taxes on other forms of savings it may be distortionary and hence undesirable on second-best grounds. There may also be over-provision for retirement.
(7) There is also a tax of 1.173% of fund assets per year, levied on asset managers, payable on all assets of TQPPs and on a proportion of EPFs, which is likely to be largely passed on to the funds themselves.
(8) The German system comprises four main types of scheme. The largest are unfunded schemes, *direct commitments* on the balance sheets of large firms, which are usually insured to cover the risk of bankruptcy. (In 1990 these were 60% of pension liabilities, DM 181 billion.) Another common form of company scheme is *direct insurance* (10%), whereby an enterprise concludes a contract with a life insurer on behalf of its employees. Employees then have a direct claim on the life insurer. Risk and administrative expenses are shifted to the life insurer, but the funds are of no direct use to the firm. An enterprise may also commission a legally independent *pension fund* (1990; 20%; DM 61 billion) or *provident fund* (1990; 10%; DM 29 billion) to handle its pension scheme, operating as a mutual insurance association. Provident funds face no limit on investment; all can be loaned back to the sponsoring company. However, since 1974 only part of transfers to provident funds have been tax-deductible for firms as an operating expense (all may be deducted for pension funds) and employees' legal rights to benefits have been strengthened, so provident funds have declined. A recent development is *special security funds*, a form of investment company whereby highly-liquid firms having direct commitments can invest part of their pension provisions in the capital markets. Given the attraction of exemption from capital gains tax and turnover tax these have grown rapidly; inflows were DM 19 billion and assets DM 116 billion in 1990, although only a part of these were counterparts to pension liabilities.

Characteristics of pension funds

Pension funds are of two main *types*, defined benefit and defined contribution, which differ in the distribution of risk between the member and the sponsor (typically a non-financial company). In the former, the sponsor undertakes to pay members a pension equal to a predetermined percentage of salary, subject to years of service. Hence members trade wages for pensions at the long-term rate of return in the capital market, while employers undertake to top up the fund to keep it in actuarial balance.[1] This risk sharing feature is absent from defined contribution schemes, where contributions are fixed and benefits vary with market returns. Both types may also have life insurance aspects, eg widows' benefits.

The main *institutional features* of pension funds can be analysed by contrasting them with other types of provision for old age and financial institution. Hence unlike pay-as-you-go pension funds, large quantities of funds are accumulated by or on behalf of workers to pay their own pensions—there is no intergenerational transfer. Unlike banks, pension funds benefit from regular inflows of funds on a contractual basis and from long-term liabilities (ie with no premature withdrawal of funds), which together imply little liquidity risk. The main risks are rather those of inaccurate estimates of mortality and lower than expected returns on assets and, for defined benefit pension schemes, unexpected changes in earnings, transfers and the legal framework. Given the nature of liabilities, funds may concentrate portfolios on long-term assets yielding the highest returns, compensating for the increased risk by pooling across assets whose returns are imperfectly correlated. Pooling is facilitated by the size of pension funds, which lowers information and transactions costs and facilitates investment in large indivisible assets.

Meanwhile, unlike other types of institutional investor (life insurance, mutual funds) pension funds benefit from tax deferral. Contributions are tax free, as are accumulated interest and capital gains; tax is only paid on receipt of a pension after retirement. Hence, for both the sponsoring company and the employee, pension funds are superior to alternatives (for the company, unfunded schemes; for the employee, other forms of saving). In addition, pension funds are contractual annuities, meaning that lump sum withdrawals are precluded even during the period when claims are payable after retirement (this also means pension assets cannot be used as collateral). In contrast, for life insurance, early withdrawal is possible (at some cost) and policy loans also entail a degree of liquidity for holders. Members of pension funds are willing to accept low liquidity, given potential for higher returns (at greater risk) that contractual annuities permit, supported by benefits of tax deferral and implicit insurance of pension levels (in defined benefit schemes).

Economic features of pension funds can be analysed from various perspectives. At a micro level Bodie[2] has suggested that defined benefit funds should be seen as a form of *employee retirement insurance*. Given risk sharing, insurance is provided against an inadequate replacement rate, social security cuts, longevity, investment risk and inflation. Pension funds are seen as insurance subsidiaries of the sponsoring firm. He suggests this approach explains a number of features of pension funds, notably reasons for employer provision (because they have superior information over earnings; benefit from economies of scale in processing information, transactions, etc; can implement enforced saving by deferring wages and salaries; and can avoid some of the adverse selection problems of private annuity insurance) and the dominance of defined benefit schemes (because they provide superior insurance to defined contribution).[3]

Insurance is not the only way to view pension funds; there is also the *tax shelter* perspective (which suggests tax advantages to companies are the main reason for growth of funds). From a *labour economics* perspective, funds benefit the employer by reducing costs of labour turnover (if vesting is imperfect, ie early leavers do not gain a proportionate share of benefits in relation to contributions) and hence funds can be a source of labour market inflexibility. Funds can also be used to encourage early retirement. Even with indexation of vested benefits, members tend to lose out by changing final salary defined-benefit funds compared with those remaining in one fund. The *corporate finance* perspective sees fund liabilities as corporate debt and fund investments as corporate assets. Given tax deductibility, corporations manage pension funding and investment to maximise benefit to shareholders. This perspective also raises the issue of the status of members as stakeholders in the firm. Although the trust status of a fund offers some protection from predators in a takeover, stripping of surpluses and reduction of expected benefits has been a controversial issue in a number of countries.[4]

(1) In defined benefit schemes there can also be a risk transfer from young workers (who can readily bear risk) to old workers near retirement. This facilitates holding of equities, which in turn reduces cost.
(2) Bodie Z, 'Pensions as retirement income insurance', *Journal of Economic Literature*, Vol 28, pages 28–49.
(3) Note that the information and insurance arguments for employer provision may suggest why the market (insurance companies, options markets etc) does not (and perhaps *cannot*) provide defined benefit schemes.
(4) Schleifer A and Summers L, 'Breach of trust in hostile takeovers', in A Auerbach ed. *Corporate takeovers: causes and consequences*, University of Chicago Press, 1988.

surprisingly, the growth of private schemes can be related to the *scale* [1] *of social security pension provision,* which imposes effective limits on private sector schemes. On the other hand the age structure of the population will determine likely future strain on a social security system (Table B).[2] In many countries, individuals now anticipate promises will be scaled down in the light of the burden of such schemes on future wage earners and/or government borrowing, thus stimulating precautionary saving via institutions; and governments are seeking to limit social security commitments in the light of these potential burdens.

The influence on the development of private schemes of the scale of social security, offset in some cases by demographic concerns, can be discerned in each country; for example Germany has a relatively generous, mandatory and pay-as-you-go state social security scheme. Private schemes are supplementary, and hence need far fewer assets to cover their more limited commitments than elsewhere. In Japan, too, social welfare promises are generous, with a prospective 'replacement ratio' (average pension as a proportion of average earnings) of over 50%. Unlike in Germany, some assets are accumulated by the state in advance of benefit commitments; this can help allay demographic concerns. Again, the benefit commitments are likely to constrain the growth of pension funds. However, social security in Japan is not payable until 60, while retirement has until recently often been at 55, so a private pension can bridge this gap. In addition, companies can opt out of part of social security contributions by paying an equivalent pension.

In Canada,[3] too, there is a relatively strong and mandatory public pension system, so benefits of private schemes can be less generous (for example, in terms of indexation). In contrast, in the United Kingdom, employees with company pensions may 'contract out' of all but the most basic state scheme, and the government, concerned over future state pension obligations, is offering incentives to individuals without a company scheme to take a personal defined contribution pension instead of an earnings-related state pension. In the United States a recent reform has made social security benefits less generous and increased the age at which full benefits are payable (it also introduced a degree of prefunding for social security, as in Japan and Canada).

Provision for retirement can also be made through other assets in which case *relative returns vis-à-vis* private pensions become important. The growth of assets in long-term institutions in the United Kingdom, the United States and Canada as a proportion of personal portfolios has a counterpart in a long-term reduction in direct personal equity holdings as a proportion of financial assets.[4] In the longer term, this reduction may result, first, from the fact that direct equity holdings generally suffer from double taxation (purchases of securities are made from taxed income, and both dividends and capital gains are also taxed).[5] A second factor may be the equalisation of the income and wealth distribution, where only the wealthy could economically maintain equity portfolios with adequate risk diversification (although mutual funds overcome this problem). As a retirement provision, equity holdings also have the disadvantage of greater capital (and income) uncertainty.

Personal pensions have grown in importance in recent years. Individual retirement accounts (IRAs) were introduced in the United States in 1974 for workers without company pensions; they offer the same tax benefits as pension funds and grew more rapidly after 1981, when all workers and their spouses became eligible (15 million plans were open in 1985). Similar provisions cover 3 million workers in Canada (1987). More recently 4.5 million have taken 'personal pensions' in the United Kingdom, generally opting out of the social security earnings-related scheme. On balance, personal pensions seem to have complemented rather than substituted for other types of private provision.

In the case of company pensions, the *attraction of schemes to employers* is important, since provision of private schemes is rarely compulsory. 'Direct commitments' in Germany, in effect, offer tax-deductible 'free capital' to the firm, though in principle the liabilities arising from pension claims should be reflected in the share price. In Japan a taxation change in 1980 encouraged companies to replace unfunded by funded pensions or bonuses, by reducing (but not eliminating) tax benefits to the book reserves. Many schemes remain unfunded, however. In the Anglo-Saxon countries the tax exemption of funded schemes makes them the cheapest way for firms to provide retirement benefits to employees. Unfunded private pensions[6] may appear advantageous to companies when population and the economy are growing, interest rates are low and employment is high, but in more adverse circumstances may prove more risky to the firm, workers and pensioners. In effect, they may face similar demographic and financial problems to state social security without the ability to raise taxes.

The *regulation of portfolios* may affect the attractiveness of pension assets if it constrains managers in their choice of risk and return. This is not, however, the case in most countries.[7] For example, US pension funds are subject to a 'prudent man rule' which requires managers to carry out sensible portfolio diversification; there are no limits on portfolio distributions. UK pension funds are subject to trust law and again follow the 'prudent man' concept; they

(1) Note that social security is invariably an indexed, defined benefit pension scheme.
(2) See Hagemann R P and Nicoletti G, 'Ageing populations; economic effects and implications for public finance', Department of Economics and Statistics Working Paper No 61, OECD, Paris, 1989.
(3) Private schemes co-exist with a flat rate non-contributory state pension scheme (OAS), an income supplement (GIS) for those over 65 on low incomes and a contributory earnings-related public pension (CPP/QPP). The last is partly funded.
(4) Davis E P, 'Portfolio behaviour of the non-financial private sectors in the major economies', Bank for International Settlements Economic Paper No. 17 BIS, Basle.
(5) However, in the United Kingdom the 'personal equity plan' scheme makes a move towards reducing the tax disadvantages of direct equity holdings. The relation between fund growth and reduction of equity holdings is less clear cut in Japan or Gennany; there is no capital gains tax in Japan, while in Germany it only applies to short-term gains.
(6) These account for virtually all private pensions in France.
(7) In practice, life insurers are more strictly regulated, see Davis E P: 'International diversification of institutional investors', *Journal of International Securities Markets*, Summer 1991, pages 143–65.

are not constrained by regulation in their portfolio distribution, except for limits on self-investment and concentration. Japanese funds face generally non-binding ceilings on holdings of certain assets (such as 30% for foreign assets and for equities). Canadian funds were strictly regulated till 1987 (when the prudent man concept was introduced) and have until recently faced limits on the share of external assets, as tax regulations limited foreign investment to 10% of the portfolio.[1] There is also a 7% limit on real estate. Meanwhile German funds remain subject to the same panoply of regulation as life insurers (4% limit on foreign asset holdings, 20% limit on equities, 5% on property). It is arguable that these are particularly inappropriate for pension funds, though they can be justified by the need to protect the insurance fund. (They may also be contrary to the EC Capital Movements Directive, depending on whether they are judged to be 'reasonable prudential restrictions'.)

Other *regulatory changes*, particularly relating to the funding of benefits, have influenced the growth of defined benefit pension funds at various times. Funding limits seek to protect security of benefits (underfunding) and prevent abuse of tax privileges (overfunding). In the United States an important influence was the Employee Retirement Income Security Act (ERISA) of 1974, which provided for minimum standards of vesting and increased funding requirements, both of which increased the burden to firms of running a pension scheme. It also introduced the Pension Benefit Guarantee Corporation to guarantee (up to a limit) benefits of funds in default; the funding requirement can be seen partly as a protection for PBGC. (This has not prevented heavy financial claims on the PBGC, following several cases of default of underfunded schemes.) Following ERISA, the growth in pensions slowed.[2] More recent changes in US regulations have clarified funding rules by defining pension fund liabilities as the present value of pension benefit owed to employees under the benefit formula *absent any projections of salary*,[3] discounted at a nominal rate of interest.[4] In addition, overfunding on this basis is limited to 50%. Regulations now seek to reduce the moral hazard of deliberate underfunding by charging higher PBGC insurance premia to underfunded schemes; but they do not take account of the asset composition of underfunded schemes, which may be more important for risk.

In Germany, too, various laws or court decisions akin to ERISA have enforced minimum standards of vesting, and what amounts to inflation indexing. The latter was felt to be particularly burdensome, despite the relatively low level of German inflation, and, along with the decline in profitability of firms, helped blunt the growth rate of private pension schemes in the 1970s and early 1980s.[5]

In the United Kingdom the reform of the state scheme in 1978 had an important influence on private schemes by setting a 'guaranteed minimum pension' (GMP) and enforcing a degree of funding sufficient to cover the GMP. There is no system to guarantee non-GMP pension benefits in the United Kingdom—partly for this reason regulations can be less strict than elsewhere, and managers can offer a high return by taking a higher level of risk. A plethora of more recent changes have limited overfunding to 5% of projected obligations, enforced a degree of indexation of pensions up to retirement for early leavers (in contrast to the United States, Japan and Canada), may make a degree of indexation *after* retirement compulsory,[6] have outlawed compulsory membership, limited tax-free contributions and benefits, enforced transferability of assets between schemes and will enforce equal pension ages.[7] A decline of the company pension fund sector is predicted, but there is little evidence of this to date. Few have left company schemes although there has been a sharp rise in personal pensions. And few companies have closed their schemes, even though some have switched to defined contribution or made them less generous for new entrants.

A further factor influencing the growth of pension funds is the *maturity* of the schemes, ie whether they have a long-run ratio of contributing to benefiting members. Immaturity helps explain the growth of schemes in the Anglo-Saxon countries over the last twenty-five years. Now, these schemes are maturing,[8] and the growth of their assets will slow (to around the growth rate of real wages), although changing regulations, such as those for indexation and retirement ages, may add to this. (Commentators suggest that recent regulatory changes in the United Kingdom could boost liabilities by £40–50 billion.) By contrast, schemes in Germany and Japan are less mature, so future growth will continue to be strong. Maturity for an individual scheme will depend on its history and development, and demographic factors. Thus, 'ageing of the population', particularly in Japan, is leading to growth in pension funds. *Coverage* is obviously also important (ie the proportion of employees covered by pension plans). However, this is a consequence of factors discussed above, rather than a separate cause of growth in itself. The features outlined in this section are summarised in Table C.

(1) A tax of 1% of excess foreign holdings was imposed for every month the limit was exceeded. In 1990 it was announced that the limit would be raised to 20% over 1990–95.
(2) Some firms terminated their schemes, and the number of new defined benefit plans initiated dropped. Some firms switched to defined contribution plans; and overall coverage ceased to grow.
(3) In other words, indexing up to retirement is not compulsory but only an implicit promise. This has an important influence on portfolio distributions, discussed at greater length below, since underfunding on this basis can be avoided by holding bonds; equities are only suitable for overfunded schemes.
(4) This definition is known as the accumulated benefit obligation (ABO). Indexation up to retirement gives the projected benefit obligation (PBO) which is not guaranteed except in the United Kingdom. The indexed benefit obligation (IBO) assumes indexation after retirement. (See Bodie Z, 'Shortfall risk and pension fund asset management', *Financial Analysts Journal*, May/June 1991.)
(5) See 'Company pension schemes in the Federal Republic of Germany'. *Deutsche Bundesbank Monthly Report*, August 1984, pages 30–37.
(6) Such rules makes it optimal to hold 'real assets' to avoid underfunding.
(7) For a discussion of related issues in the United Kingdom, see Blake D (1991), *Pensions schemes and pension funds in the United Kingdom*, forthcoming, Oxford University Press.
(8) As an example of maturity, outflows in the United States exceeded inflows by $1 billion in 1989 and $6 billion in 1990 (growth of assets also depends on returns, of course). UK net inflows were 19% of assets in 1980 and 4% in 1990.

Table C
Features of private pension systems [a]

	United Kingdom	United States	Germany	Japan	Canada
Nature of benefits for average member	Largely defined benefit based on final salary. Provisions for total or partial indexation common (75% of participants).	Primary cover largely defined benefit based on final salary. Indexation provisions rare (5% of private schemes); discretionary increases common. Supplementary defined contribution plans widespread.	Largely defined benefit based on flat rate benefit. Indexation mandatory.	Largely defined benefit based on years of service and final basic salary. Often taken as a lump sum. Indexation rare except for part replacing social security.	Largely defined benefit based either on final salary or flat rate benefit. Indexation provisions rare (6% of private schemes); some discretionary increases.
Taxation of funded schemes	Contributions and asset returns tax free. Benefits taxed, except tax free lump sum.	Contributions and asset returns tax free. Benefits taxed.	Only employers' contributions and asset returns tax free. Benefits taxed.	Contributions and asset returns tax free. Benefits taxed, except tax free lump sum.	Contributions and asset returns tax free. Benefits taxed.
Social security[b]	Low replacement ratio. Scheme members can contract out of earnings related social security.	Low replacement ratio.	High replacement ratio.	High replacement ratio. Scheme members can contract out of earnings related social security.	Intermediate replacement ratio.
Regulation of portfolios	Prudent man concept; 5% self investment limit; concentration limit for defined contribution plans.	Prudent man concept.	Guidelines; maximum 20% equity, 5% property, 4% foreign; 10% self investment limit.	Guidelines; maximum 30% equity, 20% property, 30% foreign, 10% one company.	Prudent man (since 1987); tax on foreign assets above 10%; 7% limit on real estate.
Regulation of funding [c]	Maximum 5% overfund of IBO or PBO. Funding only obligatory for contracted out part of social security.	Maximum 50% overfund of ABO. Higher insurance premia if underfunded.	Funding obligatory for pension funds (pensionskassen). Option of booking (tax exempt).	Funding optional. (Book reserves tax exempt up to 40% of liabilities.)	Funding obligatory. Maximum 5% overfund of PBO.
Maturity of funds	Mature.	Mature.	Immature.	Immature.	Mature.
Coverage of workforce (approx)	50% (company schemes) 20% (personal pensions)	46%	42%	37% (funded plans only)	41%
Insurance of benefits	No (although state guarantees payment of minimum pension if fund defaults).	Yes (special guarantee corporation).	Yes (via insurance supervisors). Booked benefits insured by Pension Guarantee Association.	Yes (under wage payment law).	Yes (Guarantee Funds operate at provincial level).

(a) Source: Turner and Daily, *Pension policy; an international perspective.*
(b) Approximate replacement ratios—average pension as a proportion of average earnings—are assessed relative to those in the other four countries.
(c) See footnote 4 on page 384 for explanation of acronyms.

Pension funds and the capital markets —portfolio distributions

Changes in portfolio distributions of pension funds[1] over the period 1966–88 are shown in detail in Charts 2 to 10 and summarised in Table E. As background, estimates of real total returns and their standard deviations for 1967–90 are in Table D.[2]

In principle, the portfolio share of *liquid assets* can be small because withdrawals are predictable (the 'contractual annuity' aspect noted on page 382). The higher levels that have often been observed at various times (Chart 2) are therefore likely to reflect high market returns on liquid assets relative to other assets. This was particularly true for the United Kingdom and the United States in 1974 when the equity market fell sharply. The United Kingdom has returned to roughly its pre-1974 level of short-term assets, while Canada and the United States have built them up considerably. This has largely resulted from the

Table D
Characteristics of real total returns, 1967–90

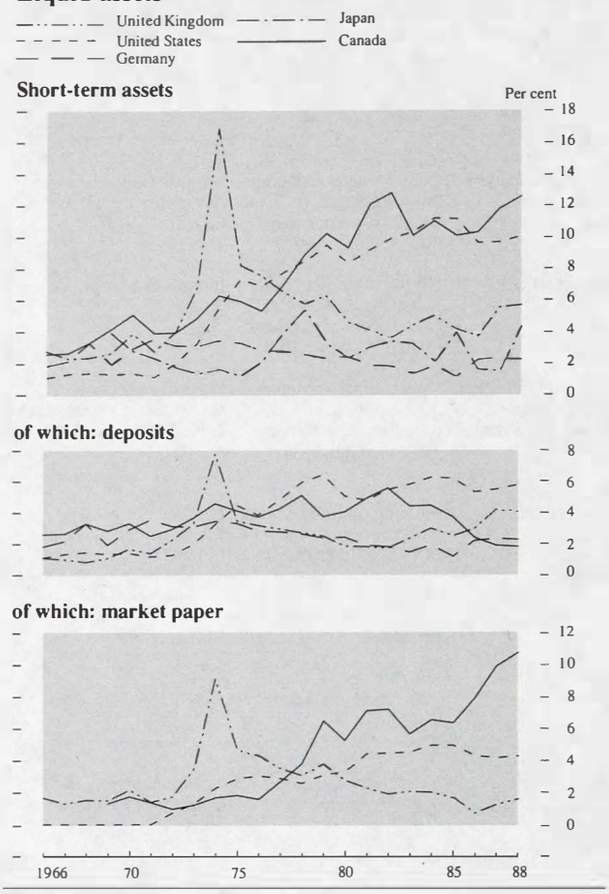
Mean *(standard deviation)* of real total (holding period) return in domestic currency

Per cent	United States		United Kingdom		Germany		Japan		Canada	
Loans	3.5	*2.9*	1.4	*5.0*	6.5	*1.9*	0.9	*4.3*	4.0	*3.7*
Mortgages	2.0	*13.4*	2.0	*5.2*	4.7	*1.4*	3.0	*4.9*	2.4	*12.3*
Equities	4.7	*14.4*	8.1	*18.9*	9.5	*20.3*	10.9	*19.4*	4.5	*16.5*
Bonds	-0.6	*14.4*	0.8	*11.1*	2.7	*14.9*	0.2	*12.8*	—	*12.1*
Short-term assets	2.0	*2.5*	1.7	*4.9*	3.1	*2.1*	-0.5	*4.6*	2.5	*3.3*
Property	3.4	*6.4*	6.7	*11.4*	4.5	*2.9*	7.2	*6.8*	4.6	*6.2*
Foreign bonds	1.5	*15.2*	-0.3	*16.0*	3.2	*12.3*	1.5	*14.9*	-1.1	*12.5*
Foreign equities	9.1	17.1	6.5	*16.4*	10.4	*14.8*	7.8	*19.6*	6.6	*14.9*
Memorandum item: Inflation (CPI)	6.0	*3.0*	8.9	*5.3*	3.5	*2.1*	5.5	*5.3*	6.4	*3.0*

(1) It should be noted that the data exclude pension funds administered by life insurance companies. The data are from national flow-of-funds tables and are not always at market value (eg US bonds and Canadian equities are at book value) and may exclude certain assets (eg US property). To maintain comparability, asset holdings combine domestic and foreign assets. Hence equities in Chart 6, for example, are both domestic and foreign. (In most cases, foreign asset data were obtained from separate sources.) For Japan data were only available for the period after 1969. Finally, in recent years the data may be partly misleading, given increased use of derivatives. A suitably hedged equity may have the characteristics of a bond (see the example on page 389)—although ownership of the company clearly remains with the equity holder.
(2) The table was constructed using annual average data on yields and prices drawn largely from the BIS macroeconomic database. Owing to lack of data, a number of bond price indices were estimated from changes in yields. This is of course only a sample over a relatively short period and does not necessarily indicate long run expected returns. For example the US real equity yield is thought to be over 8% higher than the risk free rate. (Reference: Ibbotson R G and Sinquefield R A, *Stocks, bonds, bills and inflation: historical returns*, Dow Jones Irwin, 1990.)

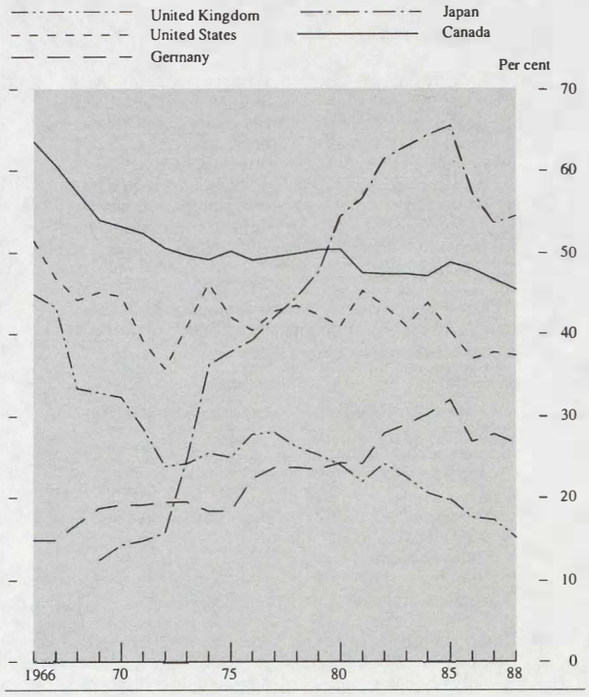
accumulation of market paper, though deposits have grown somewhat. These increases coincided with deregulation and expansion of short-term markets.

Chart 2
Liquid assets



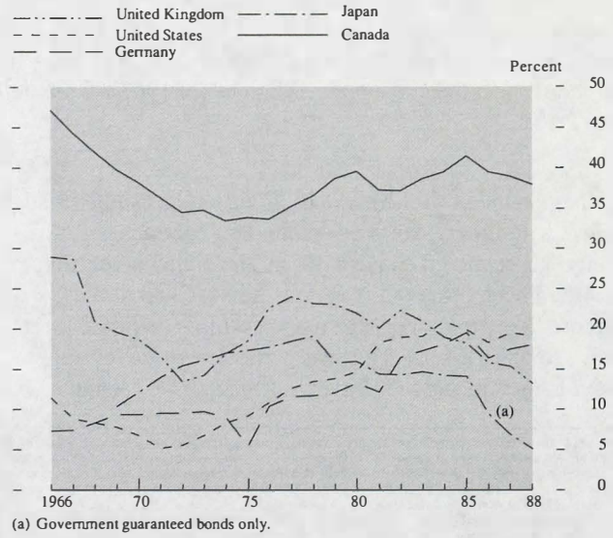
Bonds constitute a sizable proportion of pension fund assets in Canada and the United States, while their share has grown in Japan and Germany. In the United States (where regulations make it optimal to hold a large proportion of bonds despite their weakness as an inflation hedge[1]), Canada and Japan, bonds now form 40%–60% of pension funds' portfolios and 30% in Germany (Chart 3). In contrast, the bond share has fallen sharply in the United Kingdom, from 50% of gross assets to under 20% in 1988. This may reflect different liabilities; in other countries, such as Canada, only nominal returns are guaranteed, while in the United Kingdom a degree of inflation protection both before and after retirement is often expected. It also reflects alternative means of diversification; after abolition of exchange controls UK funds sold bonds to buy foreign assets. The patterns of bond holding may also relate to asset returns (see Table D); partly owing to low and stable inflation, real returns on bonds are relatively high in Germany while in other countries bonds have performed poorly. Part of the past growth of Japanese funds' bond holdings may reflect the high share of public bonds, purchased under government pressure, a practice that has now been abandoned.

Chart 3
Bonds



The share of *government bonds* in pension funds' portfolios has grown significantly since the mid-1970s in all of the countries studied[2] except the United Kingdom, where there was a contraction in the supply of public debt in the late 1980s (Chart 4). These shifts parallel the size of government deficits and corresponding *ex ante* real returns on such bonds. Except in Germany, where the bank bond market remains buoyant, *private bond* holdings of pension funds have tended to decline (Chart 5). Nevertheless, in the United States the share remains over 20%. The general decline partly reflects availability, but also a shift into public bonds (which are more liquid) and equities (which offer higher returns). Pension funds have generally not faced

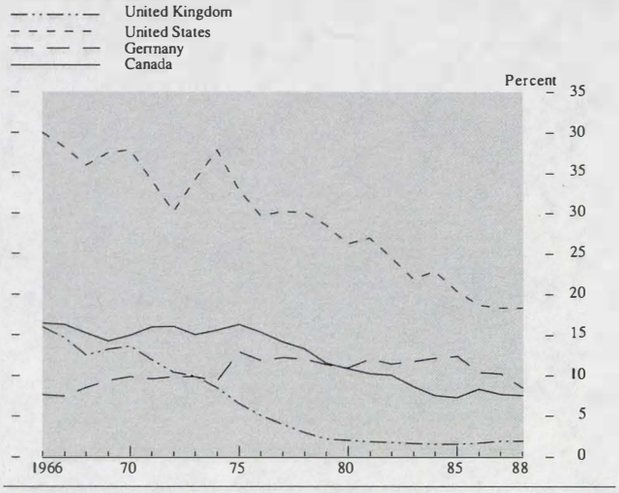
Chart 4
Public bonds



(a) Government guaranteed bonds only.

(1) See footnote 3 on page 384.
(2) The data for Japan in Chart 4 only show a subset of public bonds.

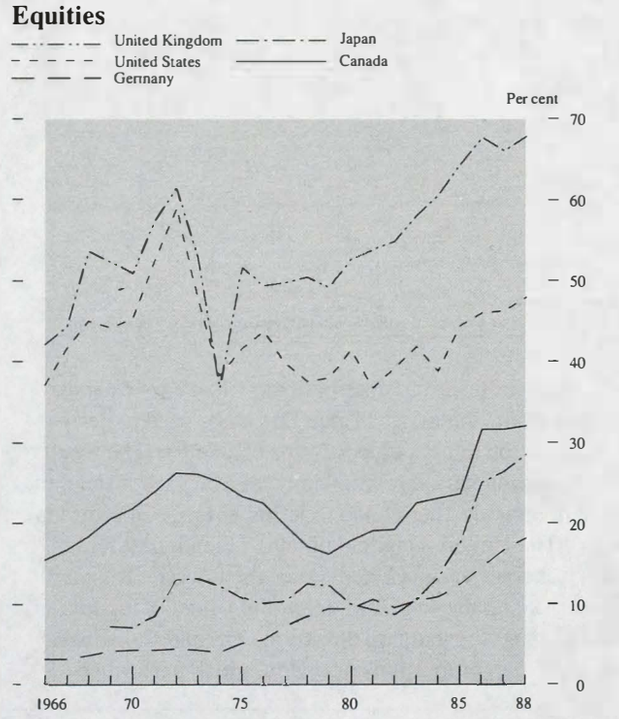
Chart 5
Private bonds



regulations against equity holding and have thus been able to take advantage of patterns of relative returns which have favoured equities over bonds (Table D).

Since in many countries pension funds may offer real returns (either in the sense of indexation to wages before retirement, or in some cases indexation after retirement), it is sensible to invest in 'real' assets such as equity and real estate.(1) The share of *equities* (including foreign equities) in the United Kingdom and Canada has grown significantly, as it has in Germany and Japan, though at a lower level (German funds are limited to a maximum of 20% by regulation). US levels in 1988 were only slightly above those in 1966, suggesting that an equilibrium equity proportion has been maintained.

Chart 6
Equities



Proportions in the United Kingdom, the United States and Canada were strongly affected by price instability in the mid-1970s, whereas the 1987 crash had little effect. Accounting conventions can have an effect on the chosen share of equities, particularly in the United States where a drop in market values can cause underfunding which has to be reflected in the employer's profit and loss account. In contrast, the UK standard permits long-run smoothing and hence enables funds to accept the volatility of equity returns.

Pension funds in all countries show a declining share of *mortgages* in recent years (Chart 7). *Loans* (largely to banks and companies) constitute a large proportion of German pension funds' assets (Chart 8), reflecting the structure of

Chart 7
Mortgages

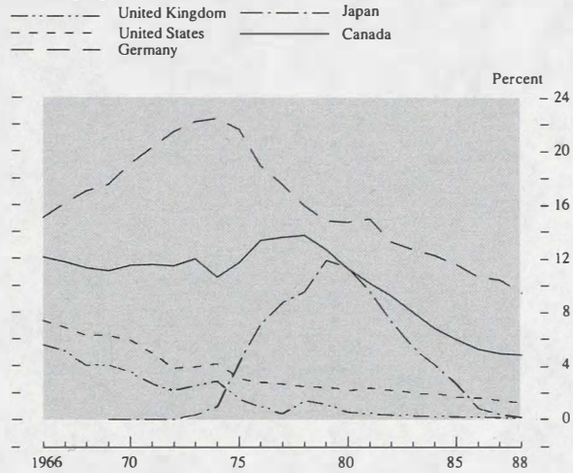
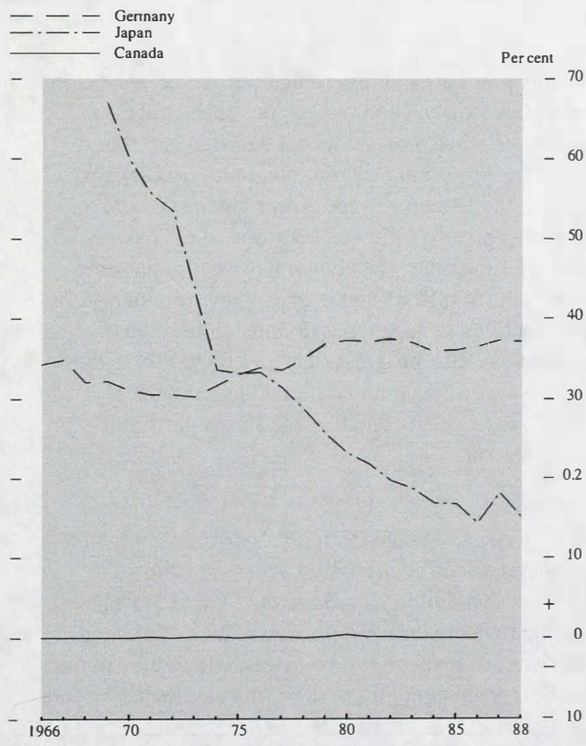


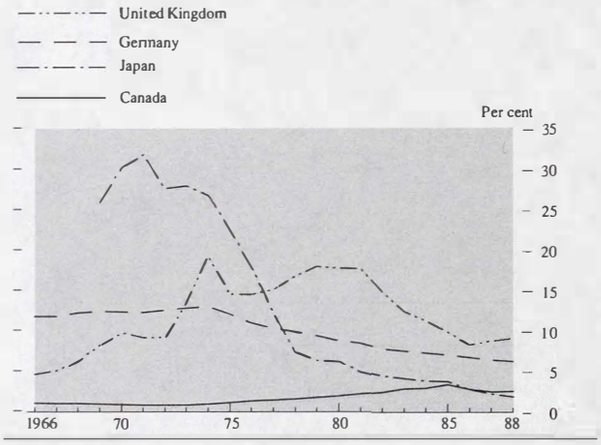
Chart 8
Loans



(1) However, Bodie Z (1990), 'Managing pension and retirement assets, an international perspective', *Journal of Financial Services Research*, Vol 4, pages 419–60, disputes the utility of equity as an inflation hedge and suggests investment in equities can be seen merely as boosting expected returns for the benefit of members.

German financial markets. In Japan, the share of loans has fallen sharply, although these medium-term floating-rate yen loans to firms were consistently the most profitable investment in Japan in the 1970s. It can be argued that this highlights a general point, that protection of fund managers from external competition (as was the case in Japan till recently) may lead to a sub-optimal investment strategy from the point of view of plan beneficiaries. The same applies to declining investment by Japanese pension funds in *property* (including equipment and real estate trusts) (Chart 9), which has fallen from almost 30% of the portfolio in 1970 to under 5% now. Property holdings in Germany, and in the United Kingdom, where much of the accumulation followed weakness of the equity markets in the mid-1970s, have also declined recently. Once UK equity returns recovered and exchange controls were abolished, property investment declined owing to its lack of liquidity and lower returns. Canadian holdings are small, and restricted to 7%.

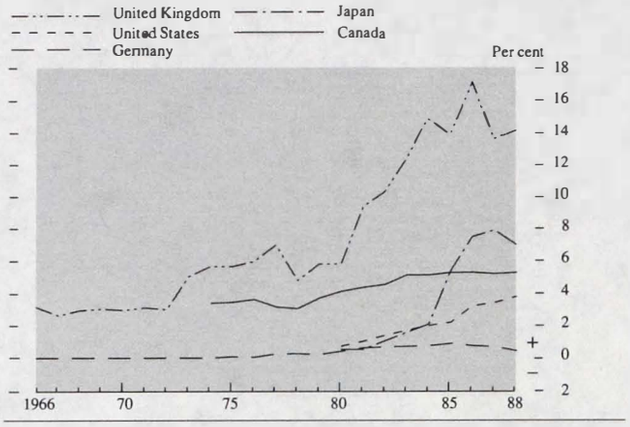
Chart 9
Property



In principle, international diversification can offer a better risk/return trade-off to fund managers and should also improve the efficiency of global capital markets. Chart 10 shows that *foreign asset holdings* have grown sharply over the 1980s in the United Kingdom and Japan. In both countries, this pattern followed abolition of exchange controls, at a time when the economies were generating current account surpluses and overseas investment returns looked attractive. In Japan, restrictions on overseas investment were also progressively eased over the 1980s. Growth was much less marked in the other countries (Chart 10); in Germany and Canada this is partly for regulatory reasons.[1]

The characteristics of pension funds' portfolios, which result from the asset selection discussed above, are shown in Table E. For the United Kingdom, the United States and Canada, the table reveals a comparative lack of change in the characteristics of pension funds' assets, which may in turn be related to unchanging aims. The main shifts have been a

Chart 10
Foreign assets



move from fixed interest to real assets by UK pension funds and into marketable and capital uncertain assets by Canadian funds. This observation suggests that many of the portfolio shifts discussed above did not imply changes in objectives, but rather an adjustment to market conditions within an unchanged set of goals in terms of real return, marketability, etc. Portfolios in Germany and Japan have been somewhat more fluid; one cause of this, as noted above, was the increased issue of government bonds, with a concomitant shift out of property and loans.

Table E
Characteristics of pension funds' portfolios

Proportions of total assets (a)

		United States	United Kingdom	Germany	Japan	Canada
Marketable securities(b)	1970	0.90	0.85	0.23	0.21	0.77
	1980	0.86	0.79	0.34	0.64	0.73
	1988	0.90	0.85	0.44	0.87	0.92
Real assets(c)	1970	0.45	0.61	0.17	0.37	0.23
	1980	0.41	0.70	0.18	0.16	0.20
	1988	0.48	0.77	0.24	0.30	0.35
Capital-uncertain assets(d)	1970	0.90	0.93	0.36	0.51	0.76
	1980	0.82	0.94	0.42	0.70	0.70
	1988	0.86	0.92	0.48	0.85	0.86
Long-term fixed-interest-bearing assets(e)	1970	0.51	0.32	0.69	0.14	0.65
	1980	0.43	0.24	0.76	0.54	0.64
	1988	0.38	0.15	0.73	0.54	0.51

(a) Categories overlap, so they do not add to unity.
(b) Equities, bonds and market paper.
(c) Equities and property.
(d) Equities, property and bonds.
(e) Bonds, mortgages (for Canada, the United States and Germany), other loans (for Germany).

The patterns of portfolio distributions (Charts 2–10) and risks and returns on assets (Table D) can be used to derive estimates of the returns on portfolios (Table F). The results differ if holding period returns on bonds are used instead of redemption yields, though the ordering in terms of return is similar. The United Kingdom obtained the highest real return, Canada and the United States the lowest. This partly reflects risk and the share of equity, the United Kingdom having the highest standard deviation. US and Canadian funds held high proportions of bonds, which performed

(1) For a discussion of life insurance companies' and pension funds' foreign investment see Davis E P, 'International diversification of institutional investors'.

Table F
Pension fund returns, 1967–88

Mean *(standard deviation)* of annual real returns in domestic currrency

Percent

	United States	United Kingdom	Germany	Japan	Canada
1 Using redemption yields on fixed-rate instruments					
Nominal	9.4 *6.1*	15.5 *8.7*	8.4 *2.6*	9.5 *4.4*	9.5 *3.7*
Real	3.2 *6.1*	6.3 *10.5*	4.8 *2.6*	3.7 *5.8*	2.9 *4.6*
2 Using holding period returns on bonds (all countries) and fixed-rate mortgages (United States and Canada)					
Nominal	7.5 *11.7*	15.1 *10.6*	8.5 *4.2*	10.6 *6.1*	7.5 *8.0*
Real	1.4 *9.7*	5.9 *12.2*	4.9 *4.6*	4.8 *9.2*	0.9 *9.5*

poorly over this period. Interestingly, Germany had a high real return and low volatility.[1] Comparison of the results with Table D shows the benefits of diversification in terms of lower standard deviations on the portfolio than on individual assets. However, the returns cannot be directly compared, as pension fund returns are free of tax, while assets held directly would not be.

Qualitative effects on capital markets

The impact of pension funds on the development of capital markets varies from country to country. For example, as regards *innovation*, in the United States ERISA codified the legal status of defined benefit corporate pension funds and imposed minimum funding requirements, sharply increasing demand for hedging by pension funds.[2] This has stimulated the development of immunisation strategies (to match assets to liabilities) based on long-term bonds. The requirement of a fixed duration for such instruments has stimulated innovations tailored to funds' needs such as zero coupon bonds, collateralised mortgage obligations and guaranteed income contracts (offered by life insurers); immunisation strategies also spurred development of markets for index options and futures. For example, pension funds writing call options on equities can be seen as converting them into short-term fixed-income securities for matching purposes. Portfolio insurance has been widely used for hedging. Meanwhile US funds have been in the vanguard of developing passive indexation strategies.

In the United Kingdom, the contribution of pension funds to innovation is less clear-cut. Many trust deeds used to prevent funds from using derivatives, though these regulations have been relaxed more recently. Taxation was also a discentive until the late 1980s (use of derivatives was counted as 'trading' and taxed). There also appears to be a more general difference in attitudes between UK and US managers to innovation.[3]

Institutional investors can influence the *demand for capital market instruments* in several ways; by influencing the rest of the personal sector's portfolio distribution between bank deposits and securities, by the institutions' own portfolio choices, and by influencing the total supply of saving.

In the Anglo-Saxon countries, econometric results[4] suggest that the growth of institutions has been accompanied by a shift by persons from securities to deposits, not matched in Germany and Japan. Securities are increasingly held in the Anglo-Saxon countries by large, informed, risk-averse investors facing low transactions costs. Such a capital market should sensitively reflect information on firms' performance. This is confirmed by econometric analysis[5] of the portfolio distributions of pension funds, which shows they are strongly influenced by relative asset returns, particularly where there are few regulations governing portfolio distributions and low transactions costs, as in the United Kingdom and the United States. Adjustment to a change in such returns is generally rapid. This implies an efficient allocation of funds. These results do not all hold where transactions costs are high and regulations are strict—eg, in Germany, Japan and Canada. In these countries adjustment to a change in returns is somewhat slower, suggesting a less efficient allocation of funds. The results also contrast with those for households and companies[6] where adjustment to changes in returns tends to be slow, due to higher transactions costs and poorer information. Meanwhile, the literature suggests that institutionalisation has not had a strong effect on total personal saving, increased saving via institutions being largely offset by declining discretionary saving. While the scale of benefits of a private pension system may have an effect on saving, funding as such should not.[7]

A further qualitative question is whether institutionalisation increases *capital market volatility*. Some commentators in the United States blamed fund managers' portfolio insurance strategies for causing volatility at the time of the 1987 crash, although this is disputed. However, regular performance checks against the market (as frequently as monthly in the United States, but less in the United Kingdom) may induce 'herding' among funds to avoid performing significantly worse than the median fund. Interviews with fund managers suggest this may be an important cause of volatility in both domestic and international markets.[8] The Japanese also appear to suffer from this despite a less competitive environment for managers. Regular performance evaluation is also said to underpin the short-termist hypothesis, that willingness of funds to sell shares in takeover battles (to maintain performance) discourages long-term investment or

(1) The high returns may appear to justify the conservative asset distribution of German funds. Growing integration of financial markets, however, should mean this asymmetric performance is unlikely to be repeated, and portfolio regulations locking funds into this type of distribution remain difficult to justify.
(2) See Bodie Z, 'Shortfall risk and pension fund asset management'.
(3) See Davis E P (1988), 'Financial market activity of life insurance companies and pension funds', Bank for International Settlements Economic Paper No 21, BIS, Basle, 1988 and 'International diversification of institutional investors'.
(4) Davis E P, 'Financial market activity of life insurance companies and pension funds' and bibliographical references.
(5) Davis E P, 'Financial market activity of life insurance companies and pension funds'.
(6) Davis E P, 'Portfolio behaviour of the non-financial private sectors in the major economies'.
(7) Funding is rather a transfer of securities from the sponsoring firm to the market, which collateralises the liabilities, reduces risk of non-payment (because of diversification) and gives scope for voluntary increase in pensions when returns are high.
(8) See Davis E P, 'Financial market activity of life insurance companies and pension funds' and 'International diversification of institutional investors'.

research and development. Evidence is scant, but there is widespread agreement that other means of exerting corporate control, besides takeovers, should be more widely used by institutions.[1]

Countries with *large pension fund sectors* tend to have *well-developed securities markets*, while others (Germany, Italy) do not. There is a question of which comes first.

Some arguments suggest developed capital markets must come first. For example, although pension funds could develop on the basis of loans or property investment, their greatest comparative advantage is in the capital market. Loans require monitoring so the customer relationship may give banks a comparative advantage. Trading and risk pooling as performed by pension funds are more efficiently undertaken in the capital markets where transactions costs are lower, although these need not be domestic markets if there are no exchange controls and funds can invest in developed capital markets elsewhere. Moreover, if one of the spurs to development of protection in retirement is income equalisation[2] (as well as rising average incomes), this may with a well-developed capital market simultaneously provide the means for development of funded schemes (reduction of personal equity holdings) which is absent in a system dominated by banks. States might be more likely to opt for a generous social security scheme in the latter case.

On the other hand, unlike pay-as-you-go social security schemes where there can be an immediate transfer of income to those who have not contributed (who are old at the outset), in funded private schemes the assets are built up while they are maturing and this stimulates investment and the development of securities markets. (This effect is of course offset if others reduce securities holdings or saving differentially in the case of private funded and social security pensions.) The discussion above is also relevant here, for example in that it suggests funds may increase market efficiency.

Conclusions

Prospects for further pension fund growth differ between countries. In the Anglo-Saxon countries most company funds are mature and therefore any significant growth is likely to stem from broadening of the coverage of private pensions across the labour force. The success of personal pensions in countries such as the United Kingdom indicates considerable scope for this. In Japan and Germany immaturity of company schemes suggests further growth is likely. But more generally, in many countries (notably in continental Europe) future demographic pressures on pay-as-you-go social security are likely to lead governments to seek to stimulate growth of private pensions as a substitute for social security. If such countries were to develop schemes equivalent to those in the United Kingdom, the sums involved would be sizable. The article has indicated a number of ways by which such growth can be stimulated; for example by changes in taxation of pensions and alternative assets, the level of state benefits, the ability of employees to opt out of the state scheme, personal pensions, legislation on the nature of benefits and legislation on provisioning.

In a European context it is also relevant to note that the EC proposes legislation to liberalise provision of personal and corporate funded pensions, although the process is still at a consultative stage. A draft Directive has been drawn up on pension schemes which addresses the following issues: first, the freedom to offer services across borders (in other words, ensuring administration and fund management can be conducted in another member state); and second, the liberalisation of investment throughout the Community. Meanwhile, discussions continue on a third proposal contained in a recent consultative paper, namely the freedom of cross-border membership of pension schemes. This is seen as the most difficult issue, mainly owing to fiscal differences, as well as the need for countries to agree on funding standards. However, agreement on these three issues could clearly facilitate development of pension funds in continental European countries currently dependent on pay-as-you-go schemes.

(1) Charkham J P, 'Corporate governance and the market for control of companies', Bank of England ***Panel paper No 25***, and 'Corporate governance and the market for companies: aspects of the shareholders' role', Bank of England ***Discussion paper No 44***.
(2) Others may be lower population growth, increased life expectancy and social change which reduces the role of the extended family.