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**FINANCIAL MARKET ACTIVITY  
OF LIFE INSURANCE COMPANIES AND  
PENSION FUNDS**

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“Pension schemes have assets exceeding £100 billion and now dominate the collection of long-term personal savings and their investment. This gives pension funds a key role in the capital market, with whose working the Bank has a general concern and in which also, as manager of the national debt, it has a special interest.”

Lord Richardson of Duntisbourne, former Governor of the Bank of England, in the third Shell International Lecture, St. Andrews, 2nd November 1983.

The impetus to innovate. John G. Heimann, a former US Comptroller of the Currency and New York State Banking Superintendent, now Vice-Chairman of Merrill Lynch Capital Markets, told the opening session of the conference that “fundamental forces are reshaping the world’s financial markets and banking systems”. He identified these forces as (1) the increasing domination of stock and bond markets by such institutions as pension funds and insurance companies; (2) the impact of technology; (3) the global spread of deregulation and competition; and (4) attempts to cope with high inflation and volatile interest rates and exchange rates.

Speech to a conference on Innovation in the Capital Markets, New York, 26th June 1986.



## Abstract

An important development in the financial markets of several industrial countries in recent decades has been the growth of long-term institutional investors and their increasing domination of the capital market. Aided by both demographic and financial market trends, it seems likely that this development will continue in the future. However, the nature and the importance of this change – including the global dimensions of the trend towards institutionalisation – have often been overlooked or underestimated by market commentators and observers. Even fund managers themselves are often unaware of the conditions faced by institutional investors in other countries.

This paper sets out to remedy these lacunae by providing a detailed survey of the behaviour of long-term institutional investors in the capital markets, thus offering a background for informed discussion of policy and of likely future developments. The principal aims of the study are to show the *causes* of institutional growth, the *nature* of institutional investors and the *implications* of their activities and growth. The paper is in the form of a transnational comparison of institutional sectors in the United Kingdom, the United States, Germany, Japan and Canada. The study draws on material from interviews with fund managers, econometric and statistical analysis, and studies of the individual countries' financial sectors.

After an introduction and brief definition of the business of life insurance and pension provision in general terms, the paper shows the levels and changes in size of the institutional sector in the five countries over the last twenty years. The size of the sector is obviously a key determinant of the degree to which institutions dominate financial intermediation. Underlying *causes* of growth can then be analysed against the background of these country experiences. Rates of return, taxation and portfolio regulation are particularly highlighted, and it is noted that taxation and regulation are at least partly policy variables. The analysis thus shows how

policy-makers may sustain or reduce the growth of institutions. The portfolio distributions of the institutional sectors are then similarly analysed. Given the size of institutions, portfolio distributions give an idea of the degree to which institutions have influenced the locus of intermediation between securities markets and bank lending. Determinants of historical shifts in portfolio distributions are suggested. Although relative rates of return are important, as might be expected, portfolio regulation and the nature of institutions' liabilities also have a clear influence.

Following these largely historical and descriptive sections, the paper analyses the current behaviour of institutions in detail, using as raw material interviews with fund managers, and estimates the effects of institutions on the capital market econometrically. These sections allow the *implications* of institutional growth to be assessed, as well as giving further detail on the *nature* of institutions. In the analysis of current behaviour the participation of institutions in financial innovation is assessed, together with recent changes in organisation and behaviour in relation to fund management. Results suggest, *inter alia*, that institutions – in contrast to popular belief – are rather cautious in their response to financial innovation, though their behaviour and organisational structures are in a state of flux. In the econometric analysis, the effects of institutions on the demand for different capital market instruments is assessed both directly and via their effects on personal sector behaviour. Results of other studies which have estimated the effects of institutions on saving are also reported.

These complementary analytical sections give a view both of the current influence of the institutional sector on capital market developments and of the average effects of institutional behaviour on capital markets over the historical period. On balance, it is concluded that institutions are beneficial to the capital market. For example, they may increase both the supply of funds and the efficiency of the allocation of funds. On the other hand, there are some reservations regarding their increasingly short-term investment horizons in some countries.

The growth of institutions raises certain policy issues, for example regarding their tax-privileged status and the usefulness of portfolio regulation. The analysis given in the paper casts light on some of these issues. For example, given the conclusion that institutions are beneficial to the capital market, their tax privileges may be justified, though it is noted that some arguments may be advanced against these. Meanwhile, laws enjoining prudent portfolio diversification are probably superior to controls on portfolio distribution as a means of prudential control, given the low rates of return and potentially higher risk that strict portfolio controls entail. Finally, experience in the United States suggests that government guarantees of fund assets may prove costly unless some control is exercised over the circumstances in which plans may be terminated.

# FINANCIAL MARKET ACTIVITY OF LIFE INSURANCE COMPANIES AND PENSION FUNDS<sup>1</sup>

## I.

### Introduction

The growth of institutional investors in capital markets has been a notable feature common to many of the financial markets of advanced countries in recent years. This paper assesses the nature and implications of this trend by means of a transnational analysis of the activities of the most important institutional investors, the so-called "long-term" institutions, that is, life insurance ("assurance" in the United Kingdom) companies and funded pension schemes.<sup>2</sup>

Both life insurance companies and pension funds are largely concerned with the provision of security to the household sector, in terms respectively of income to dependents after death (or, increasingly, as an instrument for pure saving) and of income for the principal and family after retirement. Demand for both types of

<sup>1</sup> The author thanks P. Andersen, G. Bingham, J. Bisignano, E. Koch, A.R. Threadgold and fund managers in London and New York for helpful comments and suggestions. The errors remain his own.

The following general references were used throughout. For empirical and institutional aspects: International: Gabrielli et al. (1986). Japan: Brontë (1982), OECD (1985), Financial Times (1986a). United States: Dougall and Gaumitz (1980), Henning et al. (1981), Robinson and Wrightsman (1980). United Kingdom: Dodds (1979), Peasnell and Ward (1985), Mimms (1980), Fanning (1982), Wilson Committee (1979), Financial Times (1986b), Bank of England (1986). Canada: Denny and Rea (1979), Neave (1981), Schearer et al. (1984). Germany: Bruns and Häuser (1982, 1983), Pfaff et al. (1979), Anglo-German Foundation (1981), Nardoizzi (1981), Deutsche Bundesbank (1984). For technical and theoretical aspects: Bodie and Shoven (1983), Corner and Mayes (1983), Richardson (1983), Bank of England (1983), Prodano (1987). Other references are given in the text or at the start of each section.

<sup>2</sup> The discussion concentrates on these two types of institution and thus does not discuss "unfunded" pension schemes, which do not affect capital markets in the same way, or mutual funds ("unit or investment trusts" in the United Kingdom), in which the pattern of behaviour of liabilities is rather different, and which do not generally benefit from tax privileges.



provision is likely to increase when the average age of the population rises, as is the case in many countries at present. Compared with banks, the liabilities of both institutions are predictable and long-term, the main risks being actuarial risk, i.e. the risk that the death rate of beneficiaries will not be as predicted,<sup>3</sup> and the “market” risk that assets accumulated will not earn a sufficient rate of return to cover promised payouts. Life insurance companies also face the risk of early surrender of policies.

The growth of the long-term institutions is shown in Table 1.1 below, from which it can be seen that the share of household sector assets held by life insurance companies and pension funds has grown strongly in the major industrial economies, though a distinction may also be drawn between the Anglo-Saxon countries (United States, United Kingdom and Canada) and Germany and Japan. The higher level of institutional investment in the former largely reflects the greater historical importance of the capital markets in these economies relative to the banking system, as well as the level of benefits offered by social security pension schemes. However, more recent developments, such as the ageing of the population and resultant pressure on public social security systems in Japan and Germany, suggest that a degree of convergence is likely in future, as is discussed in Section III.

Table 1.2 shows the growing preponderance of the long-term institutions in the financing of the public and corporate sectors – and hence in the capital markets – which has been permitted by the increasing inflows from the personal sector. This paper explores the causes and the implications for the capital markets of this shift to long-term institutional investment. Following a discussion of certain important economic aspects of life insurance and pension business (Section II), it is shown how long-term investment has been divided between life insurance and pension business, and an analysis is made of some of the key factors underlying these shifts, many of which are

<sup>3</sup> The actuarial risks differ somewhat between life and pension funds; for the former, the risk is that people die *sooner* than predicted; for the latter, the problem arises if they die *later*.

Table 1.1  
Equity in life insurance and pension funds as a proportion of  
personal sector financial assets

	1970	1980	1985
	as a proportion of gross personal financial assets		
United Kingdom . . . . .	0.22	0.34	0.42
United States . . . . .	0.15	0.17	0.19
Canada . . . . .	0.21	0.19	0.24
Germany . . . . .	0.13	0.15	0.16
Japan . . . . .	0.08	0.09	0.11
Japan (including postal life insurance)	0.12	0.14	0.16

Sources for all asset data in this paper, unless otherwise stated:

*United States:* Flow of funds, assets and liabilities outstanding (Board of Governors of the Federal Reserve System);

*United Kingdom:* Financial statistics (Her Majesty's Stationery Office);

*Canada:* The National Balance Sheet Account 1961-84 (Statistics Canada);

*Germany:* Deutsche Bundesbank Monthly Report (Deutsche Bundesbank),  
Bundesaufsichtsamt für das Versicherungswesen;

*Japan:* Bank of Japan Economic Statistics Annual (Bank of Japan).

themselves policy instruments. The discussion thus allows one to assess how governments can influence the process of institutionalisation (Section III). In Sections IV and V a study is made of how the composition of institutions' portfolios has changed over the years, and it is discussed whether this has involved changes in risk, returns, maturity and other aspects, using as a background the estimates of means, variances and covariances of real yields presented in the Appendix. Information regarding asset holdings shows the importance of the life insurance companies and pension funds in funding the various borrowing sectors and as holders of the various capital market instruments.

Some idea of the influence of the institutions on the behaviour of markets and on structural change, and some implications for the future may be drawn from an analysis of recent developments in institutional behaviour at a micro level. Section VI therefore

Table 1.2  
Share of life insurance and pension funds in public  
and corporate finance

		Public sector <sup>1</sup>	Corporate sector <sup>2</sup>
		as a proportion of total liabilities	
United Kingdom	1970	0.12	0.15
	1980	0.21	0.23
	1985	0.30	0.38
United States	1970	0.04	0.19
	1980	0.11	0.25
	1985	0.16	0.27
Canada	1970	0.09	0.06
	1980	0.10	0.06
	1985	0.12	0.08
Germany	1970	0.03	0.05
	1980	0.04	0.10
	1985	0.06	0.10
Japan	1970	0.01	0.04
	1980	0.02	0.05
	1985	0.02	0.06

<sup>1</sup> Holdings of public bonds divided by gross public sector debt.

<sup>2</sup> Holdings of corporate bonds, equities and corporate loans divided by gross corporate sector liabilities (including equities).

analyses in detail recent developments in organisation, techniques and instruments employed, using as a source of information interviews with fund managers and other experts.

The historical changes in portfolio distributions and the information regarding institutional techniques provide the background for a modelling exercise in Section VII in which an econometric assessment is made of the effect of institutionalisation on the supply of funds to the capital market, both via the growth of institutions on households' portfolios and via the determinants of institutions' own portfolio demands.

Finally, in the concluding section, Section VIII, some further policy aspects are considered, notably taxation, prudential and supervisory aspects (government guarantees, controls on portfolio distributions), in addition to those brought up in the earlier discussion.

## II.

### **Aspects of the business of life insurance and pension provision<sup>4</sup>**

A discussion of the nature of the institutions' business provides an essential background for the analysis which follows. This section first examines the factors that life and pension business have in common, before going on to discuss contrasts. The following section shows that, while some parallels may be drawn between life and funded pension business, it would be wrong to regard the combined sector as homogeneous. The contrasts have important implications for the capital market behaviour of the life insurance and pension sectors.

Both types of institution are concerned with the investment of funds which flow in regularly on a contractual basis to meet fairly predictable long-term liabilities owed to the household sector. The institutions therefore contrast with banks principally in the *nature of their liabilities*. Banks face the problem that actual maturities of their deposits are difficult to foresee; hence they require a relatively large proportion of liquid funds to be able to meet such demands. The institutions, having both long-term assets and liabilities, face little such liquidity risk, barring that related to the early surrender of life policies or to heavy demand for policy loans (for life insurance) or early retirement (for pension funds). With the exception of these cases, premature withdrawal of funds is either difficult or impossible, and institutions receive a steady inflow of funds in the form of premiums for life insurance policies and regular

<sup>4</sup> References: see footnote 1, but in particular Rose (1983) and Friedman (1986).

contributions to pension plans. Individuals rarely fail to make such contributions. The institutions' principal risks relate to inaccurate estimates of death rates, lower-than-expected rates of return on the asset portfolio and, in the case of pensions, unexpected changes in earnings which alter contributions and benefits.

Given the nature of their liabilities, they may therefore concentrate their *portfolios* on long-term assets yielding the highest returns, compensating for the increased risk by *pooling*, i.e. diversifying the portfolio across instruments the returns on which are imperfectly (or, ideally, negatively) correlated. Modern portfolio theory suggests that pooling can eliminate unsystematic risk which arises from the different performance of individual firms and industries but not systematic risk arising from the performance of the economy as a whole. However, to the extent that national trade cycles are imperfectly correlated, international diversification may also reduce systematic risk. Besides being important for its influence on the nature of institutional investment (it is also used by such institutions as mutual funds, and the same principles apply to banks and other economic agents), risk pooling across a wide spectrum of financial and real assets is facilitated by the large size of the individual institutions, which results in lower information and transactions costs and allows them to invest in large indivisible assets. The resulting high yield is one explanation of the growth of such institutions; the household sector has switched part of its portfolios to take advantage of this, while balancing the disadvantages of the relative illiquidity of such claims. There are, however, other important reasons for the growth of institutions.

In particular, *tax deferral* means that tax is only paid on pensions at the time of receipt, rather than while interest and capital gains are being earned. If payment is made after retirement, the recipient will often be in a lower tax bracket. In some countries the purchase of life insurance is also favourably treated for taxation purposes. Additionally, contributions to pension funds are generally tax-deductible, and (in the United Kingdom) tax-free lump-sum withdrawals on retirement are permitted. Such benefits make

institutional investment highly tax-efficient and further raise the post-tax yield.

Apart from the administration of contributions received and benefits paid, the main activity of life insurance and pension funds (and the focus of this paper) is the *management* of accumulated funds. Managers aim for a high return at a given level of risk; obviously a superior performance is likely to lead to more business. In most cases fund management may be characterised as a two-stage process: firstly, choice of the asset mix (bonds, equities, foreign assets), which is likely to determine the overall return and risk on the portfolio; secondly, the selection of individual assets within the broad categories (shares of a particular company, bonds of a particular maturity). Typically, the asset mix is the responsibility of the chief fund manager concerned with long-term strategy, while selection is the field of the individual specialist investment manager. Errors in asset mix may arise from misjudgement of the potential profitability or risk of investment in an asset or sector, while errors in selection involve choice of the wrong security within a broad group. In principle, timing is another important choice variable: in fact, for a fully invested fund timing of investment is largely dictated by the cash flow. Fund managers may be judged on their asset mix and selection performance by reference to a sample of similar managers, or by reference to market indices. However, measurement of performance vis-à-vis other fund managers is a better means of assessing risk. Some would argue that, net of transactions costs, active fund management for a given level of risk is unlikely consistently to outperform a passive index-matching portfolio<sup>5</sup> in an efficient market (see Malkiel (1984)). We discuss this further in Section VI below.

One key difference between life and pension business is the *contractual annuity* aspect of pension funds. This generally entails the preclusion of lump-sum withdrawals (except in the United Kingdom), even during the period when claims are payable after

<sup>5</sup> Where shares and bonds are held in proportion to the market index.

retirement. Given the additional key factor of *guarantees* by the firm and back-up by the government, workers are ready to renounce the liquidity of their claims. This is not true to the same extent of life insurance, as policies can often be cashed in. In order to be compensated for loss of liquidity, holders of pension claims must be rewarded by higher returns, which funds are able to supply (in practice, by promising a real return tied to future salaries instead of a nominal commitment<sup>6</sup> as typically made by life insurers), because contractual annuities allow a greater risk to be taken on the asset side. For example, the author's estimates for the United Kingdom suggest that mean real returns for pension funds were 5.1 per cent. over 1966–85, compared with 3.5 per cent. for life insurance, while the variance of the real return for pension funds was 18 per cent. higher.

Important aspects and definitions are now discussed for each business in turn, commencing with life insurance. The size of life insurance companies' portfolios in the capital markets is largely a result of their "non-term" business. A *term policy* provides insurance cover for a specified period against the risk of death during that period. Term policies can be renewed, but at a more advanced age buyers of life insurance will face higher premium rates because the risk of death is greater. These term policies, which may be characterised as pure "insurance" policies, do not provide large sums for investment. Large quantities of financial assets only arise in the case of policies which have a *saving* as well as an insurance element. Examples are "whole life" policies, which offer a lump sum to dependents on death, whenever it occurs, in return for a constant annual premium, or "endowment" policies, which offer a similar lump sum after a fixed period. In each case the lump sums arise from the premiums paid plus accumulated capital gains, dividends and interest. Funds accumulated under these policies are substantial, and will grow in the long term as long as the volume of policies sold exceeds the payments on matured policies. Historically, offered

<sup>6</sup> Especially in the United Kingdom, life insurers are now increasingly also offering real returns.

yields on life insurance in most countries have been fairly low, thus permitting a cautious investment strategy concentrated on long-term bonds. However, intensifying competition and problems of inflation have changed this situation in several countries, as will be seen.

Pension funds offered by employers provide income for employees during retirement, though there is also an insurance element (for example, widows' pensions payable in the event of death in service). As pointed out above, their attraction for employees stems largely from taxation benefits and economies of scale in administration, though an important additional factor may be generally imperfect capital markets. In this context pension funds represent a long-term contract which shares risks between employee (uncertainty of the pension, especially in real terms) and employer (future costs that are more uncertain than wages). However, it should be pointed out that employers have additional incentives to develop such schemes. This is because labour turnover is a cost to employers, and a pension fund is a convenient way of reducing it insofar as vesting and leaving conditions - which typically penalise early leavers - reduce voluntary leaving rates. (Pension funds could also therefore be seen as a source of inflexibility in the labour market.)

Pension funds which accumulate financial assets to pay retirement benefits are known as *funded* schemes. In most countries funding offers tax advantages and, so long as funds are set up as independent trusts, increases the priority of pension claims relative to other creditors should the sponsoring firm go bankrupt. *Non-funded* or pay-as-you-go schemes pay pensions from the current income of employees and firms, and do not have a direct effect on capital market activity (though indirect effects on household saving may be important). Most national social security schemes are of the latter type. An intermediate position is occupied by *booking*, whereby pension liabilities are put on a firm's balance sheet but not funded except implicitly by the growing capital and financial assets of the firm in question. (In an efficient capital market the share price will decline to the extent that the liabilities are not covered in this



way; for evidence see Feldstein and Morck (1983).) Such schemes, which are attractive to firms in offering “free” capital, are often insured by other institutions, to cover the relatively high risk of a fund implicitly invested in only one company.

Funded pension schemes may be of two types, *defined benefit* and *defined contribution*. In the former, an undertaking is made by employers to pay employees some percentage of average or final salary in pensions. Implicitly the employees are trading wages for pensions, given the implicit guarantee from the employer, at the going long-run real rate of return in the capital market. This trade is more explicit in the *defined contribution* case, where contributions are fixed, and benefits vary with market returns. However, defined contribution plans have declined since the early 1970s, given the failure of capital market returns in that decade to keep up with inflation. Obviously, this also affects defined benefit plans, but in this case firms are obliged to make topping-up payments to keep the schemes in actuarial balance: more risk is carried by the firm, instead of the employee. However, if the firm’s aim is to retain employees, this is more likely to be achieved with a defined benefit scheme, owing both to this risk-sharing element and to the fact that rewards increase with length of service.

Returns on pension fund assets tend to exceed those on life insurance; as noted, this is partly due to the nature of the liabilities, but also to the fact that under defined benefit schemes firms have an interest in obtaining high rates of return in order to minimise their contributions per unit of pension paid. This process may be aided by the method of fund management; pension funds may be managed by many institutions, for example banks, life insurance companies and firms themselves. Intense competition among institutions for such business, and the facility of measuring performance, as noted above, help to drive up returns. By contrast, life insurance may only be offered by insurance companies, which are often mutual (i.e. non-profit-making); thus competition within the industry may be less intense. A third factor may be that life insurers’ portfolios are more strictly regulated than those of pension funds in many countries.

Such regulations may have tied life companies into holding relatively low-yielding assets.

Assets in pension funds will increase rapidly in the long run as long as funds are “immature”, (i.e. assets are less than long-run liabilities, because there is not yet a long-term distribution of working and fully insured retired members). Maturity generally does not arise for many years after a scheme is initially set up. Assets will increase in a mature defined benefit scheme at the same rate as final average earnings, though the ratio of assets to liabilities will remain constant. Growth of schemes is also aided to the extent that “vesting” is imperfect, i.e. early leavers do not obtain a proportionate share of benefits in return for their contributions, which is common in defined benefit schemes. As well as differing in rates of growth, funded pension systems differ between countries in the size they eventually attain in relation to GNP or the financial market. The next section gives an analysis of the determinants of size and growth drawn from the historical experience of five countries.

This section has highlighted some of the similarities and differences between life insurance companies and pension funds. It has been suggested that a key difference lies in the “contractual annuity” aspect of pension funds, combined with the guarantee from the employer to “top up” the fund when necessary, which together enable pension funds to offer contracts in real terms, while life insurance companies have traditionally offered nominal returns. The next section examines the behaviour of life insurance companies and of pension funds in practice, using historical data.

### **III.**

#### **Trends in the total assets of life insurance and pension funds<sup>7</sup>**

This section shows the relative levels and changes in the size of institutional investors in the five countries and relates these differences to the underlying determinants of institutional growth.

This analysis identifies a series of important influences on the process of institutionalisation which may be useful as a background for the formulation of policy and a prediction of likely future trends, as well as for the interpretation of historical patterns.

*1. The size and growth of institutional investors*

Graphs 3.1 and 3.2 show the magnitude of the long-term investing institutions' portfolios in relation to personal sector gross financial assets and to GNP in the five countries studied. In each case the sector has grown over the last twenty years. The data show a clear difference between the Anglo-Saxon countries, i.e. the United States, Canada and the United Kingdom, and the others.<sup>8</sup> Graphs 3.3 and 3.4 show the extent to which the growth and current levels of the share of personal sector assets held in the form of institutional investment have come from life insurance and from pension fund business. In general, pension funds have tended to grow more rapidly than life insurance. However, conditions in the five countries differ widely.

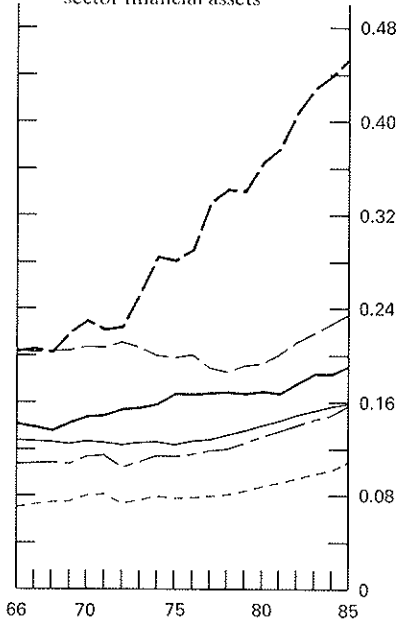
As regards life insurance, growth has been extremely rapid, albeit irregular, in the United Kingdom. The life insurance sector has also grown since the mid-1970s in Germany and Japan, especially if, for the latter, public sector postal life insurance is included. On the other hand, life insurance in the United States and Canada has fallen sharply as a proportion of personal sector assets, though in the first case the growth in pension fund business (equal to the gap between the two lines for the United States) has helped to offset the decline. For Canada, in flow terms, in the 1960s one-quarter of personal sector saving was directed to life insurance, compared with only one-eighth in the 1980s. Concerning levels, the assets of the UK life insurance sector now represent over 20 per

<sup>7</sup> References: see footnote 1, also Suzuki (1983), Curry and Warschawsky (1986), Davis (1986) and references therein.

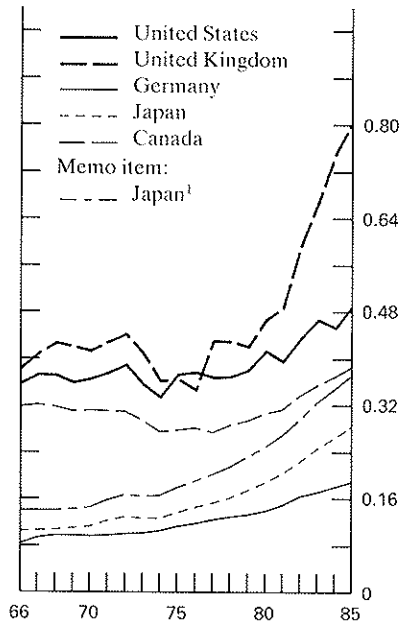
<sup>8</sup> It should be noted that the denominator of the portfolio share in the case of the United States includes "equity in non-corporate business" which is not included elsewhere. Exclusion of this would make the institutional share somewhat higher.

## Trends in total assets of life insurance and pension funds

3. 1 As a proportion of personal sector financial assets



3. 2 As a proportion of GNP



<sup>1</sup> Including Postal Life Insurance.

cent. of personal sector assets, while in Germany and Japan the share of the sector is 13–14 per cent., and in the United States and Canada it amounts to less than 10 per cent. Levels were far more disparate in 1985 than they had been in 1966.

In the case of pension funds, the United Kingdom again shows both the most dramatic growth and the highest level: 25 per cent. of personal sector assets in 1985. Growth in that country has been particular rapid since 1974. Just under half the UK workforce is covered by private pension schemes, though the proportion has not tended to increase. In the United States, too, pension funds have risen sharply from 7 per cent. to over 17 per cent., if pension funds

administered by life insurers<sup>9</sup> and individual retirement accounts (discussed further below) are included. In Canada growth has been similarly rapid. Meanwhile, the contrast noted above between the size of institutional sectors in the Anglo-Saxon countries vis-à-vis Germany and Japan is shown to spring from the small size of the pension fund sector in the latter countries. Though growing rapidly in Japan, pension funds (administered by trust banks)<sup>10</sup> still represented only 2 per cent. of personal sector assets in 1985. In Germany the size of funded pension schemes has remained between 2 and 3 per cent. throughout. These comparisons partly reflect differences in definition: thus, some pension funds in Japan are administered by life insurers and hence are included in Graph 3.3. In Germany only fully-funded independent pension schemes are shown. This excludes the practice of “booking” pension liabilities into firms’ balance sheets, which is common in that country. However, these differences do not overturn the basic contrast in the degree of institutionalisation of personal sector finance between the Anglo-Saxon and other countries.

<sup>9</sup> Funded pension schemes in the United States are run by private companies, by state and local government and by life insurers, often on behalf of other firms (the Federal Government also runs the Railroad and Civil Service schemes, but these funds are invested purely in special government debt). The relative size of the other pension funds is shown below.

	As a proportion of total pension fund reserves, end-year		
	1966	1975	1985
Private pension funds . . . . .	0.53	0.51	0.46
State and local government retirement funds . . . . .	0.25	0.29	0.28
Pension reserves of life insurers . . . . .	0.21	0.20	0.26

Regulations for private and public schemes differ. Private schemes (including those run by life insurers so long as they were in “separate accounts” from the more restricted general life insurance funds) are subject under ERISA to guidelines regarding prudent investment (essentially enjoining portfolio diversification). By contrast, state and local funds have many specific restrictions, which have led to a greater concentration on public bonds and AAA private bonds (and thus to a lower rate of return on the portfolio). British funds have a similar structure to those in the United States, covering private firms, local government bodies and life insurers, though they also include the pension funds of nationalised industries. 40 per cent. of private employees are covered, 75 per cent. of those in the public sector.

We now go on to discuss the principal factors underlying the growth and size of the institutional sectors outlined above. As well as being of interest in interpreting past trends, such a discussion offers a background for policy, if it is desired to influence the growth of the institutional sector. The various factors identified are drawn from the national studies referred to in footnotes 1 and 7.

## 2. Determinants of the growth of life insurance companies

Consider first the life insurance sector. As might be expected, a key influence on size and growth is the rate of return on the products offered by life insurance companies, relative to those offered by

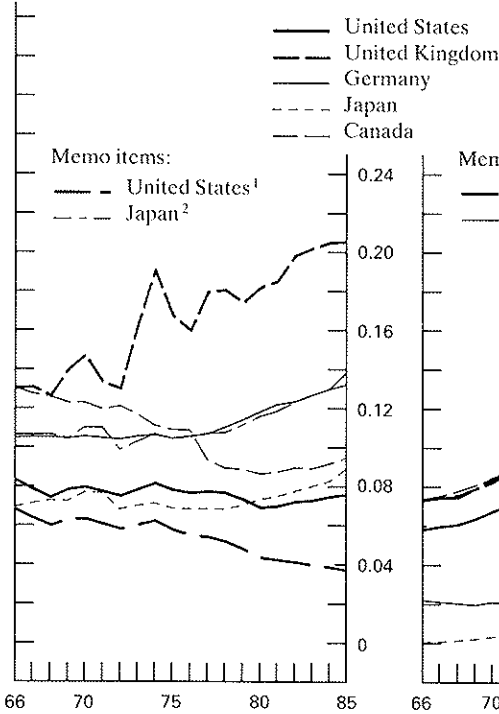
<sup>10</sup> The system of pension fund management in Japan comprises a "lead manager" who co-ordinates fund management and administration and receives about 40 per cent. of the fees. Since firms were first allowed to set up pension funds in 1962, the lead management has been dominated by the trust banks (indeed, Graph 3.4 shows only "pension trusts"); however, life insurance companies have also entered the market strongly since 1977, taking over some funds and earning mandates from new funds starting up. Therefore Graph 3.3 (life insurance) includes some pension fund reserves managed by life insurance companies; pension fund growth has been somewhat more rapid, life insurance less than the graphs indicate. The shares of pension fund management are shown below.

	Pension fund management market shares (in percentages)		
	1966	1977	1980
Trust banks . . . . .	65	71	68
Life insurers . . . . .	35	29	32

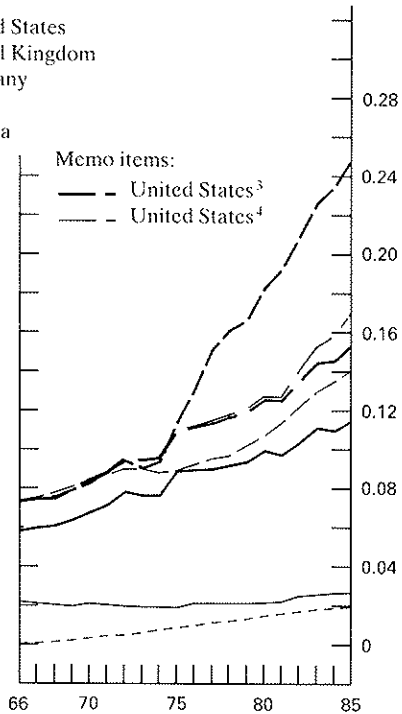
(Source: Brontë (1983).) The competitiveness of life insurers as pension fund managers was aided by regulations allowing them to offer an industry-wide yield (which can be set to gain market shares, since earnings are not disclosed), while trust banks must run pension funds on an individual basis. Life companies also only charge fees on the inflow to a fund, not on the stock of assets outstanding as do trusts. Pension funds are divided into two main categories, *tax-qualified* (introduced in 1962) and *employee* (1966), of which the latter are only for large firms, and, unlike the former, allow diversion of some social security contributions to the private pension plan. Administrative guidelines ensure that the less profitable small tax-qualified plans have been dominated by life insurers, employee plans by trusts. More recently, foreign banks have obtained trust licences and may in future be able to enter the Japanese pension business. In Canada, as in Japan, pension funds are largely run by trust banks, a form of organisation with limited deposit-taking and lending functions, but which, unlike banks, offer trust services, undertake investment management, custodial services and real estate agency services. They are often part of industrial or financial conglomerates.

## Shares of institutional investment in personal sector financial assets

3.3 Life insurance



3.4 Pension funds



<sup>1</sup> Life insurance business only.

<sup>2</sup> Including Postal Life Insurance.

<sup>3</sup> Including pension funds managed by life insurance companies.

<sup>4</sup> Including pension funds managed by life insurance companies and individual retirement accounts.

other savings media. However, this relationship is determined by several variables.

One of the most important seems to be the *degree to which portfolio diversification is restricted*. Thus, for example, it has been suggested that the growth of life insurers in the United Kingdom was

made possible by a portfolio choice which was strongly biased towards capital-uncertain assets such as equities and property, rather than the “monetary” assets (bonds, loans, mortgages) prevalent elsewhere. The reason for the concentration on monetary assets in the United States, for example, is legal controls on portfolios enforced by state law. Typically, life insurers are limited to holding only 20 per cent. of their portfolios in equity, while there are other limits on overseas investment, futures, low-rated bonds and lending on securities. Similar restrictions apply in Canada. These restrictions mean that life insurers in these countries can only offer low and/or nominally-fixed returns, which renders their products unattractive to savers, especially during periods of inflation, and helps to explain the decline in their share of personal sector assets. On the other hand, portfolio restrictions alone need not lead to a loss of market share. In Germany, too, restrictions apply to portfolio distributions – no more than 20 per cent. in equities, 4 per cent. in foreign equities and 10 per cent. in commercial property. The Japanese life insurance sector, like other financial sectors in that country, has traditionally been segmented, highly structured and carefully government-controlled. For example, until 1986 life insurance companies in Japan were only allowed to invest 30 per cent. of their assets in equities, 20 per cent. in real estate, 10 per cent. in a single company loan and 10 per cent. in overseas assets; there were tighter guidelines than for banks, despite the considerably longer maturity of liabilities. Competition has been permitted only in certain areas, such as methods of sale (door-to-door, by mail, in banks and stores). In these countries, therefore, returns have clearly not been as high as they could have been, but portfolio share has not been lost.

An important supplementary influence that helps to explain this is the *competitiveness of alternative vehicles for saving*. For example, in Japan control of bank deposit rates means life insurance has been competitive with bank deposits, even with a relatively un-adventurous portfolio strategy. In addition, a falling mortality rate has enabled companies to quote lower premiums and obtain a large



net cash flow. Since the Ministry of Finance lowered premium rates slowly, firms have also made large profits from demographic changes. Dividends are paid to policy holders, but are set at rates competitive with alternative investments rather than being based on the surplus from policies written and net investment income. In Germany, too, returns are competitive with other forms of saving even in the short run, via regular "surplus sharing", facilitated by a relatively low interest rate fixed by the authorities on which premium calculations are made. This competitive strength has been achieved despite the controls on portfolio distribution described above. Competitiveness in price and returns in Germany does not, however, extend to the inter-company level, as these parameters are also fixed. Instead, competition concentrates on methods of sale (see Hammond and Kay (1985)). In the United States, in contrast to Japan and Germany, competition from pension and mutual funds, both of which can invest heavily in equities, has eroded the market share of life insurers. More recently, the deregulation of deposit rates has made life insurance even more uncompetitive. In Canada, as in the United States, rates of return on life insurance have been low relative to yields on other assets, while the development of mutual funds and pension funds has offered alternative vehicles for long-term contractual savings, not previously so widely available. Rates paid on time deposits and Canadian savings bonds have also risen. The experience of the United Kingdom shows, however, that competition need not lead to a declining share so long as there are no restrictions on portfolios. As shown in Graph 3.3, in that country life insurance portfolios have grown significantly despite competition from pension funds and building societies, higher inflation than elsewhere and the abolition of tax relief on premiums in 1984.

Competitiveness may, of course, extend beyond mere relative returns to include *product development*. For example, British life insurance companies have developed new forms of policy, such as "with profits" policies in which bonuses accrue to policy holders, policies "linked" to the performance of specified portfolios, single

premium insurance, and endowment policies to cover house purchase loans, as well as variants on traditional life insurance products. All of these have helped contribute to growth, especially endowment policies in the buoyant housing market. In Germany, too, product development has been flexible, notably "adjustable" policies where premiums and sums insured are automatically related to the trend in income. On the other hand, the experience of Canada suggests that product development alone is not sufficient to retrieve market share without high underlying returns. In the 1980s, life insurance companies in Canada responded to the loss of business by some increase in offered returns, as well as by a diversification into "group" (i.e. company) term, health and disability insurance along with pension fund administration and the addition of extra services to life policies, such as medical coverage or disability insurance. These have not been sufficient to recover the companies' former market share, though some consolidation after 1980 can be seen from Graph 3.3.

Another aspect of product development of significance in several countries is *diversification into pension fund management*, which may make an appreciable difference to the size of life insurance companies' overall portfolios. The guaranteed investment contract (GIC), a tax-qualified group pension contract offering the advantages of a defined contribution pension scheme, with fixed rates and maturities, has been one successful approach to pension provision adopted by US life insurers in recent years. The growth of pension fund management by US life insurers is shown in Graph 3.3. Pension fund business of life insurers has also been strong in the United Kingdom, Japan and Canada.

*Taxation* is obviously a key influence on the competitiveness of life insurance companies; taxation can diminish the attractiveness of returns earned on the asset portfolio. This does not appear to have been the case yet in the United Kingdom, however, despite the fact that returns on life insurance have always been taxed and that tax relief on premiums was abolished in 1984. In North America, on the other hand, high tax rates on interest income have been a serious

problem for life insurers, especially during periods of inflation. By contrast, the growth of the German and Japanese life insurance sectors has been stimulated by tax advantages: German life insurance companies benefit from significant tax privileges, both regarding deductibility of personal premiums from income tax, and tax privileges for such premiums paid by employers on behalf of their employees (though these are also available for other saving instruments). In Japan, too, large deductions can be made from the individual's taxable income to allow for life insurance premiums, and benefits are generally also tax-free.

Finally, the relative performance of different countries' life insurance sectors may also be influenced by the *existing attitudes of the personal sector* towards means of finance (of course, life insurers may also influence these preferences). The popularity of life insurance in Germany may be related to the prevalence of target saving, prior to durable and house purchase, rather than borrowing, as well as to competitive rates of return. Life insurance is a suitable vehicle for such saving. The structure of German personal sector portfolios reveals a readiness to accept illiquidity in exchange for return; most bank deposits are long-term (i.e. over four years' notice). Life insurance is thus readily acceptable to consumers. (See also Section VII (1).) Meanwhile, the Japanese are the world's biggest buyers of life insurance; in 1980 policies amounted to two and a half times total GNP (compared with 1.6 times in the United States) while 90 per cent. of households held some form of life insurance. This is a result of the high propensity to save, but life insurance has also increased its portfolio *share*. As in Germany, debt is not a common means of finance, and households again are ready to accept illiquidity of financial assets.

Various factors have been identified which help to explain the growth and level of life insurance saving in a country. Relative return aspects, including taxation, have been shown to be important, but also the ability of life insurers to develop new products and to diversify, and the attitudes of the personal sector towards finance. A key factor underlying relative returns which has been found to be

particularly important is the ability of life insurers freely to diversify the portfolio, by contrast with the relative lack of freedom of other institutions. Without this, product diversification and other strategies may be unable to render the sector competitive. The paper has noted several policy instruments which might be used by government to influence the growth of this sector. For example, taxation, portfolio regulation and control of returns on life insurance and other assets could all be used for this purpose.

### 3. *Determinants of the growth of pension funds*

The majority of pension fund members are affiliated as a consequence of their employment. Such fund membership is often compulsory. Therefore *rates of return* on pension funds do not attract investors in the same way as do life insurance schemes. On the other hand, the *nature of the benefits* offered may provide an incentive to work for a particular firm, thus in turn making it attractive for that firm to offer a particular type of scheme. On the side of the employees, pensions have often been the basis for *collective bargaining* (particularly in the United States), and increased employers' contributions have also often been used to circumvent wage controls, both of which have encouraged the further growth of such funds. Finally, the more generous the benefits offered, the more assets a pension fund will require.

It is therefore likely, for example, that the growth of pension funds in the United Kingdom and the United States has been related to the relatively generous *benefits* offered. In the United Kingdom the nature of benefits has changed since the 1960s. Defined benefit plans, often indexed to inflation, now cover all public sector and 90 per cent. of private sector schemes. Defined contribution plans declined in popularity during the mid-1970s, an era of high inflation and low real rates of return to investment, though a general dislike of uncertainty regarding retirement income may also have played a part. Defined benefit plans are obviously more vulnerable to deficits during periods of securities market weakness. Thus, in the United Kingdom, following the stock market collapse of 1974, pension

funds were often in actuarial deficit and, as a result, firms had to make large "topping-up" payments in the 1970s, effectively supporting the growth of the funds. More recently (since 1981), asset growth has reflected the strong capital markets, resulting in some schemes becoming overfunded. Similar tendencies have been apparent in the United States. By contrast, in Canada the indexation of benefits offered by trustee pension schemes is rare; a fixed income is promised in retirement which encourages a conservative investment policy based on bonds, as discussed in Section V below. In Germany, too, three-quarters of pension funds promise a fixed nominal amount dependent on duration of employment; final salary schemes are less common than in the Anglo-Saxon countries. These factors may help to explain the slower growth of schemes in Canada and Germany.

As for life insurance, the degree to which pension funds represent an advantageous means of saving depends on *taxation*. For example, tax treatment has been crucial to the growth of pension funds in the United Kingdom, where contributions and all returns on investments are free of tax. In addition, up to one and a half times one's salary (up to £150,000) may be taken out at retirement as a tax-free lump sum, and employers' pension contributions, unlike wages, are not subject to national insurance contributions. The tax treatment of pension funds is similar in the United States, Canada and Japan, though it has been noted above that other forms of saving also enjoy tax privileges, especially in Japan. This explains the slow growth of funds in Japan during the 1960s and 1970s. In Germany, on the other hand, independent pension funds (and direct insurance) face a disadvantage compared with other countries, in that employee contributions are treated as current income and are subject to wage tax (deferred taxation is absent). These disadvantages give labour an incentive to press "direct commitments" (i.e. pension liabilities held on the books of the sponsoring firm) onto the firm, which are not taxed. Partly as a consequence of these taxation effects, "direct commitments" are the dominant form of private pension obligation, covering 55 per cent. of benefiting

employees in 1981, compared with 35 per cent. for funded independent pension funds and provident funds<sup>11</sup> (the categories shown in Graph 3.4).

The principal *alternative* to a private pension fund is the state social security pension scheme. It is, therefore, not surprising that the growth of private schemes can be related to the *scale of the social security pension scheme*. The pension system in Germany is dominated by the relatively generous state social security scheme, which is mandatory. Private schemes are purely supplementary, and hence need far fewer assets to cover their commitments than elsewhere. Their supplementary character is revealed by the fact that private pension fund benefits in 1982 were only equal to 7 per cent. of pensions paid by social security. In Japan, too, social welfare promises are generous, with a "replacement ratio" (average pension as a proportion of average earnings) of over 50 per cent. There is some concern that these promises may not be fulfilled, given current demographic trends ("ageing of the population"), without debt issue or an increase in tax rates (see Economic Planning Agency (1985)). Such concerns aid growth of private pension schemes. On the other hand, to the extent that such promises are kept, they are likely to impose a ceiling on the growth of pension funds to a relative size far below that in the United Kingdom and the United States. Growth may be limited to the level

<sup>11</sup> The residual 10 per cent. is covered by "direct insurance". 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. Another common form of company scheme, as discussed above, is "*direct insurance*", 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* or *provident fund* to handle its pension scheme, operating as a mutual insurance association. 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.

required to provide replacement of the traditional lump-sum retirement bonuses. However, an additional factor promoting the growth of private pension funds in Japan is that social security is not payable until 65, while retirement is often at 55; so a private pension can provide a valuable source of income during this hiatus. Canada is an intermediate case. Private schemes co-exist with a flat rate non-contributory state pension scheme (OAS), a negative income tax for those over 65 on low incomes and a contributory earnings-related public pension (CPP). The last is only partly funded but, nonetheless, had accumulated assets (largely government bonds) by mid-1981 equal to 40 per cent. of trustee schemes. (A separate "QPP" covers Quebec.) The existence of a strong public pension system means the benefits of private schemes can be less generous than elsewhere. In the United Kingdom and the United States, by contrast, the state schemes have historically offered a relatively low replacement ratio, thus encouraging the growth of private schemes. In the United Kingdom, employees with private pensions may "contract out" of all but the most basic state scheme.

Other assets may, of course, also be substitutes for pension wealth, particularly for those who are not members of company schemes (the self-employed, for example). In this case, *relative returns* become of direct relevance. Thus, the relative growth of long-term institutions in the United Kingdom as a proportion of personal portfolios has, in part, been the result of a continual reduction in direct personal equity holdings. This reduction stems from the vulnerability of such direct holdings to capital market instability, as was shown in 1974, but also from the fact that such equity holdings suffer from double taxation (purchases of securities are made from taxed income, and both dividends and capital gains are also taxed) and because for most persons a reasonable degree of risk spreading could not be achieved by direct holdings of securities. The mechanism for disinvestment has generally been that heirs of estates containing equities have sold them and saved instead through more tax-efficient housing and institutional investment. The decline in equity holdings is almost a mirror image of the growth of

institutional investment (see Davis (1986) and the analysis in Section VII). The new "personal equity plan" scheme makes a move towards reducing the tax disadvantages of direct equity holdings. The United States has experienced a similar shift.

Besides being important to the portfolio choices of individuals, the relative attractiveness of alternative means of finance is also relevant for the company offering the pension scheme, if alternatives are available. This is an additional explanation for the success of "direct commitments" (as defined above) in Germany. The system, in effect, offers "free capital" to the firm, though in principle the liabilities incurred from pension claims should be reflected in the share price. In Japan a taxation change in 1980 encouraged companies to replace retirement bonuses by pension schemes, by reducing tax benefits to the former.

The *regulation of portfolios* is a less important determinant of relative growth of pension fund sectors than for life insurance, since pension funds are generally relatively free of binding restrictions. However, other *legal changes*, particularly relating to the *funding* of benefits, have influenced the growth of pension funds at various times. 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. Some firms terminated their schemes, and the number of new plans initiated dropped. The effect of the change may be seen in the lower growth rate of the share of pensions in personal sector assets after 1974. An offsetting factor to this, however, was the introduction under ERISA of individual retirement accounts (IRAs) for workers without company pensions, offering the same tax benefits as pension funds. The growth of IRAs accelerated in 1981 when all workers and their spouses were given IRA eligibility. As a result, IRAs grew from 1.5 per cent. to 3.3 per cent. of household gross assets between 1982 and 1985, as shown in Graph 3.4 (see EBRI (1986)). Unfortunately, the precise instruments corresponding to IRAs are not known; they are held



with a variety of commercial banks and non-bank financial institutions. ERISA also clarified the obligations of trustees in relation to portfolio diversification: trustees were to act as a "prudent investor" would, by diversifying the portfolio across different assets. In the conclusion of this paper, it is argued that this is a better approach to portfolio regulation than controls on portfolio proportions held in risky assets. In Germany, too, various laws or court decisions akin to ERISA in the United States 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, has helped blunt the growth rate of private pension schemes. However, a positive aspect for firms is that provision formation (full funding) is not compulsory in Germany, as it is elsewhere. In the United Kingdom the reform of the state scheme in 1978 had an important influence on private schemes by setting a minimum standard for benefits under private schemes ("the Guaranteed Minimum Pension") and enforced adequate provisioning. As shown in Graph 3.4, this does not appear to have discouraged the growth of pension schemes; if anything, quite the contrary.

A final factor influencing the growth of pension funds is the *maturity* of the schemes, i.e. whether they have a long-run ratio of contributing to benefiting members. Immaturity is an explanation for the growth of schemes in the Anglo-Saxon countries over the last twenty years. Now the schemes are tending to become mature, which can be expected to reduce the growth rate of their assets. By contrast, in Germany about 50 per cent. of employees are now acquiring claims, though only 30 per cent. of pensioners are in receipt of supplementary pensions. This indicates immaturity of the schemes, which may be expected to lead to stronger future growth (as also in Japan) while growth of relatively mature schemes in the Anglo-Saxon countries tails off. Although maturity for an individual scheme will depend on the firm's history and development, the private pension *system* is also influenced by *demographic* factors

relating to population size and distribution. Thus, “ageing of the population”, particularly in Germany and Japan, is currently leading to growth in pension funds. *Coverage* is obviously also important (i.e. the proportion of employees covered by pension plans). However, this is a consequence of the factors discussed above, rather than a separate cause of growth in itself.

To summarise, pension fund growth is influenced by such factors as the nature of benefits offered, in particular vis-à-vis the state scheme, taxation and the attractiveness of other assets. The causes differ somewhat from those underlying the growth of life insurance, which is more of a “retail” asset on which rates of return are directly relevant. The discussion suggests that pension fund growth may be influenced, inter alia, by changes in the taxation of pensions and alternative assets, the level of state benefits, the ability of employees to opt out of the state scheme (or their company scheme), and legislation on the nature of benefits and the degree of provisioning required. The various factors identified can explain both the size and the growth rate of pension fund assets in the different countries.

This section has discussed the underlying causes of the changes in the size of the long-term institutional sector in the major economies. The main contrast is between the Anglo-Saxon countries and Japan and Germany with regard to the funding of pensions; in terms of size, the life insurance sectors are more comparable, though in competitiveness, they differ widely. The contrast in the size of pension schemes should not be overstated; Japan appears to be moving towards an Anglo-Saxon system of funded pension provision (in a way that Germany does not), a change which, as discussed below, has implications for the structure of capital markets. In the light of this historical survey, the paper now goes on to analyse the way in which institutional assets have been invested. In particular, consideration is given to the extent to which portfolio choices have been prompted by considerations of risk or return rather than institutional factors relating to the circumstances of the sectors’ evolution (as discussed above) or administrative guidelines regarding portfolio composition.

#### IV. Portfolio behaviour of life insurance companies<sup>12</sup>

Graphs 4.1 to 4.12 below and the summary Table 4.1 on page 48 show the portfolio distribution of the life insurance sector over the period 1966–85, drawn from national flow-of-funds data. They reveal large portfolio shifts over the last two decades, often far exceeding those of the non-financial private sector (compare with the graphs in Davis (1986)). In this section the levels of and changes in the distributions are related to such factors as relative risks and returns, other asset characteristics, the nature of the sectors' liabilities and regulation. Important background information for this section is provided by the tables showing the characteristics of asset yields presented in the Appendix.

It should be noted that the data contain some inconsistencies. For example, in the flow-of-funds statistics, equity in Canada is measured at book value plus cumulated retentions and in Germany it is at book value, while elsewhere it is measured at market value. The distribution of securities between bonds and equities before 1975 has largely had to be estimated for Germany, while data on property holdings are not available for the United States. Also, in several countries the life insurance companies manage a large amount of pension fund reserves that cannot be separated from other assets. However, the data still allow some interesting comparisons and contrasts to be drawn.

As shown in Graph 4.1, life insurance companies generally hold less than 5 per cent. of their portfolios as short-term or *liquid assets*. This reflects the relatively predictable pattern of receipts and payments (especially compared with the personal sector, though also with non-financial companies). Also, for an individual institution bonds and shares may be considered relatively "liquid". Receipts

<sup>12</sup> References for Sections IV and V: see footnote 1, also Deutsche Bundesbank (1976, 1980) and Bank of Japan (1982).

will tend to be invested in liquid assets mainly when the market for longer-term investments is sour, as in 1980–81, or when short-term assets are offering exceptional returns. It may thus be significant that holdings in the United States, Canada and Japan have increased significantly since 1980, while deregulation of the financial markets has proceeded. In the United Kingdom rapid growth in liquid assets occurred in 1972 after the “Competition and Credit Control” deregulation. By contrast, holdings of liquid assets in Germany have been relatively constant and rather low.

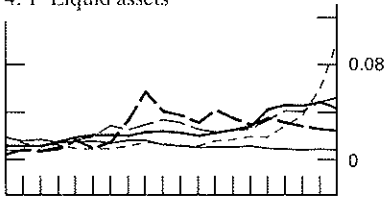
Graphs 4.2 and 4.3 show the composition of life insurers’ liquidity. Holdings of bank deposits have been relatively stable except in the United Kingdom, where an increase in the proportion over 1971–74 has been maintained. This has occurred despite a recovery in equity values since the stock market collapse of 1973–74 (which depressed the denominator of the portfolio share).

Graph 4.3 shows market paper holdings for the Anglo-Saxon countries and Japan. Again, holdings in the United Kingdom grew in the early 1970s but have declined since, to reach near zero in 1985. By contrast, holdings for the United States and Canada grew significantly after 1977, in line with lower transactions costs from block trading, and increased returns, as well as initially low real yields in the equity and bond markets.

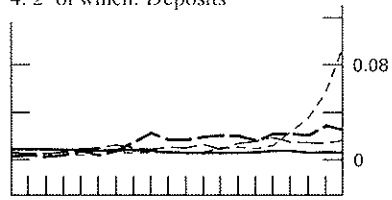
*Bonds* tend to be a staple asset of life insurers, as they offer a certain nominal return over a long period and thus facilitate the matching of assets with the term and return promised on liabilities. However, bonds are vulnerable to high inflation, which reduces the real value of such “money-fixed” assets; in addition, the market value of bonds falls when interest rates increase, should life insurers wish to trade the bonds rather than holding them until maturity; and if life insurers begin to offer “real” rather than nominal contracts, bonds obviously become less attractive. As shown in Graph 4.4, the major changes have been in Japan, where bond holdings have increased, and in the United Kingdom, where they have fallen. In each case, supply conditions, as well as returns, may have been important.

## Portfolio distribution of life insurance companies

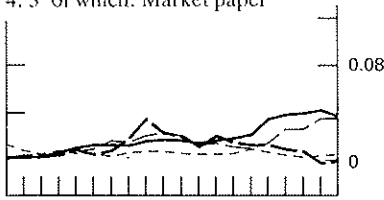
4. 1 Liquid assets



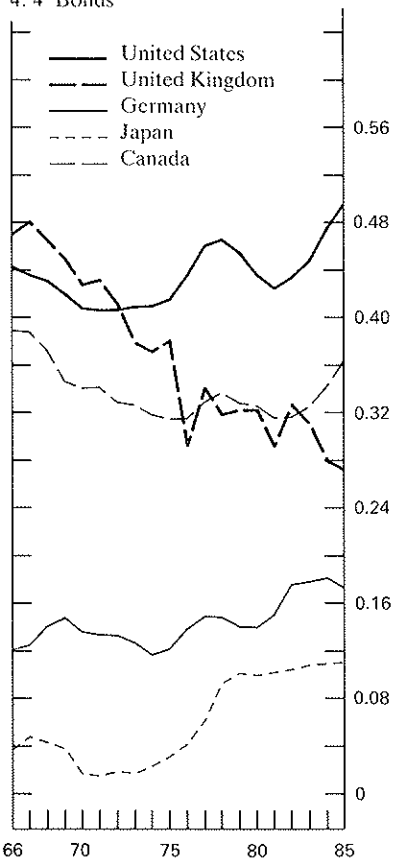
4. 2 of which: Deposits



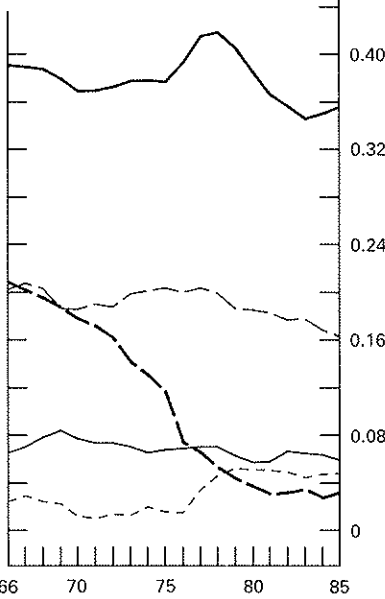
4. 3 of which: Market paper



4. 4 Bonds



4. 5 of which: Private bonds



The Japanese Government began to run large public sector deficits in the mid-1970s, with the result that the supply of bonds increased significantly, while financial institutions were forced to absorb a proportion of government bonds at issue for much of the period. Meanwhile, the end of the "rapid growth" period was reducing the demand for corporate loans, thus allowing a greater proportion of cash flow to be devoted to bonds. In the United Kingdom the decline in bond holding is partly the result of the fall in corporate bond issues (see Graph 4.6). Given the increased attraction of medium-term variable rate bank loans, especially during an inflationary period when nominal but not real interest rates were high, together with the high yields offered by public bonds since 1976, firms in the United Kingdom have largely ceased to issue fixed rate bonds since the late 1960s. (More recently, there has been a surge in Euro-bond issues, particularly at floating rates.) However, an additional factor in the switch from bonds by UK life insurers has been the move towards real rather than nominal liabilities.

The relative share of bonds held by different countries is also of interest. The United States has consistently had the highest share of bonds, aided (as in Canada) by regulations which limited investment in equities, despite the higher returns on equities shown in the Appendix. The data do not show the maturity distribution of the bonds. Historically, in the United States bonds have been held to maturity, opening a gap between portfolio returns and yields on new bonds when rates rise. Now bonds are bought with shorter maturities and often floating rates. German bond holdings have been only half those of the United States as a proportion of the portfolio, but have grown somewhat in recent years, in line with the increased issue of bonds by the government and banks, relatively high real returns and portfolio regulations.

Graphs 4.5 and 4.6 show how bond holdings are divided between *public and private bonds*. As noted, the United Kingdom has shown a marked switch towards the former, but such a tendency has been present in all five countries in recent years. In the United States such

factors as large government deficits, high real returns on public bonds in the early 1980s, a desire for liquidity at a time when disintermediation through policy loans was a serious problem, and an increase in the share of pension reserves in life insurers' liabilities all helped to lead to a growth of public bonds from 4 per cent. to 14 per cent. of life insurers' portfolios in 1980-85. These are largely Federal obligations (including agency mortgage-backed securities); tax-exempt state and local government bonds are relatively unattractive to life insurers due to life insurers' relatively low tax obligations. By contrast, German life insurers hold twice as many local government bonds (often intermediated by banks) as they do Federal Government obligations. In Canada increased government deficits since the mid-1970s have reversed the long decline in the amount of public bonds outstanding in relation to GNP since the Second World War (which has also been a feature of the other Anglo-Saxon countries). This has been reflected in life insurers' portfolios. In the United Kingdom some of the growth in the share of government bonds since 1975 has reflected uncertainty regarding equities following the market weakness in 1974, but other important factors were high yields, increasing government deficits (which led to issues in the form of long-dated stock which funds prefer), and after 1981 issue of some index-linked stock, providing a guaranteed real return. Public bond holding in Japan has grown since the beginning of high government deficits in 1975, rising from a negligible size to 6 per cent. of the portfolio. These bonds offer relatively low yields, but, especially in the late 1970s, the institutions were obliged to invest in them.

*Private bonds* have held up well as a share of life insurance portfolios in the United States and Canada, compared with the United Kingdom, though some decline in the share is again apparent in the early 1980s. Such bonds have historically been attractive to life insurers because periods to maturity are long (often exceeding those on government bonds), while, compared with government bonds, yields are high, though liquidity is low (estimates of the spread are shown in Davis (1987)). In the United States such corporate bonds

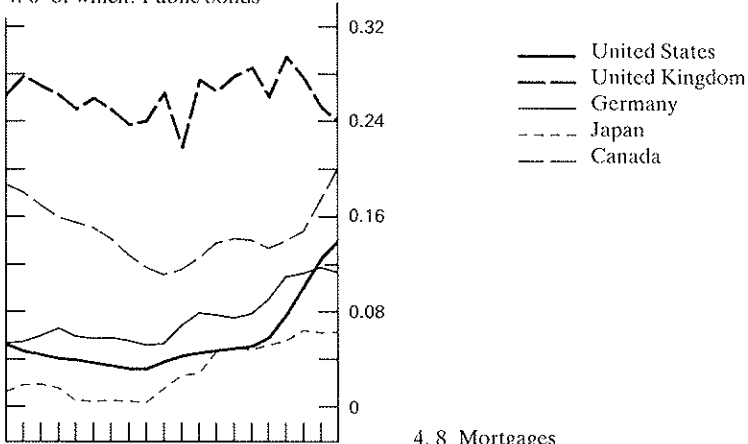
have historically been largely "private placement", often issued by small firms unable to make public offers, but with high yields and generally without call options. More recently public market issues have become more popular, due to a desire for liquidity and reluctance to make forward commitments for private placements when interest rates are volatile. It should be noted that US life insurance companies are often not permitted to hold low-rated bonds ("junk bonds"). In Germany the share of private bonds (mortgage bonds, industrial and other bonds) has remained constant, while in Japan growth since 1976 has coincided with deregulation and the shift from direct to indirect financing on the part of firms.

*Equity* shares in Graph 4.7 show a sharp contrast between the United Kingdom and elsewhere. As noted above, North American life insurance companies generally face legal limits on the proportion of equities in their portfolios; in Canada the limit is 25 per cent., while in the United States it is 20 per cent., so the constraint is not binding. It has been suggested that life insurance companies in Canada are unwilling to hold equities for fear of showing a loss on their portfolios, given the obligation to declare equities at market prices (see Neave (1981)). Such growth in equity holdings as there has been in North America has been due to diversification into pension fund management, since such segregated funds are not subject to regulatory ceilings on equity holdings. In the United Kingdom, by contrast, the share of equity has grown significantly to 40 per cent. of the portfolio. The growth has not been regular; the stock market collapse of 1973-74 caused a significant decline in equities' share. Growth has come from two sources: inflows and revaluations. The latter were particularly important in the early 1970s and 1980s. The shift into equities (and property) was necessitated by inflation, which made it important to maintain the real values of portfolios, while the sharpening of competition discussed in Section III also made maximisation of real returns important.

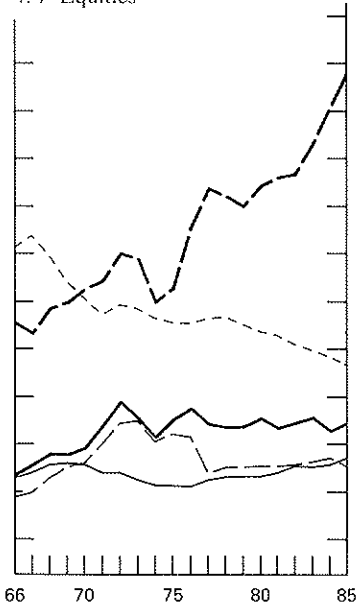


## Portfolio distribution of life insurance companies

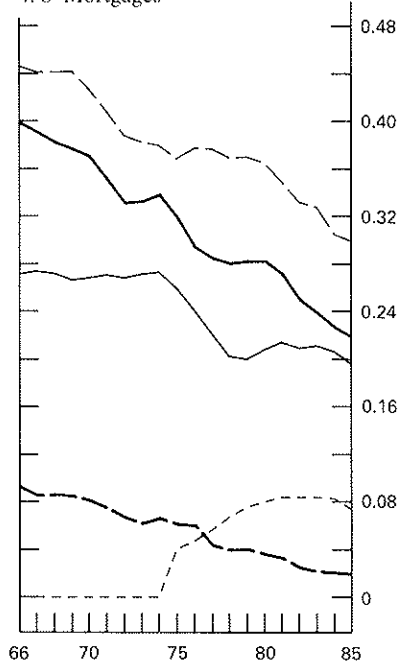
4. 6 of which: Public bonds



4. 7 Equities



4. 8 Mortgages



In Japan equities have declined somewhat as a proportion of life insurers' portfolios, falling far below the maximum of 30 per cent. permitted by the Ministry of Finance. This has corresponded with a focusing of attention on loan expansion over the period until about 1978, after which bonds supplanted equities at a rapid rate, despite the high returns on equity over this period. Recently, the growth of Tokkin Specific money accounts (permitted after October 1984 to constitute up to 3 per cent. of life insurers' assets) has aided a recovery in equities' share.

Equity holdings (including direct participations and investment trusts) of German life insurers have been a declining share of the portfolio in recent years, falling from 21 per cent. of securities in 1970 to 8 per cent. in 1985. Although some legal changes made such investment more attractive (such as the liberalisation of investment regulations at the end of 1974, which allowed shares to comprise 20 to 25 per cent. of the portfolio, and the elimination of the double taxation of income from shares in 1977), growth was impeded by the narrowness of the German share market. More recently some recovery has come about, aided by rising share prices.

*Mortgages* form a large but declining share of life insurers' portfolios in the United States, the United Kingdom, Canada and Germany, as shown in Graph 4.8, while in Japan such lending has grown significantly from a low level in the mid-1970s. In the United States most mortgages are conventional, but a large part also consists of federally insured mortgages. In many cases, rather than directly issuing mortgages, US life insurers buy groups or packages of mortgages from mortgage companies, often with forward commitments. Several factors have told against mortgage holding in that country. In the 1970s high interest rates caused disintermediation via a widespread taking-out of policy loans (see below) which made companies sensitive to the need for liquidity, a feature absent from traditional mortgages. This has led to a switch to more liquid GNMA and other mortgage-backed pass-through securities (classified here as "public bonds"). Secondly, as noted above, the desired maturity of long-term assets has been shortened

in order to reduce interest rate risk caused by disintermediation and to enhance asset/liability matching with new insurance products. Again, long-term mortgages were thus unattractive. Thirdly, there has been a switch to equity to boost portfolio yields, including equity investment in real estate. Recent developments have enabled some improvements to be made in the characteristics of mortgage lending from the life insurers' point of view, notably the ability to liquify mortgage portfolios via collateralised mortgage securities, interest rate swaps to convert fixed into floating rate loans and the issue of floating rate mortgages. Mortgages are increasingly being used to back GIC pension plans (see Section III). Many of the same features apply to Canada, though in Canada an additional disincentive to mortgage holding has been a shortening of the maturity of such loans.

In Germany mortgage loans have declined along with the level of construction activity, though there was something of a recovery during the economic upturn of 1979–80. In the United Kingdom mortgage lending has declined to a negligible share of portfolios. To date, no secondary mortgage market has developed; hence mortgages lack liquidity, while offering the actuarial uncertainty of provisions for early repayment (and hence interest rate risk) and generally variable interest rates. Other investments, particularly in shares and property, have therefore tended to supplant mortgage lending. Finally, in Japan mortgage lending has increased from a low level in 1974 (before which data are not available), partly as an offset to the decline in industrial loans at the end of the rapid growth period, though also in line with increased demand for such borrowing by households.

*Other loans*, as shown in Graph 4.9, comprise loans to banks, public authorities, and industrial and commercial companies together with policy loans, largely to households. Such lending has been a marked feature of life insurers' portfolios in Japan and Germany. However, particularly in Japan, it has declined in recent years. For Japanese life insurers this reflects the end of the high growth period after the first oil shock, and the developing

preference of firms for direct methods of finance, both at home and in the Euro-markets. Policy loans represent a relatively small proportion of the total. Historically, loans to industry were among the highest-yielding investments available, when poorly developed securities markets limited the borrowing options to corporations. Especially in the case of small life insurers, many loans were arranged and guaranteed by the bank in the life insurers' industrial group, a joint loan strategy being developed within the group. Life insurers also benefited from not being subject to window guidance during tight money periods, though the Bank of Japan had an additional sanction in that it could restrict bank guarantees to life insurers. Life insurers have offset to some extent the declining demand for long-term loans since 1974 by more aggressive competition with banks for loans and increasing "samurai" (yen-denominated) foreign lending.

German life insurers have suffered less from declining demand for loans, though the recession of the early 1980s has reduced the portfolio share somewhat, following a long period of growth. The precise forms of loan covered here include registered bonds, borrower's note loans and other loans. Historically these have been attractive because they offer a higher yield than marketable bonds, while the amount and maturity of the loan can be tailored to the needs of individual lenders. Most loans have been to banks, though public authorities have also been important recipients. As in Japan, firms' demands for lending have shown increasing weakness.

Non-mortgage lending in the Anglo-Saxon countries has been relatively minor. In the United States growth largely reflects increasing borrowing against policies at fixed low rates, which is especially attractive to policy holders during periods of high interest rates – and extremely unprofitable for life insurers, being effectively a form of disintermediation, driving down average returns. Such loans also put pressure on liquidity and the ability to meet claims. Since 1982 declining interest rates have helped to reduce arbitrage possibilities and demand for such loans has fallen. Policy loan cycles have also been marked in Canada. In the United Kingdom policy

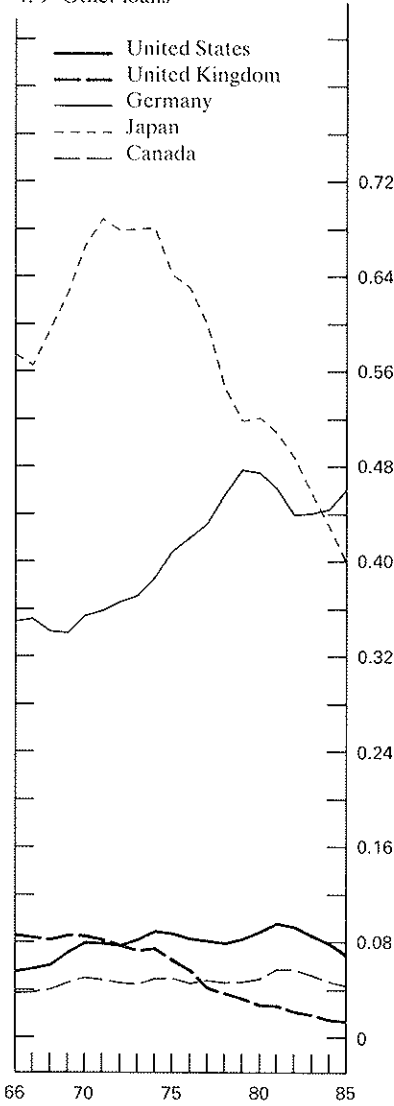
loans are a relatively minor phenomenon, while loans to the corporate sector have declined sharply. Firms (and local authorities) have preferred variable rate bank lending and, in the latter case, bond issue. For UK life insurance companies, the disincentives for loans are the same as those applying to mortgages.

*Property* investment, although illiquid, "lumpy" and having high transactions costs, has been an attractive long-term investment for life insurers in recent years, due to the high real returns offered, particularly in the form of capital gains, and the negative correlation of yields with those on other assets in some countries. The weakness of the share markets as an alternative form of "equity" investment during the 1970s increased the appeal of such investment. As shown in Graph 4.10, growth has been most marked in the United Kingdom and Canada. In the United Kingdom the stock market collapse boosted the portfolio share of property directly, while both purchases and revaluations helped sustain growth until 1980. Since then the share of property has declined, as returns on commercial property have fallen back. In Canada regulations allow 10 per cent. of assets to be invested in real estate, though an additional 7 per cent. may be freely invested. Growth of real estate holdings was spurred by tax law changes in 1970, which allowed the deduction of depreciation allowances on real estate from taxable earnings (hence lowering effective taxation on such assets). Portfolio shares have grown to near the regulatory ceiling as a result. Flow-of-funds data for real estate holdings are not available for the United States, but estimates of the American Council of Life Insurance reported in Curry and Warschawsky (1986) suggest that a level of 3–4 per cent. was maintained during the period 1970–85. As well as capital gains, rental income in the United States has been allowed to rise in line with inflation, due to built-in escalator clauses in rental agreements.

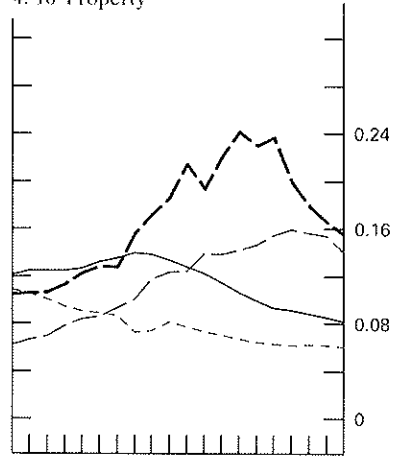
The absence of such guarantees, especially for residential real estate, has subdued real estate investment by German life insurers (rent levels tend to be tied to the mortgage interest rate). This has encouraged a switch to commercial property, but such investment has been viewed as high-risk, and there is a 10 per cent. limit on

## Portfolio distribution of life insurance companies

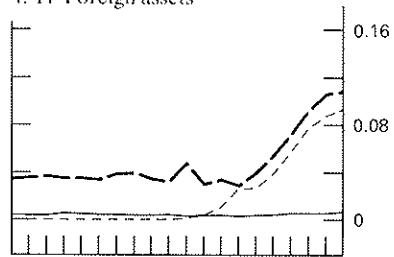
4. 9 Other loans



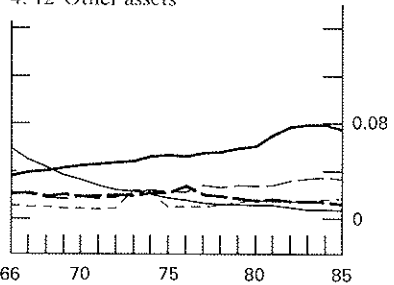
4. 10 Property



4. 11 Foreign assets



4. 12 Other assets



holdings. Part of the decline may also be attributed to writedowns of real estate by life insurers. Finally, for Japanese life insurers property has retained a relatively stable share of the portfolio.

As shown in the Appendix, diversification into *foreign assets* may be of interest to institutions both for reasons of return and for diversification. However, data on foreign assets are only available in the case of the United Kingdom, Japan and Germany. The evolution of foreign assets in these countries is shown in Graph 4.11. The increase in UK and Japanese overseas investment since the abolition of exchange controls in those countries in 1979–80 is evident. For the United Kingdom the high returns on foreign assets, which are shown in the Appendix, were helped by a tendency of the exchange rate to depreciate. The Japanese life insurance sector has invested heavily overseas, particularly in US Government bonds, despite occasional losses due to exchange rate changes. These outflows are regulated, but the permissible proportion of the portfolio has been progressively liberalised, reaching 20 per cent. in 1986. Sargen et al. (1986) reported a portfolio share of 9 per cent. at the end of 1985 in US dollars. Meanwhile in Germany overseas investment has been relatively small-scale, a process aided by satisfactory returns on domestic assets and a structural appreciation of the exchange rate. Evidence for the other countries suggests that life insurers in the United States and Canada invest little in foreign assets. The former were estimated in 1980 to invest 4 per cent. of their assets in foreign securities, of which 95 per cent. were bonds, and these were mostly Canadian (see Ehrlich (1981)), while the latter are constrained by restrictions on foreign investment.

The effects of the portfolio shifts described in detail above on the characteristics of life insurers' portfolios are summarised in Table 4.1 overleaf. It reveals common trends towards marketable securities and capital-uncertain assets (equities, bonds, property), but otherwise divergent shifts. Thus, the Anglo-Saxon countries have tended to shift out of fixed interest assets, while life insurers in Germany and Japan have tended to increase their holdings. UK life insurers have shifted into real assets, followed to some extent by the

Table 4.1  
 Characteristics of life insurance companies' portfolios

		United Kingdom	United States	Canada	Japan	Germany
		as a proportion of total assets				
Marketable securities <sup>1</sup>	1970	0.68	0.50	0.41	0.22	0.20
	1980	0.67	0.56	0.40	0.27	0.20
	1985	0.77	0.63	0.46	0.26	0.25
Real assets <sup>2</sup>	1970	0.36	0.08	0.15	0.29	0.19
	1980	0.56	0.10	0.21	0.24	0.15
	1985	0.64	0.10	0.20	0.21	0.15
Capital-uncertain assets <sup>3</sup>	1970	0.80	0.48	0.49	0.31	0.33
	1980	0.89	0.54	0.53	0.34	0.30
	1985	0.93	0.60	0.56	0.32	0.33
Fixed-interest-bearing assets <sup>4</sup>	1970	0.44	0.78	0.77	0.02	0.76
	1980	0.33	0.72	0.69	0.10	0.82
	1985	0.29	0.71	0.66	0.11	0.83

*Note:* Categories overlap, so they do not add up to one.

<sup>1</sup> Equities, bonds and market paper.

<sup>2</sup> Equities and property.

<sup>3</sup> Equities, property and bonds.

<sup>4</sup> Bonds, mortgages (for Canada, the United States and Germany), other loans (for Germany).

Canadians, while others have not. Contrasts in terms of levels are even greater.

In this section some of the influences on life insurers' portfolio composition have been outlined. In addition to expected returns, determining factors have included risk of returns, covariance with other yields, liquidity, government regulations, the changing demands of borrowers, the changing profile of life companies' liabilities and general changes in instruments and the structure of the financial system. After a parallel analysis of pension funds' portfolios, the paper goes on to discuss recent changes in techniques



and to assess the extent to which these changes may be analysed econometrically, in order to probe further the importance of long-term institutions to the national capital markets.

## V.

### **Portfolio behaviour of pension funds**

This section analyses the changes in portfolio distributions of pension funds over the period 1966–85, which are shown in detail in Graphs 5.1 to 5.12 and summarised in Table 5.1 on page 56. Since many of the changes in market conditions are parallel to those discussed above in regard to life insurance, this section is briefer and focuses particularly on the similarities and contrasts between pension fund and life insurance portfolio behaviour. It is seen that, although some portfolio shifts have been similar to those discussed above for life insurance, others run somewhat counter – for example, the share of equities in the portfolio. Since pension funds obviously face the same market returns as life insurance companies, these contrasts can be related to such factors as differences in liabilities and in regulation as discussed in Sections II and III above.

Before commencing, it is emphasised again that the data for “pension funds” shown here cover only fully funded pension schemes, and generally exclude those administered by life insurance companies. Also, within the pension fund sector shown, there are often different sub-groups (public sector, private, local authority) which may have different aims or may be subject to different regulations. Shifts in portfolio distribution may thus result from changes in the weights of these sub-groups: in practice, however, such changes have not been large over the period considered (see, for example, the table in footnote 9). Finally, it should be noted that for Japan data were only available for 1969–85.

Graphs 5.1 to 5.3 show the *liquid assets* of pension funds. In general, such assets for use in transactions can be smaller than those for life insurers, because withdrawals are more predictable (the

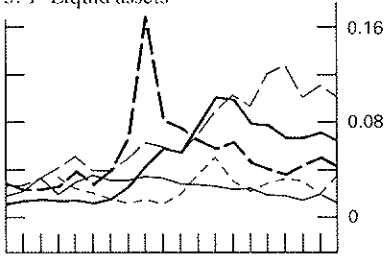
“contractual annuity” aspect noted above). The relatively high levels that have been observed are therefore likely to reflect high market returns on liquid assets relative to other assets. This was particularly true for the United Kingdom and the United States in 1974 when the equity market collapsed. Pension funds in both countries increased their portfolio share of deposits, the United Kingdom also raising the share of market paper. In the longer term 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. As shown in Graph 5.3, this has largely resulted from the accumulation of market paper, though deposits have also grown somewhat. As noted for life insurers, these increases coincided with deregulation and high returns on such assets. It is, however, of interest that in 1985 pension funds in the United States, Canada and the United Kingdom held far more liquid assets as a proportion of their total assets than life insurance companies. By contrast, the proportions for Germany and Japan are similar between types of institution.

*Bonds* remain a sizable proportion of pension fund assets in Canada and the United States, while their share has grown sharply in Japan and Germany. As shown in Graph 5.4, in the United States, Canada and Japan bonds now form around 50 per cent. of pension funds’ portfolios, 30 per cent. in Germany. Meanwhile the bond share has fallen sharply in the United Kingdom, from 50 per cent. to 20 per cent. of gross assets. Comparison with Graph 4.4 reveals that bonds generally account for a greater proportion of pension fund assets than for life insurers. However, life insurers, particularly in North America, hold a higher proportion of fixed rate long-term debt instruments than pension funds given their high level of mortgage holding (compare Graphs 4.8 and 5.8).

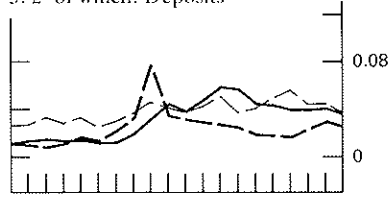
As shown in Graph 5.5, the share of *government bonds* in pension funds’ portfolios has grown significantly in all of the countries studied since the mid-1970s. These shifts parallel high government deficits and correspondingly high real returns on such bonds. Except in the United Kingdom, holdings are somewhat higher than those of life insurers. In the United States and Canada

## Portfolio distribution of pension funds

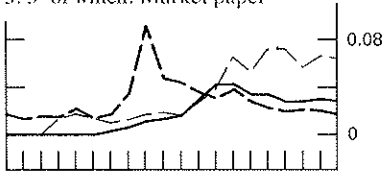
5. 1 Liquid assets



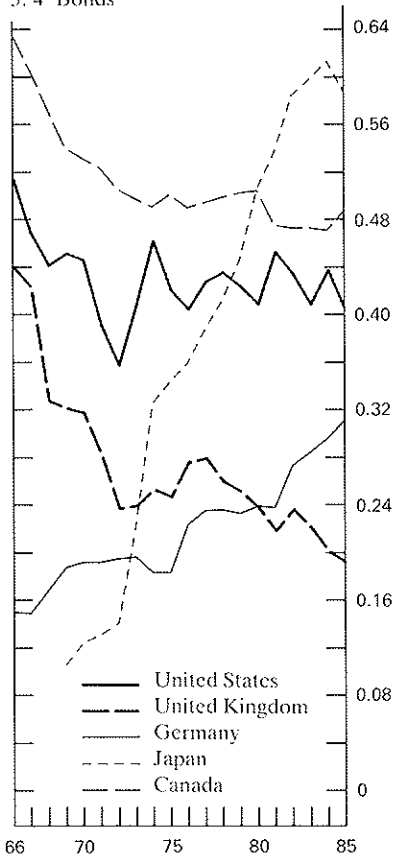
5. 2 of which: Deposits



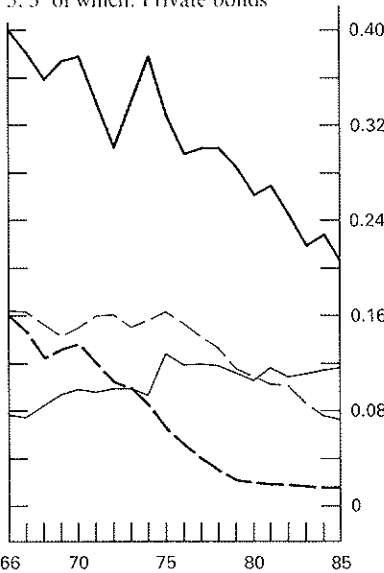
5. 3 of which: Market paper



5. 4 Bonds



5. 5 of which: Private bonds



this partly reflects the investment strategies of public sector pension schemes, which have tended to concentrate on such bonds. Evidence for Japan suggests that much of the growth of bond holdings has resulted from a greater share of public bonds purchased at issue, at the government's insistence.

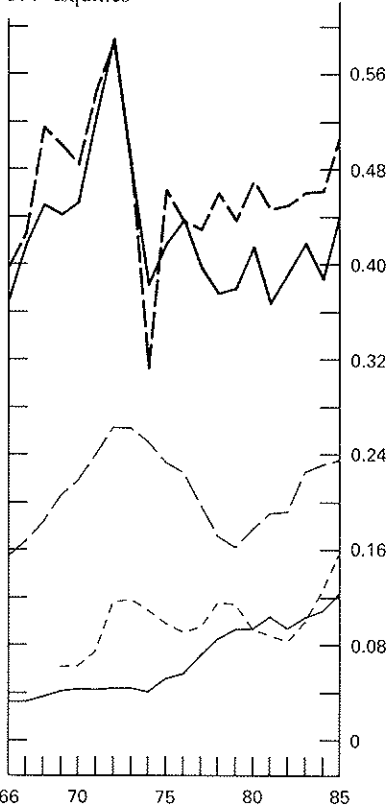
Except in Germany, where the bank bond market remains buoyant, *private bond* holdings of pension funds have tended to decline. Nevertheless, in the United States the share remains over 20 per cent. The decline reflects availability, but also a shift into public bonds and equities. Unlike life insurers, which have often remained locked into corporate bonds, pension funds have generally not faced regulations against equity holding and have thus been able to take more advantage of shifts in relative returns. They are also less interested than life insurers in the use of corporate bonds for liability-matching purposes.

Graph 5.7 shows the share of *equities* in pension funds' portfolios. Over the period covered, the share in the United Kingdom has grown significantly, as has the share in Germany and Japan at a lower level. Elsewhere levels in 1985 are similar to those in 1966, suggesting that an equilibrium desired proportion of equity has been maintained in the United States and Canada. Market values in the United Kingdom and the United States were strongly affected by the market instability in the early 1970s, i.e. "revaluation" rather than "flow" changes. Canadian data are at book value, but the results of stock market volatility are shown in the relative drawdown of equity over the period 1972–79. In most countries the portfolio share of equity tends to be higher for pension funds than for life insurance (see Graph 4.7). As noted, this is partly due to regulation but may also be attributed to the difference in liabilities. Since pension funds may offer real returns, and need not plan for lump-sum withdrawals or fixed nominal payouts, it is sensible to invest in "real" assets such as equity and real estate. This contrast may also be seen in the case of *mortgages*; these are shown in Graph 5.8 not to be a large proportion of pension funds' portfolios, and also the portfolio share has declined in recent years.

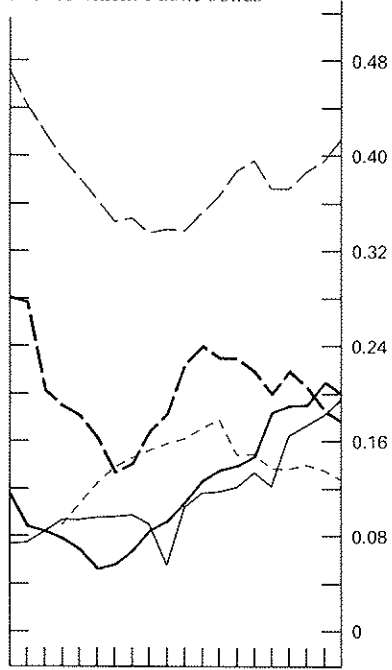
# Portfolio distribution of pension funds

- United States
- - - United Kingdom
- Germany
- - - Japan
- - - Canada

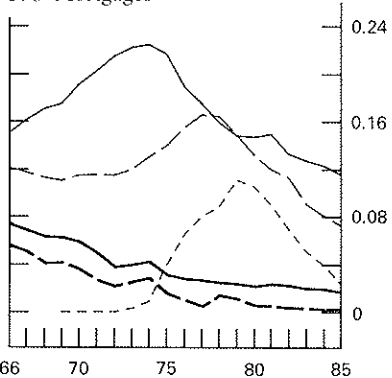
5.7 Equities



5.6 of which: Public bonds



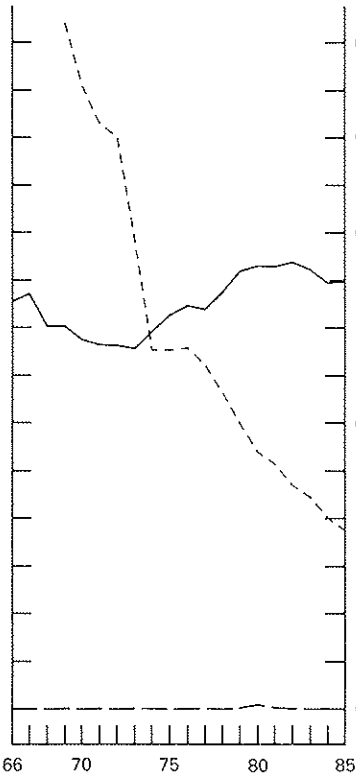
5.8 Mortgages



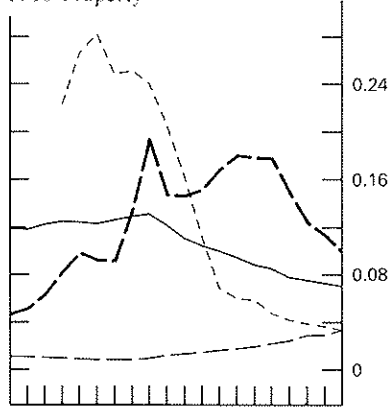
# Portfolio distribution of pension funds

- United States
- - - United Kingdom
- Germany
- - - Japan
- - - Canada

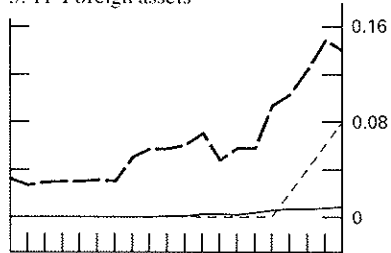
5. 9 Other loans



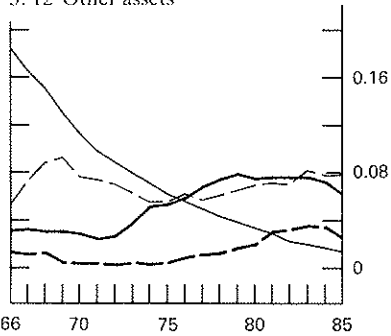
5. 10 Property



5. 11 Foreign assets



5. 12 Other assets



Graph 5.9 shows that *loans* (largely to banks and companies) still constitute a large proportion of German pension funds' assets, as for life insurers. As shown in the Appendix, returns on such loans have been high in Germany. In Japan the share of loans in the portfolio has fallen sharply, given the slackening demand at the end of the high growth period. The sharper decline in Japan for pension funds than for life insurers suggests a relatively conservative approach to fund management, as these medium-term floating rate yen loans to firms have been consistently the most profitable investment in Japan, at least until the early 1980s.

The same comment applies to declining investment by Japanese pension funds in *property* (including the equipment and real estate trusts) (Graph 5.10), which has fallen from almost 30 per cent. of the portfolio in 1970 to under 5 per cent. now. Returns are again long-term, floating rate, and have historically been relatively high. In other countries, property holdings in the United Kingdom and Germany have also declined recently. Pension funds in the United Kingdom accumulated much real estate following the weakness of the equity markets in the mid-1970s. Once equity returns recovered, property investment declined owing to its lack of liquidity and lower returns. Comparison with Graph 4.10 shows a generally lower proportion of property for pension funds than for life insurers.

*Foreign asset* holdings by pension funds have followed a similar pattern to those of life insurance companies. The portfolio shares of foreign assets for the United Kingdom, Germany and Japan are shown in Graph 5.11. Estimates by Ehrlich (1981) suggest that in 1980 2 per cent. of US pension fund assets was invested abroad, though this was expected to grow rapidly. For Japan, estimates by Mitsubishi Trust shown in the Graph (Financial Times, 17th February 1986) suggest that foreign assets of trust banks' pension funds increased from a negligible size in 1981 to 8 per cent. of the portfolio in 1985. The recent raising of the ceiling on foreign investment will allow them to increase further.

The characteristics of pension funds' portfolios, which result from the asset selection discussed above, are shown in Table 5.1.

Table 5.1  
 Characteristics of pension funds' portfolios

		United Kingdom	United States	Canada	Japan	Germany
		as a proportion of total assets				
Marketable securities <sup>1</sup>	1970	0.85	0.90	0.77	0.26	0.23
	1980	0.79	0.86	0.73	0.62	0.34
	1985	0.86	0.87	0.79	0.64	0.44
Real assets <sup>2</sup>	1970	0.61	0.45	0.23	0.36	0.17
	1980	0.70	0.41	0.20	0.15	0.18
	1985	0.74	0.44	0.27	0.19	0.19
Capital-uncertain assets <sup>3</sup>	1970	0.93	0.90	0.76	0.50	0.36
	1980	0.94	0.82	0.70	0.67	0.42
	1985	0.94	0.85	0.76	0.67	0.51
Fixed-interest-bearing assets <sup>4</sup>	1970	0.32	0.51	0.65	0.14	0.69
	1980	0.24	0.43	0.64	0.52	0.76
	1985	0.20	0.42	0.56	0.48	0.79

*Note:* Categories overlap, so they do not add up to one.

<sup>1</sup> Equities, bonds and market paper.

<sup>2</sup> Equities and property.

<sup>3</sup> Equities, property and bonds.

<sup>4</sup> Bonds, mortgages (for Canada, the United States and Germany), other loans (for Germany).

Comparison with Table 4.1 for life insurers on page 48 reveals a comparative lack of change in the characteristics of pension funds' assets, which may in turn be related to unchanging aims and regulation. This is particularly true for the United Kingdom, the United States and Canada, where the main shift has been a move from fixed interest to real assets by UK pension 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.

To summarise, contrasts have been indicated between pension fund and life insurance company portfolio behaviour which can be related to the nature of liabilities and the relative absence of regulation for pension funds, especially in the cases of the United States and Canada. Important differences are also observable between pension funds in different countries, for example, the higher share of equity in the United Kingdom and of loans in Germany. Such contrasts often arise from differences in the relative returns on assets – see also Section VII, where portfolio demand equations are estimated – but may also arise from strength or weakness on the supply side and the changing nature of the capital market.

In the light of these portfolio distributions, there follows an analysis of the techniques by which these funds are currently managed in the United Kingdom and the United States, the countries where the institutional sector is most highly developed.

## VI.

### **UK and US long-term institutions' current portfolio management – techniques, instruments and organisation<sup>13</sup>**

The flow-of-funds data described above give a general outline of changes over the past twenty years in institutional portfolio distributions. However, such data are limited in the amount of information that they can convey regarding the *manner* in which institutions operate. For example, they tell nothing about whether equity portfolios are managed actively or passively, or whether futures are used to hedge against risks. Such lacunae are of

<sup>13</sup> References: see footnote 1, also Sametz (1984), Corner, Mayes and Woodward (1983), Frost and Henderson (1983), Wood Mackenzie (WM) (1986), Financial Times (1987) and Jackson (1987).

A comparative study of long-term institutional investors' financial market activities in the United States and the United Kingdom

*Recent changes in techniques, organisation and instruments* – headings for discussion

1. *Liquid assets*

- Traditional liquid assets
- Liquidity of security portfolio
- CDs
- Commercial paper
- Euro-notes

2. *Bonds*

- FRNs
- Euro and foreign bonds
- Convertible bonds
- Bonds with warrants
- Securitised loans
- Other – zero coupon
  - junk bonds
  - bonds separating principal & interest
  - immunised bond portfolios

3. *Equities*

- Indexed portfolios
- Venture capital funds
- ADRs
- Foreign equities/property

4. *Techniques*

- Swapped assets
  - Options (buy or write)
  - Futures
  - Warrant trading
- (Use for hedging currency/interest rates/security prices/stock index)

5. *General*

- Management/trustee relation
- Time horizon for returns
- Performance measurement – returns/risk exposure
- Flow versus stock re-allocation
- Active or passive shift into new instruments?
- Are instruments tailored to funds' needs?
- Currency composition
- Objectives and strategy (related to liabilities?)

particular importance given the acceleration of change in financial markets in recent years. The nature of such changes in the banking sector has been widely reported, for example in the Cross Report (1986), but for institutions this is not the case, particularly in the realm of transnational comparisons. This chapter aims to start to fill this gap by an analysis of the institutions' participation in new instruments as well as recent changes in operating techniques and organisation. The methodology employed was to conduct interviews with fund managers and other experts (who shall obviously remain anonymous) in London and New York, using the headings for discussion shown above. The London interviews were conducted in

October 1986, New York in January 1987. While obviously unrepresentative owing to the small size of the sample (six for each country), such a technique, particularly when combined with local publications and other available information, allows a clearer picture to emerge of the aims, methods and potentialities of long-term institutions, together with some implications of their growth.

#### *United Kingdom*

Fund management was discussed with representatives of life insurers, public sector funds and merchant banks; the description that follows may thus be unrepresentative of the 26 per cent. of pension funds managed by independent managers, stockbrokers and clearing banks. The portfolio distributions described above, and the rapid growth of portfolio size relative to that of institutions elsewhere, suggest that funds offered by UK institutions are real-returns-oriented and more attractive to investors than those elsewhere, especially since tax systems faced by institutions have been shown to be either similar or more favourable to institutional investment elsewhere. It has been suggested above that lack of regulation was an important determinant of this growth. The following description suggests other important factors.

#### *United States*

As in the United Kingdom, discussions were held with fund managers and economists from life insurance companies, public sector funds and investment banks. Although not all-embracing, the sample thus covers a wide spectrum of US fund management. It has been shown above that pension fund growth in the United States has been rapid over recent decades, as in the United Kingdom, while pension funds' portfolio distributions have been similar to those in the United Kingdom, with a heavy concentration on equities. Analysis will thus reveal to what extent this similar growth and broad asset selection has been backed by similar detailed organisation and techniques. Meanwhile, the US life insurance industry has performed relatively badly, losing market share as

shown in Graph 3.3. We assess whether this was a result of fund management techniques, or rather regulation and the preferences of individuals. This analysis is aided, on the one hand, by comparison with the more successful UK life insurance industry and, on the other hand, by comparison with US pension funds.

### *1. Liquid assets*

*Liquid assets* are used by UK institutions largely as an instrument to hold inflows which are waiting to be invested. The size of such inflows depends on the maturity of the fund: for mature funds there is no positive cash flow. Such liquidity is largely held in sterling, to avoid the need to take a view on the exchange rate. In some cases where liquidity does have to be held in a foreign currency forward rate agreements would be used. Liquidity can arise in other cases when, for example, a fund manager feels it wise to go liquid in a particular market, say the Japanese, when he feels equity prices will fall. Yen cash or short-term Japanese Government bonds might then be held.

The form in which liquid assets are held seems still to be largely the seven-day deposit. Most of the fund managers did not invest in "new instruments" such as CDs, commercial paper and Euro-notes, either due to their foreign currency denomination, because (for commercial paper) higher risk is felt to offset the normal advantages of liquidity, or merely because returns net of transactions costs are not seen as significantly higher than those on deposits. Of these instruments, CDs appear to be the most likely to be used; the managers also mentioned the use of short-term bonds, local authority temporary debt and building society deposits as possible repositories of liquidity. Euro-notes might be used in some cases for US clients.

In the United States, too, liquid assets are used largely as a park for money waiting to be invested, or if the market is sour. A frequently-used liquidity management technique appears to be use of an independently managed money market fund to maximise

returns on liquidity. There might be one for the whole fund, and also one for each individual manager. For the fund itself the account would hold cash flow, while for the managers the money account would act as a "sweep" account into which any cash would be deposited at the end of the business day. The maturity of assets in such a fund would typically be 30-60 days, and it would generally comprise bankers' acceptances, seasoned CDs and commercial paper. These accounts would tend to be dollar-based. Few of the managers would hold Euro-notes or Euro-CDs for their US operations. Even those who did use these instruments noted that they would be regarded as less sound than domestic CDs and commercial paper.

Some US managers would include in their liquidity bond instruments such as FRNs, government bonds with up to two years' maturity, mortgage-backed securities and, in particular, floating rate and short-term collateralised mortgage obligations. As noted below, these instruments might also be held as investment vehicles in cases where preservation of principal is important to a fund at all times.

A distinction could be drawn between life insurers and pension funds in the United States in that the former were constrained by the nature of their liabilities to stay relatively liquid, while the latter could stay fully invested except in a sour market, as is the case for both types of institutions in the United Kingdom. Rebuilding of liquidity by life insurers in the United States reflects the continuing negative effects of loss-making policy loans on their portfolios (which were highlighted in Section IV).

The managers were also asked about the *liquidity of their security portfolio*. Had it increased? Were some "investment" securities also regarded as liquid? The general response in the United Kingdom suggested that liquidity and securities were kept separate, the latter being regarded solely as investment vehicles, and that liquidity had not increased. In an emergency it would be government bonds that would be sold from the portfolio and not equities.

A similar response was obtained in the United States from most of the fund managers, i.e. there is a division between “trading” and “investment” assets. The cut-off point was often seen to be a bond with over two years to maturity. However, in some cases (pension funds where preservation of principal was important, life insurers) assets which elsewhere would be counted as “liquid” would be held as investment vehicles. These would include floating rate notes, CMOs and other mortgage-backed securities. The distinction is thus somewhat less sharp than in the United Kingdom, reflecting an outlook on the part of some US institutional investors which was relatively more short-term and oriented towards nominal returns. Regarding the liquidity of the security portfolio itself, it was felt that it had increased, particularly for life insurers. They have tended to switch from private placement corporate bonds to bonds tradable in the public market and to US Treasury issues. This is a further aspect of their recent shift to liquidity as noted above.

## 2. Bonds

The discussion then focused on *bonds*. In general, it was felt in the United Kingdom that for pension funds bonds were not the natural habitat, given the higher real return on equities. Also, many of the types of bonds offered are of interest largely to taxpayers and not to tax-exempt pension funds. In view of their different tax status and somewhat greater emphasis on nominal returns, life insurers were more committed to bonds than pension funds.

In the United Kingdom there was a general consensus that *floating rate notes* were of little interest to institutional investors, who regard them, along with Euro-notes, largely as a vehicle for company liquidity. This was also felt by most to be the case for fixed rate Euro and foreign bonds; most of the fund managers would only consider bulldog/Euro-sterling bonds, though others held long-term government bonds in major currencies (albeit only in the last two to three years). Euro-bonds in bearer form were largely considered an attraction to the taxable investor.

Even *UK gilts* (government bonds) were felt to be a relatively minor investment by most of the managers. They were seen largely as a short-term investment (to obtain a capital gain when interest rates fall), or were considered when a portfolio had exceptional income requirements. They were no longer viewed as important for diversification because it has been possible to use foreign equities for this purpose since the abolition of exchange controls.

*Convertible bonds* were held by all of the UK managers, largely in sterling, and were generally regarded as equities rather than bonds. Bonds with warrants were also held by most of the managers, though, as discussed later, separate trading of warrants does not yet appear to be a feature of UK institutions' behaviour. Securitised loans have yet to become widely available in the United Kingdom, but the managers' comments suggest that even when they do become available, they will not be seen as a habitat of pension funds but instead as an instrument that money dealers might use for the accounts of corporate treasurers.

*Zero coupon bonds*, junk bonds and bonds separating principal and interest are again largely US instruments that have not become widely available in the United Kingdom. Most fund managers did not trade them, given their sterling and equity orientation. Also, these bonds were felt to be largely of interest to taxpayers – for example zero coupon bonds, which offer a return wholly in the form of capital gains. However, they were still felt to hold some attractions for pension funds. Zero coupon bonds are of interest if one takes a view on the future interest rate, as they preclude the need to reinvest the annual coupon at a possibly lower rate. Some small amounts of junk bonds had been held, though they were seen as injurious to equity values of the issuing firm, and fund managers did not encourage firms in which they held shares to issue such bonds. STRIPs, TIGRs, etc. were not held. The US instruments in general were felt in any case to mimic poorly the UK index-linked government securities, which all the fund managers held, despite the problems of falling inflation (which has had the effect of reducing the yield on indexed gilts relative to other assets).

For US fund managers *bonds* are more of a mainstay than in the United Kingdom. Bond/equity proportions quoted ranged from a minimum 25/75 for the more aggressive, externally managed private funds to 90/10 for life insurers. The latter were constrained to hold mainly bonds, both by the nature of their liabilities and by legal restrictions on portfolio distributions. Meanwhile, public sector pension funds, partly for reasons of caution, tended to hold a greater proportion of bonds than private sector funds. In the shorter term, it was emphasised that the proportions were not fixed; the private funds would often invest 50 per cent. or more in bonds if interest rates were expected to fall. A common tactic in bond investment is to “play the US yield curve”, trying to lengthen maturities when the curve steepens and to look for kinks in the curve from which profits might be obtained. This would not necessarily involve any change in the proportion of bonds in the portfolio. These short-term techniques are obviously focused on capital gains rather than coupon yields. Not that bonds are only held for short-term purposes; they were also used for long-term investment, for example, due to the protection they offer against falling inflation.

Regarding *bond instruments* used, most fund managers agreed with their UK counterparts that FRNs were largely a vehicle for liquidity. As observed, however, some managers with short-term and nominal liabilities might use FRNs for investment, and even in the long term it was noted that they might become attractive if inflation accelerated. Given their strong preference for dollar-based assets, the managers tended not to invest in foreign currency Euro or government bonds. Even Euro-dollar bonds would not be a major asset – 1 per cent. for life insurers was considered typical. Some quoted a figure of 0.5 per cent. for foreign government or supranational issues, which could be in foreign currency, while those with European securities managers allowed them to hold foreign currency denominated bonds. Some funds would hold “Yankee bonds”, i.e. foreign bonds issued in US dollars, and managers offering immunised bond portfolios (discussed below) might invest up to 15 per cent. of the immunised portfolio in non-dollar



securities. Regarding Euro-bonds in general, a disincentive “seasoning issue” was noted, i.e. once such bonds are seasoned there is not much market turnover, so that funds then face low liquidity. For foreign government bonds, the political and expected exchange rate situation would obviously be relevant, and sometimes for such reasons a ban would be put on the purchase of bonds from some countries.

*Convertible bonds* tended to be either held and regarded as an equity rather than a bond instrument, given the high correlation of their return with equities, or avoided on the grounds that holding debt and equity separately should offer a higher return. Bonds with warrants are not widely used in the United States; life insurers noted nonetheless that they would buy them if they were offered. Sometimes such instruments would be held by fund managers of international securities.

*Securitized loans* have long been available in the United States in the form of federally guaranteed mortgage bonds, such as FNMA and GNMA securities. More recently, privately sponsored mortgage bonds (CMOs) have become popular, and there is an emerging trend to package other loans, such as credit card and car loans. Most funds held FNMA and GNMA securities, generally classing them as bonds rather than mortgages. They often faced restrictions on the holding of securitized loans which were not federally guaranteed. Trustees of some funds, especially public funds, might insist on the holding of mortgage bonds (and municipal bonds) as a “social duty”. CMOs were held by life insurers and some of the pension funds interviewed, though the other pension fund managers felt they would diversify into them in due course. Life insurers also expressed an interest in packaged consumer loans.

*Zero coupon bonds* were popular; as noted above, they are attractive in that they preclude the problem of coupon reinvestment. Junk bonds were often ruled out by credit-rating restrictions, either by trustees or by law (the latter especially for life insurers). Those who did hold such bonds would typically hold only a small number,

with management sub-contracted to specialist managers. Bonds separating principal and interest were popular, in particular STRIPs (i.e. a Treasury bond without interest – effectively a zero coupon bond).

US fund managers were asked about their use of *bond index fund techniques*. These were also used by some managers in the United Kingdom, but they originated in the United States, and their use appears to be more widespread there. There are two basic techniques: “dedication” and “immunisation”. Dedication is basically a passive technique, which involves the purchase of bonds whose maturity and coupons exactly match the nature of the liabilities. Once purchased, the bonds are retained until maturity. On the other hand, immunisation generally involves a balancing of the duration of assets with the duration of the bond market index. (Duration is the weighted average maturity of a bond, where the weights are the present value of the coupon and redemption payments at each payment date. Duration thus changes when the market interest rate, at which future payments are discounted, changes.) Immunisation in relation to a market index ensures that the performance of the bond portfolio exactly matches that index. It is a more active strategy than dedication, requiring constant purchases and sales in order to shift the duration of the portfolio to that of the target. At a minimum, rebalancing in this way would be done every year (a figure quoted by life insurers). As an active technique, immunisation is more likely to cause market volatility than is dedication. Immunisation was felt initially to be a fashion, induced by high interest rates, but now it is thought likely to be a lasting phenomenon. However, some dissatisfaction was expressed, especially by pension funds, at the fact that the duration of the market index (at five years) was out of line with the duration of pension plans (typically fifteen years). Several of the managers had therefore increasingly adopted a matching of asset to liability duration using immunisation. This prevents large fund surpluses or deficits arising, a factor which will be increasingly important to firms under the new “FASB87” accounting rules.

Use of immunisation was not universal; one fund used a “dynamic asset allocation model” as a method of bond insurance, employing arbitrage between risk-free and risky fixed interest rate assets. This technique compensates declines in the value of the portfolio, caused by higher interest rates, by the higher yield obtainable at the time from the reinvestment of coupon receipts in the risk-free assets, such as Treasury bills.

### 3. Equities

As noted, *equities* are the mainstay of UK institutional investors, and several innovations in this area have been proposed recently. *Indexed* or “*index-matching*” portfolios have long been popular in the United States, holding all the shares in a stock market index or, alternatively, a core of shares which replicate the behaviour of the market index, in each case minimising transactions costs (this might be characterised as both an “instrument” and a “technique”). In an “efficient market” such a strategy should generally beat an actively managed portfolio net of transactions and management costs. Some UK managers did run explicit index funds, both UK and foreign, which have grown considerably in recent years. Equity index funds fall into two main categories, the first comprising large funds that cannot be actively managed, and which thus hold the whole index or at least a “core” of companies. Secondly, portfolio insurance could be obtained by holding a portfolio, together with put options on the index, giving insurance on the downside risk. As discussed below, this is only one type of insurance.

Passive management of an index of equities can be implicit as well as explicit, if much of the portfolio remains unchanged for long periods. For large UK funds this can be the case for as much as three-quarters of their British equities, which suggests that index-matching is more widespread than it appears at first sight. The managers who denied using indices might well have been passively managing much of their portfolio in this implicit sense. The implications and usefulness of indexing were the subject of conflicting views. Obviously, those promoting index-matching funds

were strongly in favour. Some felt that the utility of indexing in the sense of modern portfolio theory was unproven in the British case, because the market was inefficient due to the presence of many institutions which failed to take advantage of opportunities for arbitrage or profit. (The “semi-weak” form of the efficient markets hypothesis requires that current share prices contain the effect of information which is generally available.) Others felt that a general move to index-matching would be a bad thing as it would eliminate the possibility of establishing an efficient market.

*Venture capital funds* have been an important feature of the effort by the British Government to encourage the growth of small firms (as they have elsewhere, see Gönenc (1986)). Most of the fund managers invested in venture capital funds or firms on the Unlisted Securities Market (USM), though generally only a rather small part of the portfolio (1–2 per cent.) was so dedicated. The problems are largely of illiquidity, though the USM has also tended to underperform the main market. Trustees often feel that such investment is the “social duty” of a fund. It was noted that venture capital investment was sub-contracted to specialist funds rather than done by the managers themselves in most cases. Further to the discussion of index matching, some large funds would also track the USM index by buying a small amount of all the USM shares.

*American depository receipts* (ADRs) are a means of trading UK shares on the US markets. As such, they enable UK firms to broaden their shareholder base, while causing some concern on the part of the UK authorities that if they are extensively used by UK investors, they will lead to a fragmentation of the British equity market. Most of the UK fund managers interviewed did not use ADRs extensively; however, in most cases it was felt that the instruments were useful, largely for *timing* of transactions if the price of a share moved to warrant a transaction when the UK market was closed, rather than as a means of disintermediation. It was also pointed out that some shares are in any case concentrated in ADR form, so ADR transactions are needed to retain a balanced portfolio.

Regarding *foreign equities and property*, responses from UK fund managers indicated on balance that foreign equities were a vital component of the portfolio, but that foreign property would generally either not be taken on at all, or only in the form of a property trust. Some managers used foreign equity as a means to develop holdings in industrial sectors, where there is no UK counterpart, thus taking an implicit view of common world trends for major industries. Most, however, took the view that diversifying between countries in all industries was an important means of reducing the volatility of returns on the portfolio, as well as perhaps of increasing the mean return.<sup>14</sup> It may also be of significance that sterling has tended to depreciate secularly against other currencies. Foreign investment has thus tended to be particularly profitable in sterling terms.

In the United States *index funds* for equities are widely used, especially for large funds. They tend to be explicit (i.e. setting out deliberately to replicate the behaviour of the market) and are often combined with portfolio insurance techniques, as discussed further in Section 4. The most popular index to follow appears to be the Standard and Poor's 500-share index. Indexation sometimes accounts for all of the equity portfolio, though with large funds it might make up only 15 per cent., with the rest managed actively. Cost and lower risk were cited as advantages. As in the case of indexed bond portfolios, investment banks are vigorously promoting these techniques. One manager, however, noted that growth of indexation to the market index is declining. A new approach is enhanced or "core" indexing. Sectors would be held constant, while stocks would be juggled within the categories. Low fee structures could be offered for such an approach. It was noted that the profitability of such an arrangement net of transactions costs implies

<sup>14</sup> Analysis by WM computer services (1986) suggests that diversification into foreign equity has generally succeeded in both of these objectives.

some market inefficiency. For obvious reasons, these schemes are popular with "pension consultants", who set up teams of managers and offer their services to plan sponsors.

*Venture capital funds*, if used at all, tend to be a small proportion of the portfolio, as in the United Kingdom. A major problem inherent in such venture capital funds, which are generally closed-end ("investment trusts"), is illiquidity. An investor wishing to sell out will tend to drive the price down. On the other hand, closed-end funds are more appropriate than open-end ("unit trusts") for venture capital, because they enable projects to mature without the risk of withdrawal of the original funds from the growing firm. It was emphasised, especially by life insurers, that institutions might participate in venture capital by means other than such funds. For example, there might be direct investment in equity of small firms, or participation in a direct limited partnership. There might also be participation in a leveraged buy-out at the "mezzanine" level (i.e., at a level of risk higher than that of senior debt holders), lending to those buying the equity in the form of an unsecured note. The note would not be purchased with marketability in mind, but rather to make a high return, with the firm's cash flow being used to pay off the debt.

*ADRs* were used by several of the managers, though some problems were noted in connection with pricing. Sometimes trustee restrictions would enforce the use of these receipts in preference to foreign securities. Investment managers with a presence in the foreign equity market tended to prefer buying the securities there.

*Foreign assets* were far less popular among US than among UK investment managers. In several cases foreign securities were eschewed as a policy decision; in all cases the view was taken that to the extent that liabilities were in dollars, assets should be similarly denominated. Unlike sterling, the dollar has not faced a long-term depreciation, which would boost returns on foreign assets. However, several managers said they expected use of foreign assets to increase. Insofar as foreign assets were currently held, they were largely equities and bonds, not property. Some used an industry

basis for foreign investment (as noted above), while others took a view on differential movements of markets and interest rates.

To summarise the discussion of the instruments, institutions in the United Kingdom appear at this time to be fairly unadventurous in their use of new instruments; however, in most cases reasons could be adduced for the neglect of any instrument, and it appears that most of the means available for significantly reducing the volatility or increasing the yield on the portfolio have been adopted (passive management, convertible bonds, venture capital, foreign equities). US funds tend to use a wider range of new instruments than is the case in the United Kingdom. This largely reflects the greater availability of instruments, such as STRIPs, zero coupon bonds and securitised loans, on the home market. In terms of indexing, this may also be a function of the lower transactions costs and the earlier liberalisation of the capital markets, as well as the earlier development of these techniques in the United States and the, perhaps, greater scope for gains in the field of indexed bond investment than for equities. On the other hand, the US funds appear to invest rather less than their UK counterparts in venture capital and foreign assets. As noted, this is related to a preference for assets to be denominated similarly to liabilities. However, one might suggest that it increases funds' vulnerability to market instability in the United States, a risk which could be reduced by balancing investment in other countries, where stock market cycles are not synchronised. There appears to be a growing awareness in the United States of the possible benefits of such an approach.

#### *4. Techniques*

The fund managers were asked to comment on their use of the new techniques for portfolio management, which appear to be widely used by commercial and investment banks (swaps, options, futures, warrant trading). In general, institutions in the United Kingdom appear to be adopting these techniques rather slowly, while in the United States the use of these techniques, especially by

pension funds, is more widespread. This can partly be related to the depth of the markets for these instruments. Life insurers in the United States, by contrast, were often barred from using such instruments by law.

*Swapping* was not a generally employed technique in the United Kingdom; some managers commented that this was because they were not involved in the Euro-markets. It was noted that funds formerly used swaps when exchange controls were in force (back-to-back loans) and thus might use them again if such controls were reintroduced.

In the United States swaps were not used by the pension fund managers interviewed. Double credit risk and illiquidity were noted as problems with this technique. Life insurers, however, often negotiate swaps with other companies. This may be useful for tax purposes, taking losses, then moving into comparable assets. The technique would be of particular use for illiquid assets such as private placement bonds.

UK funds differed in their use of *options* markets. Some were not involved but would consider use of options; others would buy options for hedging purposes but not write them; some did both. Some felt that pension funds were "natural" writers of options, accepting some risk to gain a return. Others were more circumspect, only writing options for covered positions on a few portfolios, citing the illiquidity of the market and the high dealing costs.

*Futures* were again often not, or little, used in the United Kingdom, frequently because the trustees of the funds suspected that they were instruments for "gambling". Such restrictions by trustees may ban futures trading on a portfolio, or restrict futures (and options) trading to cases where delivery of a security is involved. Such a clause would rule out stock index options or futures, a market which is starting to develop in the United Kingdom (though as yet not many participants are ready to offer "puts", so the market has limited liquidity).



*Warrant trading* does not seem prevalent among UK institutional investors as yet and would be constrained by trustees in the same way as options and futures. However, *forward rate agreements* (FRAs) seem to be a quite common means of hedging currency risk.

To the extent that these techniques are used, *which risks are they used to hedge?* In most cases in the United Kingdom they are used for currency hedging. Some used futures and options for this, while others combined options and FRAs. The forward currency method was felt to be advantageous because of the high dealing costs in the futures markets. Some used traded options to cover security prices; gilts futures were also mentioned.

In the United States options and futures are used widely, particularly by private sector pension funds, but warrant trading is not common. In the case of *options*, funds tended both to write (call) and buy (put) them. One estimate was that half of US pension funds use call options. Puts tended to be used against the stock index as a means of portfolio insurance. Calls would often be used when income was desired rather than capital appreciation. This might occur in the case of a fully funded mature scheme needing income to pay liabilities and not in need of growth – indeed, facing penalties of tax and possible take-over if the fund went into excessive surplus. It was noted that options against individual equities (rather than the index) were in decline, reflecting losses in recent years.

*Futures* were used extensively as a means of hedging or portfolio insurance for equities, bonds and foreign currency, and also for program trading. *Program trading* is the simultaneous buying and selling of portfolios of securities. Many program trades are aimed at profiting from arbitrage between the stock index future market and the stock market. In theory, an index future should sell for the same price as the underlying stocks, plus carrying costs saved in owning futures instead of stocks. In practice, futures will fluctuate around this price, partly because the lower cost of trading futures causes futures to reflect buying and selling pressures before these pressures are fully reflected in stock prices. When futures are above or below

the norm by an amount sufficient to cover transactions costs, program traders can profit by offsetting trades in futures and the underlying stocks. Numerical examples of insurance and program trading are given in Morgan Guaranty (1986). Unlike the UK markets, both futures and options markets are well developed and highly liquid; indeed bond and equity futures markets were felt to be more liquid than the markets for the assets themselves.

Put briefly, *use of futures for insurance* is similar to that described above for arbitrage between bonds and Treasury bills. Portfolio insurers sell stock index futures, which reduces the investor's exposure to changes in stock prices and creates an income cushion analogous to that provided by sale of stock and purchase of Treasury bills. Additional adjustments are made by purchasing index futures to raise stock market exposure as stock prices rise and selling index futures to reduce exposure further if stock prices fall. Similar effects are obtainable through the purchase of stock index options or options on stock index futures.

Although some resistance from trustees was noted, and despite lack of use by most life insurers and public pension schemes, stock index futures and similar techniques generally appear more acceptable for funds in the United States than in the United Kingdom. Futures and options can be used to hedge all the risks noted on the questionnaire, viz. currency risk, interest rates, security prices and the stock index. An additional use was duration management; futures could be used as a duration extension technique as well as for insurance (implicitly shortening duration). It was pointed out that futures are more widely accepted in the fixed income market – where half of all activity is in the futures market – than in the equity market.

Participation in the new techniques by the UK institutions has thus been rather restrained to date, owing to problems with trustees as well as a lack of market development. However, even where the techniques were not yet being employed, managers suggested that they might use them in the future. This suggests that a greater use of these techniques by institutional managers is in prospect. The more

extensive use of these instruments in the United States may indicate the likely future development of the UK market. It is worth noting that in the United States portfolio insurance and program trading have been accused of creating equity market volatility, by causing extensive sales of stock when the market is falling. However, the case for this does not appear to be proven at the time of writing, except at the individual dates when option and future contracts must be renewed (“the witching hour”).

### 5. Organisation

We concluded the interviews by discussing some more general issues in investment management, which can nonetheless have an important bearing on portfolio distribution, operating techniques and frequency of transactions.

Regarding the *relation between management and trustees*, it has already been noted that in some cases the trustees constrain the portfolio distribution or techniques used in both the United Kingdom and the United States. In the United Kingdom some might, for example, limit the proportion invested in the Unlisted Securities Market; others might oppose the use of futures. Some fund managers avoid such problems by insisting on total delegation of the right to make portfolio decisions. Others try to persuade clients that certain techniques are in their best interests. Others again impose self-restraint.

In the United States, too, various restrictions imposed by trustees might include prohibition of the use of non-dollar securities, credit restrictions on lower-rated bonds, hedging, use of futures, limits such as 5 per cent. on investment in one company, and limits on equity exposure. For example, private funds might limit the proportion of equity to 50 per cent., public funds perhaps to as low as 30 per cent. by state statute.

The basic law regarding institutional investment in the United States is the “prudent man rule” (see Section III), which requires fund managers to invest in the way a prudent investor would. However, life insurers typically face many more legal controls on

portfolios under state law (for which New York is often taken as a model). These include limits on overseas investment, separate limits on Canadian dollar securities, futures, lending on securities, limits (20 per cent.) on equity proportions, and junk bond restrictions.

What of *internal versus "external" management* of the portfolio, i.e. sub-contracting some of the running of the portfolio? The tendency in the United Kingdom is towards external management, although it was felt that internal management was far cheaper, and figures collected by WM (1986) suggest that funds managed centrally reap higher returns than those which are split up among several management companies. One explanation for the shift to external management is delegation in the case of niches in the market where there is no in-house expertise, for example, venture capital, securities issued in Canada, Europe or Japan. More generally, the difficulty of retaining in-house expertise given the increase in salaries to the financial sector has led several firms to abandon internal management.

In the United States the trend has been opposite to that in the United Kingdom: a shift from external to internal management, though more recently a relatively stable situation has been maintained. This has occurred despite the fact that internally managed funds are suffering from cutbacks of staff and an inability to offer competitive salaries. Meanwhile, a significant recent development is the use of investment management "boutiques", as in the United Kingdom, which are often brought to the sponsor's attention by pension consultants.

Where funds are for the most part externally managed in the United States, the degree to which fund management also involves the trustees tends to vary. In the case of the public sector pension funds, the trustees had some involvement in the portfolio decision. In one case the sponsors would set a benchmark return, which would approximate the return on a certain distribution of assets. They would not set a precise asset allocation, but might say to the managers that they should stay between 40 per cent. and 80 per cent.

of equities. In another case the sponsors would have a pension committee which would set precise portfolio shares for investment managers.

The *time horizon* for returns of institutional investors has often been criticised as being too short, thus preventing industrial management from making long-term strategic investments in R+D, etc. For the United Kingdom, in most cases, this criticism appeared initially to be unfounded, at least to the extent that most fund managers claimed a time horizon for returns of three to five years, and that it has not shortened recently. Indeed, to move to passive management was felt to be the opposite of shortening time horizons. However, such long time horizons were not the universal rule; where funds were managed for others the horizon was considered to be one year. If two years in succession gave bad results, it was feared that the account would be lost (a discussion in the *Financial Times* (19th February 1986) supports this view in noting that dismissal of pension fund managers reached a record level in 1985). It was also noted that while the overall horizon might be long, the monitoring of returns as a management tool would generally be far more frequent, taking the form of a monthly or quarterly check to see where the portfolio allocation was underperforming and how to correct it. Time horizons were far shorter for "unitised" life insurance (i.e., where returns are linked to those on portfolios of neutral funds), where risk aversion was lower than for other life insurance and for pension funds. Thus there is some evidence that time horizons have shortened.

Time horizons in the United States appear in general to be rather shorter than in the United Kingdom. One manager of a public sector fund noted the paradox of short time horizons (featuring weekly or monthly monitoring, and firing of managers on returns over a trade cycle or a shorter period), as against the long duration of pension fund liabilities. However, he felt that one could achieve a balance by gearing the investment philosophy (via benchmark returns) to a longer range, but still not letting a manager lose money for the fund

for more than three years. Similarly, life insurers felt that their time horizons were as long as the maturity of the assets, but would still monitor their (internal) managers monthly. Another public fund gave a moving ten-year average as a time horizon for returns on the portfolio, with five years on each asset category, while fund managers would be monitored every quarter, with possible changes every one and a half years.

The external managers gave time horizons of one, three and five years at which they would be assessed. They would feel insecure with an existing client if more than one year's numbers were bad, and even more so vis-à-vis prospective clients to whom they were proposing their services. They noted, however, that a case could be made for lower returns when one's own market was performing badly, as in the case, perhaps, of the NASDAQ index versus Dow Jones.

These results imply that pressure on industrial management transmitted via short-term institutional time horizons is quite intense in the United States. It may be significant that the United States has seen the most dynamic merger wave in industrial countries in recent years.

For consideration of *performance measurement*, one needs to refer back to the discussion in Section II. Typically, there are two levels of portfolio management: the long-term strategy of distribution of the assets between markets and/or instruments (generally the responsibility of the chief economist or portfolio manager), and then the work of an individual investment manager, trying to maximise his return for given risks in a particular area. He is generally given money to invest in a certain type of asset and is then checked against others for his selection performance in markets. Broadly, in the United Kingdom the strategic planner is concerned with risk more than return, the investment manager vice versa.

Consider first the "return" aspects. Managers appear to be judged over a calendar year on average, against either a commercial

index of the institutional average return (for example, that prepared by WM computer services) or by some similar in-house system of a model portfolio.

“Risk” aspects may again be checked against an index of the pension fund average type which shows the reduction in variability of return and the change in mean return obtainable by diversifying.<sup>15</sup> Long-term strategists’ methods varied in detail, though the basic methodology of diversification is the same. Some used “balanced portfolios” as defined subjectively rather than by computers, with reference to currencies, markets, sectors and types of company. It was felt by some that analysis of “betas” and other tools of modern portfolio theory were inappropriate in the United Kingdom because of inefficient markets. Others adopted a strategy of investing in all assets and countries where returns had not been historically highly correlated, working with calculations of optimal portfolios using computer programmes derived from the Capital Asset Pricing Model (CAPM) solving for portfolio “betas”. They would eliminate only those assets which are not on the frontier of efficient portfolios (it was suggested that this might be the case for UK Government bonds). Such an approach involves little collating of views as to what will happen in a market, accepting that some asset prices will go up, others down, but still requiring such decisions as to whether to hedge the dollar. For others, a method akin to iterative planning was used (see Heal (1978)) with a “flexible monetary allocation”. A plan would be made at the beginning of the year, but it could be adjusted when, for example, managers of real property felt returns were exceptional, so that they needed more funds. Those employing explicit indexing felt they could reach the same risk level as the whole portfolio more economically using Barr-Rosenberg methods to find a “strategic core” group of shares with the same risk characteristics as the index.

<sup>15</sup> Thus, for example, WM (1986) showed that diversifying from UK to overseas equities in the period 1982–85 raised the mean return on equity by 1.12 to 2 per cent. and reduced the variability (variance) by 1 to 2 per cent. For diversification from UK equities to gilts a small reduction in returns allowed a 4 per cent. fall in variability.

It was pointed out that the concern of long-term strategy is basically risk; this is not to deny the trade-off of risk and return. In justifying fund performance relative to other funds, the manager needs to be able to show that others are getting better returns due to higher risk: if not, he is guilty of "inefficient" investment in the sense of the CAPM model noted above.

*Performance measurement and management techniques* in the United States follow the same basic patterns as in the United Kingdom, but there appears to be more focus on returns than on risk in that country compared with the United Kingdom. For example, life insurers measured returns against the market index and against other companies, while in terms of risk measurement it was felt that the portfolio was "not risky". Other fund managers felt risk was dealt with in terms of diversification and portfolio insurance, but often no attempt was made to measure risk exposure. One manager felt that no sensible results had yet been obtained regarding risk-adjusted rates of return. The discussion also called into question whether portfolio managers are more interested in risk than return, especially because attribution of realised rates of return between asset allocation and stock selection is hard to isolate, the former being due to the portfolio manager rather than the individual investment manager. In only one case was risk explicitly measured at the asset diversification stage. The process involved estimation of returns under various economic scenarios. The standard deviation of returns under the scenarios, weighted by the expected probability of occurrence, was then regarded as an index of risk.

Given these considerations as a background, returns were generally measured against a market index such as the S & P 500, though in other cases objectives based on real returns would be set (5 per cent. real return on the portfolio, 6 per cent. on US equities, 2 per cent. on bonds, 7 per cent. on foreign equities). Life insurers noted the difficulty of measuring performance in private placement bonds. There exist services in the United States, such as Wilshire and SEI, which take data from trustees or managers on average



institutional behaviour, as does WM in the United Kingdom, but use of these was not widespread among those interviewed.

Management techniques used in the United States are similar to those discussed above for the United Kingdom; primarily they involve a central selection of broad asset categories, with groups of managers at a lower level setting their own policies as to which security to buy and being able, in turn, to demand more cash from the policy-makers if they feel there are profitable opportunities. Long-term strategists' approaches also include variants on indexing techniques. These comprise stratified sampling techniques to find the optimal numbers of stocks to reproduce the attributes of the index. There was more focus on use of portfolio "betas" as a stock selection tool than in the United Kingdom, suggesting a more efficient market (or at least a greater faith in the tools of the theory of finance). Some preferred to aim for stocks with high "alphas", i.e. productive managers

Institutional portfolios and inflows are often considered to be so large that managers only need to *allocate the inflow* to change the balance of the portfolio *rather than re-allocate the stock*. This is the basis of econometric models such as those presented in Friedman (1977) and in Friedman and Roley (1979). The important distinction in both countries seems in practice to be between mature and immature funds. The latter have a heavy inflow and will thus only infrequently re-allocate the stock (for example, when the definite view has been taken that exposure to a country must be reduced). The former must re-allocate the stock, as the net inflow is zero or small. In the United Kingdom some funds, even with a positive inflow, turn the stock over regularly – for example, unitised life insurance (pursuing high returns for relatively high risk). Some pension fund managers also avoid holding "core assets".

In the United States the picture was similar; "flow" activity depends on the maturity of the fund, where many US funds are in or approaching such a state. Many firms are able to take contribution holidays and are heavily overfunded, even allowing for a possible bear market. For life insurers the flow depends on the rollover of

policies, which is likely to be more frequent than new flows to pension funds. Whether the stock is turned over depends on how far the more passive index techniques are adopted. As noted, these are fairly widespread.

Do institutions “invent” new instruments, i.e. are they active *innovators* in the markets, like banks, or are they passive, following suit later (when any profit has probably been arbitrated away)? The general answer in the United Kingdom was “passive” – as is largely confirmed by the discussion of instruments above. The main widespread innovations of the fund managers appear to be the “dedicated” and “immunised” bond funds, as noted above, together with the somewhat more uncommon “explicit” equity index funds which use such systems as the dividend discount model or computer-aided asset allocation. Venture capital funds might also be thus classified. In general, however, institutional managers (particularly those of internally managed funds) are not equipped to invent such instruments, having insufficient staff and expertise – and the same argument could undoubtedly be used in reply to the frequent calls for greater institutional involvement in corporate management. The issue of innovation was broadened by the question as to whether banks, etc. were tailoring new instruments to funds’ requirements, or whether the funds needed to adapt to instruments designed for other users. Responses tended towards the latter; the instruments are designed to help others, though the fund managers may try to adjust them. This is, of course, less of a problem for fund managers who are part of a larger financial institution, who can carry out their own innovations, such as those noted above.

US institutions, particularly fund managers with investment banks, are perhaps more innovative than their UK counterparts. Those interviewed were promoting such techniques as tailor-made options and futures packages, equity portfolio protection, “market-equity-enhanced immunisation”, “dynamic asset allocation” (as discussed above), and various other types of index funds and cash management techniques. The investment banks would try to

develop techniques which were usable by many funds, but which could also be tailored to the needs of each fund. Life insurers tended to use investment banks as a source of such ideas.

A further question related to how decisions on the *currency composition* of portfolios were made. In a United Kingdom context this mainly means overall asset allocation decisions, as discussed above. The main aims of the decision are thus diversification (to minimise risk, because returns are not highly correlated) and to take opportunities unavailable in the United Kingdom. Some noted that bonds were of little use for diversification, given the high correlation of world interest rates (see OECD (1986) and Kneeshaw and Van den Bergh (1985)). Currency could not be used as an investment vehicle, despite the potential high returns, owing to problems with the UK tax authorities – cash could, however, be held while awaiting investment. Attitudes to taking profit from exchange rate changes tended to differ (this would depend on both the time horizon and the view of how markets work). Some would not switch currencies for exchange rate gains even if hedged, given the view that markets are efficient and purchasing power parity tends to hold in the long run. Others would take advantage of such expected changes (often using hedging to protect themselves), feeling that the potential return offsets the higher risk, compared with investment in the United Kingdom.

As noted above, US funds are less adventurous than those in the United Kingdom regarding currency composition, though some reasons can be suggested for this. Investment banks were encouraging external diversification, up to 10–15 per cent., but admitted that clients were often reluctant. Those with heavy external asset proportions tended to be those with liabilities in foreign currencies.

What are the *objectives* of the UK and US funds, and how do they relate to liabilities? In most cases the objectives could be stated simply - to maximise real return, in some cases for a given level of

risk, or to preserve capital. Particularly in the United States, however, some more subtle considerations also came into play. In many cases duration-matching was felt to be important, especially for life insurance and for those pension funds which promise a nominal return. The FASB accounting rules will impose penalties for large variations between pension liabilities and assets. Similar legislation is proposed in the United Kingdom. In the case of life insurers in the United States, objectives are changing along with liabilities. Although still predominantly offering contracts in nominal terms – as a result of consumer demand for such contracts – US life insurers are beginning to be more competitive, both with each other and with mutual funds, etc., offering real returns and shifting some of the market risk to the customer. A continuation of this trend would suggest a degree of convergence with their UK counterparts, and with pension funds in both countries.

To summarise, UK and US institutions face similar basic organisational problems and broadly meet them in the same way (how to allocate assets, risk/return measurement, etc.). However, the responses also show important differences in time horizons, innovativeness, scope of portfolio re-allocation, etc., which correspond in part to the distinction between internally managed funds and those managing funds for others. The trend in the United Kingdom is a swing towards the latter; internal managers are finding that they are unable to retain financial expertise within their salary structures, so funds are contracted out. This would suggest a shift to somewhat shorter time horizons, a greater use of innovative techniques and a greater market turnover – except to the extent that there is a parallel shift to index-matching passive management. It is significant that stark contrasts were not found in the United Kingdom between fund management by life insurers and pension funds. Indeed, for unitised life insurance the former appeared the more aggressive risk-takers. This contrasts with the United States, where life insurance behaviour – partly due to the law – is rather different and more conservative than pension funds in the United

States and both types of institution in the United Kingdom, particularly with respect to the proportion of bonds and the adventurousness of asset selection.

### *6. Summary*

This section has highlighted some of the features of fund management in the United Kingdom and the United States, which are not covered by study of flow-of-funds data. The analysis shows broadly that institutions in the United Kingdom are not yet heavily involved in innovative financial instruments, but that generally such a neglect can be justified because of the inappropriateness or cost of the relevant instrument to institutions. Those instruments which are potentially profitable have generally been accepted. Regarding techniques, funds are restrained either by lack of own resources, trustees or lack of satisfactory market development, but it appears that far more use of options, futures, etc. by institutions is in prospect. Regarding organisation, methods are fairly common across institutions, but those managed on behalf of others are somewhat more innovative and may have a rather shorter time horizon.

In the United States organisation and methods are broadly similar to those in the United Kingdom. The main distinctions may be drawn in terms of the selection of more market-based liquid assets, the wider variety of bond instruments used in the United States, the more widespread use of index funds, futures and options, and the far lower portfolio shares of external assets. A contrast has also been noted between pension fund and life insurance behaviour in the United States which is not so marked between their respective counterparts in the United Kingdom. This may be linked to the relative lack of competitiveness between US life insurance and the other three sectors discussed here. It has been emphasised that this distinction is partly a result of legal restrictions and also of consumer demand. The US life insurance industry is now beginning to change its products so as to become more competitive in terms of real returns.

Finally, it is of interest that the interviews suggest that fund managers, despite the long-term nature of their liabilities, are in all cases coming under more pressure to “match the market” in the short term. The potential adverse consequences of this for the real economy have been widely noted (Jackson (1987), BIS (1987)) – managers of firms may themselves be forced to adopt short-run investment horizons to prevent a falling share price and potential take-over. We discuss this problem further in the conclusion. A related theoretical issue is that if fund managers were to adopt long-run time horizons, one should see an arbitraging-away of differences in real returns between assets such as equities and bonds. The fact that they adopt short horizons may therefore be an underlying cause of the relatively high cost of equity capital.

## **VII.**

### **Institutional investors and the demand for capital market instruments**

#### *1. Summary*

This section analyses econometrically certain issues relating to the demand for financial assets arising from the institutionalisation of investment and the portfolio distributions of the institutional investors. Since the discussion of the results below is rather technical, we present them first in summary form. Those not wishing to read a detailed account of the econometric work should proceed after the summary to the conclusions in Section VIII.

Institutional investors can influence the supply of funds to the capital market in several ways; by increasing the total supply of saving, by influencing the rest of the portfolio distribution of the personal sector between bank deposits and securities, and by the nature of the institutions’ own portfolio choices.

We do not test directly for an influence of the growth of institutions on personal saving; however, the literature suggests that institutionalisation has had a positive effect on total personal saving.

As regards the influence of the growth of institutions on the portfolio behaviour of the personal sector, results differ between the Anglo-Saxon countries and Japan and Germany. In the former group, the results suggest that the growth of institutions has induced or accompanied a shift by persons from securities to deposits; in the latter, vice versa. For the Anglo-Saxon capital markets, this implies that securities are increasingly held by large, informed, risk-averse investors facing low transactions costs. Such a market should more sensitively reflect information on firms' performance. On the other hand, the growth of institutions appears to have had no strong effect on the balance of intermediation between direct (securities) and indirect (bank) intermediation. By contrast, the results imply that in Germany and Japan institutions are competing with banks for funds, and the growth of institutions implies a shift towards direct intermediation. The growth of institutions is thus not inimical to the direct holding of securities by the personal sector in those countries. It is suggested that the results for Germany and Japan are partly a function of the small size of the institutional sector and the predominance of life insurance companies, whose liabilities are somewhat closer substitutes for bank deposits than are pension fund liabilities. The pattern of substitution may shift towards the Anglo-Saxon pattern as pension funds grow.

The portfolio distributions of life insurance and pension funds are themselves strongly influenced by relative asset returns. This is the case particularly where there are few regulations governing portfolio distributions and low transactions costs, for example in the United Kingdom and the United States. Adjustment to a change in such returns is generally rapid, while there is often no long-run desired share of the portfolio for any particular asset – institutions being prepared to shift the balance of the portfolio widely between the different categories of asset. This implies a rapid portfolio adjustment in response to changes in relative returns, and hence an efficient allocation of funds to uses where returns are highest. These results do not all hold where transactions costs are high and regulations are strict – e.g. in Germany, Japan and Canada. In these

countries adjustment to a change in returns is somewhat slower and a long-run desired portfolio share tends to emerge – results which may indicate a less efficient allocation of funds. These contrasts are greatest for life insurance companies – for pension funds, which tend to be less regulated, the results are more comparable between countries.

The results contrast with those for households and companies reported in Davis (1986), where adjustment to changes in returns tended to be less marked, and the equations were less well determined. This illustrates the higher transactions costs, poorer information, lower liquidity and a wider range of objectives on the part of the non-financial sector. While households and companies need assets for transactions as well as investment, institutions can concentrate on the latter and hence determine their portfolio distribution to a greater extent by relative pecuniary returns.

*2. Do life insurance and pension fund asset holdings affect the composition of other personal sector financial wealth?*

Much analysis has been carried out on the question of whether pension wealth reduces discretionary personal saving and hence wealth holding (see, for example, Diamond and Hausman (1980), Blinder et al. (1981) for the United States, Threadgold (1978), Green (1981) and Hemming and Harvey (1983) for the United Kingdom). Theory can offer no definite conclusions; empirical research has generally found some displacement of other saving or a zero effect. However, while the global supply of funds is clearly important to capital market activity, perhaps of equal importance to market development are effects on *portfolio composition*.

Pension assets have several characteristics that render them less-than-perfect substitutes for conventional assets. For example, the realisation of benefits requires a worker to stay long enough with a firm for benefits to be vested;<sup>16</sup> benefits cannot generally be withdrawn as a lump sum or used as collateral; their magnitude may

<sup>16</sup> This feature is of greatest importance in the United States.



be uncertain and realisation depends on survival (except for widows' benefits). They are, therefore, exceptionally illiquid and subject to uncertainty regarding realisation. Although portfolio theory offers few definite conclusions regarding composition effects, one might expect assets of similar liquidity and risk characteristics to be substitutes for pension wealth. Thus Avery et al. (1985) in the United States found, using cross-sectional data, that pension wealth was highly substitutable for equities and bonds, and for financial, as opposed to tangible, assets, while no effects were detectable for the amount of debt owed. This last result is perhaps not surprising because pension fund assets cannot be pledged as collateral. (However, King and Dicks-Mireaux (1983) found no strong effects of institutional investment on holdings of other assets.)

Using a mean-variance approach, Davis (1986) presented sets of time series portfolio demand equations for the personal or household sector in the United States, the United Kingdom, Germany and Japan. Because of their contractual nature and the difficulty of detecting a rate of return, he did not analyse holdings of equity in life insurance and pension funds (or trade credit). However, these equations permit a simple test to be made for any additional effects of pension wealth on portfolio holdings, by inserting terms in the share of such wealth into each of the equations. The error correction specification used enables a distinction to be made between short-run effects (given by the term on the difference of the log of the pension wealth share) and long-run effects (given by the sign on a lagged levels term in the log of the pension wealth share, in the long-run static solution to the equation concerned).

The results are shown in the table on page 90. In the short run, there appear to be no marked patterns; indeed, given the long-run contractual nature of obligations to long-term institutions, this might be expected. Since agents cannot generally opt out of their life insurance contract or pension plan in the short run, the sign pattern is likely to show which assets are accumulated during periods of rapid institutional portfolio growth, i.e. economic expansion with

Effect on other personal sector asset holdings of increased equity  
with life insurance companies and pension funds\*

	United States	United Kingdom	Germany	Japan
<b>1. Short run</b>				
Sight deposits	-	-	-	-
Time deposits	-	-	+	+
Deposits with other financial institutions	+	+	+	+
Market paper	-	-		
Government bonds	-	-	-	-
Corporate bonds	+	-	+	-
Tax-exempt bonds	+			
Equities	-	-	-	-
<b>2. Long run (steady state)</b>				
Sight deposits	+	+	-	+
Time deposits	+	+	-	-
Deposits with other financial institutions	+	+	-	-
Market paper	-	-		
Government bonds	-	+	+	-
Corporate bonds	-	-	+	+
Tax-exempt bonds	-			
Equities	-	-	+	+

\* Sign on a term in the difference (short run) and level (long run) of the share of long-term institutional investment in individuals' portfolios entered into the asset demand equations estimated in Davis (1986).

greater employment or a booming stock and bond market, which are likely to occur at a similar time. We do not take such coincidental growth to have any causal relevance. Holdings of deposits with other financial institutions are the only consistent complements to pension wealth in the short run; as noted in Davis (1986), Section V, their growth at the expense of bank deposits has been a common feature

of financial market developments. Equities, market paper and sight deposits are consistent short-run substitutes; in other cases, the results are more mixed. In all countries, except the United Kingdom, a bond market instrument is a short-run complement. This is consistent with the explanation outlined above.

The long-run results are of greater interest. In general, there are two distinct groups of countries. In the United Kingdom and the United States capital market instruments are generally long-run substitutes for institutional investment, a finding similar to the results of the Federal Reserve study noted above, while deposits are all long-run complements. This implies that the growth of contractual saving has led households to shift their non-contractual saving into liquid and capital-certain assets and away from direct participation in the capital market. Institutions, rather than competing directly with depository institutions for funds, tend to complement them. This appears to be sensible risk-averse portfolio behaviour. Since long-term institutions take care of security in old age, at the cost of liquidity, and indeed, take (pooled) risks on behalf of the household, the rest of the portfolio may be devoted to strongly liquid assets, which are not risky in the same sense and may be largely devoted to more short-run transactions purposes. For the capital market the implication is that the sign pattern, if maintained, will lead to the increasing displacement of personal by institutional investors, which are large, well-informed about market developments, probably less risk-averse, face different tax schedules and increasingly have the technology to shift funds at will.

However, this tendency is not common to all the countries analysed. In Germany and Japan the results show that in the long run pension wealth is broadly a substitute for liquid assets and a complement to capital market instruments. Some features of the financial and pension systems may have influenced this result. Most time and "other financial" deposits tend to be rather long-term in these countries; in Germany 80 per cent. of time deposits have a term of over four years, for example. Therefore, desire for liquidity may not induce substitution into these assets when pension wealth

grows; indeed, in an active market, bonds and equities may be more liquid. Secondly, the capital uncertainty of bonds may be lower in these countries, given the lower variability of interest rates, while the equity markets fell in the period 1973–74 to a lesser extent (and hence, induced less perception of risk) than in the Anglo-Saxon countries. However, the most important factor is probably the supplementary (to social security) nature of pension wealth, especially in Germany. Since such wealth may not be wholly relied upon for retirement, other long-run securities offering a high yield may be accumulated, despite the attendant risk. This tendency will be accentuated if deposits show an artificially low return, as a result of regulation or of oligopoly. The implications of this pattern are clearly rather different from those of the pattern prevailing in the Anglo-Saxon countries; institutions and banks are, at least to date, in direct competition for funds, while the growth of institutional investment has not been inimical to direct holdings of equities (including unit trusts) and bonds by households. The relatively small size of the institutions and, particularly, the greater weight of life insurance companies as opposed to pension funds are likely to have influenced the result; life insurance is closer to “traditional” saving than is a pension fund, and may compete more directly with deposits. Growth in pension funds, as is anticipated in Japan, may be expected eventually to shift the long-run responses into a pattern more akin to that observed in the Anglo-Saxon countries.

With these results as a background, this section now goes on to assess the determinants of the long-term institutions’ portfolio holdings in the capital markets.

### *3. What are the determinants of institutional investors’ portfolio distributions?*

Portfolio theory suggests that the demand for an asset depends on the mean and variance of the pecuniary return on that asset, as well as non-pecuniary characteristics such as liquidity. As discussed above, a diversified portfolio enables the level of risk to be reduced for a given return, by comprising assets whose returns have negative

or low correlations. In this section a simple general model of portfolio demand is applied to the annual data for portfolio holdings discussed in Sections IV and V. The results are preliminary, relatively imprecise and often poorly determined, but do offer some insights into the differing responses to changes in asset returns and in portfolio size of the holdings of different assets in the portfolio of an institution, as well as illustrating differences between types of institution and institutional sectors in different countries.

The model of portfolio demand used is as follows:

$$A_i = f(A_{i-1}, A(L) r_{own}, a(L) r_{alt}, A(L) \ln W, K)$$

where  $A_i$  is the asset in question,  $r_{own}$  the real own yield including capital gains and losses,  $r_{alt}$  the real yield on the rest of the portfolio weighted by current portfolio shares,  $W$  is the size of the total portfolio,  $K$  a constant and  $A(L)$  a general lag distribution. For a discussion, see Davis (1986). The general equation was specified in first-differences and lagged levels rather than as an auto-regressive distributed lag. This allows the separation of short and long-run effects on the dependent variable and avoids the "spurious regression" problem by differencing the dependent variable, while retaining a determinate long-run solution by inclusion of lagged levels terms (see Hendry et al. (1983)).

The effects of the variance of an asset return on the dependent variable will be captured by the constant, to the extent that it does not change over time. A priori one would expect the own yield to have a positive effect on holdings of an asset and the portfolio yield to have a negative effect. However, if the correlation of the asset's return with that of the rest of the portfolio is sufficiently negative, then it may be a complement to other assets, and both yields would have positive signs. The size of the portfolio should have a positive effect on asset holdings, unless the holdings are being constantly reduced, in which case a negative effect will be found. As noted in Section VI, such an asset could exist in principle, having an inferior risk, return and covariance performance to the rest of the portfolio (in terms of portfolio theory, a portfolio incorporating it does not lie on the frontier of efficient portfolios). The lagged dependent

variable should have a negative sign. The size of the coefficient shows how rapidly the portfolio is adjusted in response to changes in the independent variables. With perfect information, no constraints on portfolios and zero transactions costs, no such lags should enter the equation. As will be seen, however, they are empirically significant in most cases.

We now go on to discuss the estimation results, bearing in mind the characteristics of the instruments in each country shown in the Appendix. Results for life insurance companies are shown on pages 98–100. Many variables are insignificant; this is only to be expected given the small number of observations. The results for own rate elasticities are good. In the short run, significant perverse signs are only found for loans in Germany. As shown in the Appendix, holdings of these loans have been decumulated, largely owing to a lack of supply, despite their attractiveness to investors with high yields. In the long run, German loans and Canadian mortgages have a significant negative sign. The latter, being fixed rate, are generally in short supply when rates are high (there is also an insignificant negative sign for mortgages held by US life insurance companies).

Regarding alternative yields, signs are significantly positive in the case of Germany for bonds, foreign assets, property and equities. As illustrated in the Appendix, in the case of Germany the correlation of the returns on these assets with other returns is often low or negative; thus the positive sign can be attributed to complementarity arising from portfolio diversification. However, the pattern may also arise from the regulation of portfolio distributions, which may induce apparent complementarity of assets.<sup>17</sup> A similar explanation may apply to the insignificant positive signs found for equities in Japan and for mortgages in Canada.

The lagged dependent variables were significant for most assets in Germany, but in other countries this was true of certain assets

<sup>17</sup> If holdings are constrained to a proportion of the portfolio and the constraints are binding, and if an increased return on the rest of the portfolio increases the size of the portfolio by higher inflows of interest, profits and dividends, then the size of the asset holding will increase at the same time.

only. In particular, only loans had a significant lagged dependent variable for the United Kingdom, and one could not in other cases reject a pure first-difference specification. Results for the lagged wealth term are generally similar; the coefficients are largely significant with the expected positive sign for Germany, while in the United States, and particularly the United Kingdom, one cannot reject the hypothesis of a coefficient of zero. Can any inferences be drawn from this? The results may suggest that for the United Kingdom and the United States there is no stable long-term relationship between the asset holding and the size of the portfolio, i.e. there are no defined long-run desired portfolio shares. This may be as one would expect with low transactions costs, shifting means, variances and covariances of asset returns and a reasonable degree of liquidity of all assets; a fund manager would be prepared to shift the distribution of the portfolio freely in the light of these parameters, and not to have a desired portfolio distribution to which he would return. On the other hand, when portfolio distributions are regulated, yields stable, transactions costs high or markets relatively illiquid, one would expect a long-run desired portfolio distribution to emerge. The United Kingdom has been unregulated as regards portfolio distributions over the estimation period and the United States is the most lightly regulated, while, as has been pointed out, the other countries' life insurance companies have regulated portfolio distributions and, especially in Germany, rather illiquid capital markets with high transactions costs.

The difference of wealth term is significant in most cases. It tends to be high in the case of bonds and equities. This partly reflects the fact that capital gains on these assets form a significant proportion of the change in portfolio size during many periods; if changes in portfolio distribution are relatively infrequent, then a proportionate increase in the value of equities which is not redistributed across the portfolio will give a high coefficient on the difference of wealth. It is of note that the United Kingdom has one of the lowest coefficients on the difference of wealth in the equities equation: a short-run elasticity of 0.75. This may again show relatively active portfolio

management; a revaluation of equities will be redistributed across the rest of the portfolio in an optimal manner rather than retained in that asset. For comparison, the coefficients for Germany and Canada are over 3.4.

Taking an overall view of the equations, the level of explanation is reasonable, with average  $R^2$ s and standard errors as follows:

	$\bar{R}^2$	s.e.
United States . . . .	0.72	0.04
United Kingdom . .	0.54	0.11
Germany . . . . .	0.65	0.05
Japan . . . . .	0.76	0.09
Canada . . . . .	0.58	0.06

These may be compared with the results for similar equations to determine household and company sector asset distributions in Davis (1986), which gave significantly lower  $R^2$ s and higher standard errors. The difference may be attributed to the lower transactions costs and higher liquidity faced by life insurers, as well as their rather narrower range of aims and activities. Their portfolio distribution does not, in general, have to take transactions motives into account and can thus concentrate on risk and return aspects, subject to any government restrictions on permissible portfolios. Transactions motives may enter into the demand for short-term assets; it is notable that this equation generally has the highest standard error, suggesting that for short-term assets considerations other than the nature of yields and portfolio size are important. Meanwhile, almost half of the equations showed signs of auto-correlation, a problem that was particularly severe for Japan.

The results for pension funds are shown on pages 101–103. While being statistically not as well determined (having higher standard errors), the results bear out many of the inferences drawn from the data for life insurance companies. For example, own rate elasticities are generally correctly signed. However, a significant contrast occurs in regard to short-term assets, where, for the United States, the United Kingdom and Germany, both short and long-run own



rate coefficients were negative. This may be linked to different levels of inflow during various configurations of asset returns, if money is initially invested in short-term assets before being redistributed across the portfolio – for example, if topping-up payments are made when real rates on short-term assets are relatively low owing to inflation.

The results for alternative asset yields give significant positive signs for Canadian equities and other loans, for UK mortgages and for Japanese bonds, equities and loans. The matrices in the Appendix suggest that these patterns do not arise from negative correlations. In the case of UK mortgages and Japanese loans they may arise instead from a continual decumulation of the asset, a result borne out by the negative coefficient on lagged wealth.

The lagged dependent variables show less of a contrast between countries than was the case for life insurance companies, perhaps because pension fund regulation has generally been less strict than that for life insurers. Assets for which a first-difference specification could be accepted included bonds and equities in the United States, equities, bonds and property in the United Kingdom, equities, bonds, mortgages and property in Canada, mortgages, loans and property in Germany, and equities in Japan. It is of interest that those assets without a defined long-run solution include some of the dominant assets in the portfolios of the pension funds. This may indicate a degree of portfolio flexibility, the other assets being held in relatively fixed proportions while the share of the dominant asset is allowed to vary widely. Examination of the graphs in Section V gives some support to this suggestion.

The average  $\bar{R}^2$  and standard errors were as follows:

	$\bar{R}^2$	s.e.
United States . . . .	0.42	0.08
United Kingdom . .	0.48	0.18
Germany . . . . .	0.69	0.09
Japan . . . . .	0.73	0.12
Canada . . . . .	0.51	0.07

Over one-third of the equations showed a significant degree of auto-correlation.

One explanation for the fact that the results were poorer than those obtained for life insurers may be the relative lack of homogeneity among pension funds. Particularly in the United States, the United Kingdom and Canada, there are private, public and local funds which may vary widely in their aims and constraints.

To summarise, the results for portfolio demands have shown that investment institutions respond strongly to relative returns, and, especially when unconstrained, do not have long lags in their adjustment. Differences have been traced for life insurance companies in the responses of regulated and unconstrained institutions. In many cases the latter appear to have no defined long-run desired portfolio distribution, instead being prepared to vary the proportions widely in the light of relative returns. This may be optimal behaviour in a market with high liquidity and low transactions costs. Results for pension funds are statistically weaker than those for life insurance companies. This may be attributable to the heterogeneous groups of pension funds drawn together in the available statistics.

Portfolio demand equations: US life insurance companies, 1968-85

	Constant	$\Delta r_{own}$	$\Delta r_{all}$	$r_{own,t-1}$	$r_{all,t-1}$	$\ln A_{t-1}$	$\Delta \ln W$	$\ln W_{t-1}$	$\bar{R}^2$	sc	LM(2)
Short-term assets	9.86 (1.3)	0.042 (3.7)	-0.012 (1.7)	0.046 (3.2)	-0.018 (2.1)	0.007 (0.1)	0.042 (0.4)	-0.81 (1.2)	0.57	0.07	5.8
Bonds	-2.96 (1.8)	0.0002 (0.2)	-0.0045 (1.9)	0.0007 (0.7)	-0.004 (1.5)	-0.25 (1.4)	1.73 (4.8)	0.48 (1.7)	0.90	0.02	7.1
Equities	5.19 (1.4)	0.0025 (1.2)	-0.0023 (0.6)	0.00063 (0.2)	-0.0068 (1.4)	-0.3 (2.7)	2.68 (2.3)	-0.19 (0.5)	0.77	0.07	6.4
Mortgages	-3.6 (1.5)	-0.0035 (1.4)	-0.0011 (1.1)	-0.0015 (0.5)	-0.0004 (0.3)	0.075 (1.1)	0.68 (2.9)	0.22 (1.5)	0.70	0.02	3.0
Industrial loans	1.89 (1.2)	0.011 (3.5)	0.00002 (0.1)	0.01 (3.4)	-0.0003 (0.1)	-0.13 (2.9)	-0.215 (0.8)	-0.05 (0.3)	0.66	0.02	3.8

Portfolio demand equations: UK life insurance companies, 1968–85

	Constant	$\Delta r_{own}$	$\Delta r_{alt}$	$r_{own,t-1}$	$r_{alt,t-1}$	$\ln A_{t-1}$	$\Delta \ln W$	$\ln W_{t-1}$	$\bar{R}^2$	sc	LM(2)
Short-term assets	-1.34 (0.5)	0.052 (1.6)	-0.016 (1.9)	0.01 (0.2)	-0.021 (1.8)	-0.22 (1.1)	0.89 (0.8)	0.44 (0.5)	0.19	0.32	3.2
Bonds	0.088 (0.3)	-0.0003 (0.3)	-0.0026 (0.7)	0.0011 (0.5)	-0.0076 (1.3)	0.052 (0.2)	1.88 (4.6)	-0.076 (0.5)	0.71	0.08	7.0
Equities	0.28 (0.6)	0.0038 (4.3)	-0.0028 (2.0)	0.0057 (4.0)	-0.0051 (2.5)	0.062 (0.5)	0.75 (3.2)	-0.119 (0.6)	0.80	0.06	12.3
Mortgages	0.14 (0.4)	0.0065 (1.6)	-0.0007 (0.7)	0.0135 (2.6)	0.001 (0.6)	-0.014 (0.2)	-0.23 (1.2)	-0.06 (0.5)	0.64	0.04	3.2
Industrial loans	0.18 (0.7)	0.018 (5.6)	-0.0008 (0.9)	0.019 (5.2)	-0.0034 (2.5)	0.087 (2.2)	0.23 (1.6)	-0.077 (5.0)	0.75	0.04	3.5
Property	0.58 (1.9)	-0.0013 (0.7)	0.0035 (1.7)	0.0035 (1.7)	0.0031 (1.1)	-0.033 (0.5)	0.07 (0.3)	-0.171 (1.5)	0.28	0.06	5.3
Foreign assets*	-2.0 (0.5)	0.016 (1.4)	0.002 (0.5)	0.004 (0.4)	-0.003 (0.4)	-0.31 (0.8)	0.52 (0.5)	0.06 (0.5)	0.38	0.17	8.0

\* Dummy for exchange control abolition 0.31 (2.0).

Portfolio demand equations: German life insurance companies, 1968–85

	Constant	$\Delta r_{own}$	$\Delta r_{alt}$	$r_{own,t-1}$	$r_{alt,t-1}$	$\ln A_{t-1}$	$\Delta \ln W$	$\ln W_{t-1}$	$\bar{R}^2$	sc	LM(2)
Short-term assets	-1.03 (2.0)	0.011 (0.9)	-0.029 (1.4)	0.019 (1.1)	-0.026 (1.1)	-0.86 (2.3)	-0.61 (0.2)	0.32 (2.3)	0.36	0.09	2.7
Bonds	-2.96 (4.1)	0.005 (2.2)	0.011 (0.9)	0.006 (1.9)	0.037 (2.6)	-0.84 (3.9)	3.23 (3.0)	1.04 (4.0)	0.60	0.05	2.6
Equities	-1.62 (3.1)	0.0007 (0.8)	0.036 (2.5)	0.0007 (0.5)	0.035 (1.7)	-0.33 (2.2)	3.86 (3.4)	0.39 (2.7)	0.65	0.05	3.8
Mortgages	0.51 (3.7)	0.012 (1.1)	0.0028 (0.6)	0.014 (1.5)	0.007 (1.0)	-0.48 (3.1)	-1.84 (3.5)	0.25 (2.6)	0.68	0.02	8.5
Industrial loans	-1.47 (4.3)	-0.0079 (2.2)	-0.0085 (3.4)	-0.0094 (2.9)	-0.015 (3.7)	-0.62 (4.3)	2.69 (4.9)	0.82 (4.4)	0.71	0.02	2.4
Property	0.43 (4.2)	0.0033 (1.6)	0.0075 (1.5)	0.007 (2.3)	0.018 (2.3)	0.049 (0.5)	-0.097 (0.2)	-0.132 (1.8)	0.73	0.02	1.5
Foreign assets	-1.6 (1.1)	0.016 (1.2)	0.13 (6.6)	0.015 (1.5)	0.085 (2.0)	-0.39 (1.5)	-0.46 (0.2)	0.2 (0.8)	0.81	0.09	9.1

Portfolio demand equations: Japanese life insurance companies, 1968–85

	Constant	$\Delta r_{own}$	$\Delta r_{alt}$	$r_{own,t-1}$	$r_{alt,t-1}$	$\ln A_{t-1}$	$\Delta \ln W$	$\ln W_{t-1}$	$\bar{R}^2$	se	LM(2)
Short-term assets	-15.7 (2.1)	-0.086 (1.4)	0.006 (0.4)	-0.076 (1.5)	0.0016 (0.1)	-0.16 (0.8)	8.26 (1.4)	1.02 (1.8)	0.55	0.16	9.8
Bonds	1.24 (0.3)	0.0002 (0.5)	0.034 (1.6)	0.011 (1.4)	-0.0005 (0.1)	-5.3 (1.5)	0.019 (0.1)	0.263 (0.9)	0.53	0.18	13.6
Equities	1.03 (1.3)	0.0011 (1.8)	0.0021 (0.4)	0.0007 (1.0)	0.0031 (0.5)	-0.37 (1.7)	0.42 (0.8)	0.28 (1.8)	0.77	0.03	15.2
Mortgages*	-10.2 (1.4)	0.107 (1.4)	-0.043 (1.1)	0.164 (2.3)	-0.108 (1.8)	-0.98 (23.7)	0.452 (0.1)	1.416 (3.4)	0.99	0.12	--
Industrial loans*	1.31 (1.7)	0.013 (1.7)	-0.0015 (1.4)	0.018 (2.6)	-0.002 (1.3)	0.027 (0.1)	0.07 (0.1)	-0.073 (0.7)	0.91	0.02	11.9
Property	-1.33 (1.0)	0.0028 (2.2)	-0.0047 (1.7)	0.0031 (2.4)	-0.011 (2.9)	0.016 (0.1)	1.51 (4.4)	0.061 (0.4)	0.8	0.03	8.3

\* D75 -0.08 (2.9).

Portfolio demand equations: Canadian life insurance companies, 1968–85

	Constant	$\Delta r_{own}$	$\Delta r_{alt}$	$r_{own,t-1}$	$r_{alt,t-1}$	$\ln A_{t-1}$	$\Delta \ln W$	$\ln W_{t-1}$	$\bar{R}^2$	se	LM(2)
Short-term assets	17.0 (0.8)	-0.011 (0.4)	-0.018 (1.7)	0.053 (1.6)	-0.021 (1.6)	0.097 (0.3)	2.96 (2.1)	-1.65 (0.7)	0.35	0.16	3.0
Bonds	-2.2 (2.5)	0.00115 (2.1)	-0.0021 (0.7)	0.0023 (2.9)	-0.0019 (0.5)	-0.03 (0.2)	0.95 (6.0)	0.23 (2.1)	0.86	0.02	0.9
Equities	9.5 (2.8)	-0.0002 (0.1)	-0.001 (0.2)	-0.001 (0.4)	-0.0016 (0.3)	-0.22 (2.0)	3.41 (5.3)	-0.73 (2.0)	0.77	0.09	0.3
Mortgages	0.45 (0.1)	-0.0005 (0.1)	0.0013 (1.1)	-0.007 (2.0)	0.001 (0.6)	-0.007 (0.1)	0.92 (3.5)	-0.034 (0.5)	0.65	0.02	5.6
Industrial loans	-1.91 (0.9)	0.011 (2.1)	-0.004 (2.3)	0.012 (2.6)	-0.0048 (2.0)	-0.21 (1.6)	-0.075 (0.3)	0.337 (1.2)	0.38	0.03	1.9
Property	-0.52 (0.2)	-0.0003 (0.2)	-0.004 (2.1)	-0.0008 (0.4)	-0.0026 (1.3)	-0.09 (1.4)	0.22 (1.0)	0.13 (0.4)	0.49	0.03	1.9

Portfolio demand equations: US pension funds, 1968-85

	Constant	$\Delta r_{own}$	$\Delta r_{alt}$	$r_{own,t-1}$	$r_{alt,t-1}$	$\ln A_{t-1}$	$\Delta \ln W$	$\ln W_{t-1}$	$\bar{R}^2$	se	LM(2)
Short-term assets	-7.7 (1.0)	-0.06 (1.7)	0.005 (0.5)	-0.078 (2.0)	0.014 (1.1)	-0.19 (1.2)	-0.21 (0.3)	0.79 (1.1)	0.02	0.21	1.5
Bonds	-0.87 (2.7)	-0.0004 (0.7)	-0.0019 (2.2)	0.0002 (0.3)	-0.0017 (1.6)	-0.22 (1.7)	0.36 (2.8)	0.28 (2.2)	0.31	0.03	2.2
Equities	1.28 (1.9)	0.0027 (2.0)	0.0013 (0.9)	0.0037 (2.2)	-0.001 (0.6)	-0.19 (1.3)	1.9 (7.3)	0.072 (0.6)	0.93	0.05	1.2
Mortgages	4.9 (1.8)	0.0119 (2.1)	-0.0019 (1.2)	0.02 (2.5)	-0.0032 (1.7)	-0.3 (2.0)	-0.16 (1.2)	-0.19 (1.6)	0.42	0.03	6.2

Portfolio demand equations: UK pension funds, 1968-85

	Constant	$\Delta r_{own}$	$\Delta r_{alt}$	$r_{own,t-1}$	$r_{alt,t-1}$	$\ln A_{t-1}$	$\Delta \ln W$	$\ln W_{t-1}$	$\bar{R}^2$	se	LM(2)
Short-term assets	-3.2 (1.4)	-0.055 (1.0)	0.003 (0.3)	-0.059 (1.0)	0.0008 (0.1)	-0.62 (1.6)	-1.94 (1.6)	1.19 (1.4)	0.21	0.25	1.1
Bonds	-0.15 (1.4)	0.0004 (0.6)	-0.0068 (3.5)	0.001 (1.0)	-0.005 (2.4)	-0.27 (1.8)	1.4 (8.1)	0.17 (1.8)	0.86	0.05	3.2
Equities	-0.19 (0.7)	0.0048 (1.8)	0.0008 (0.4)	0.0049 (1.9)	0.0004 (0.1)	-0.49 (1.6)	1.17 (2.5)	0.4 (1.3)	0.88	0.09	2.4
Mortgages	1.2 (2.0)	-0.004 (0.2)	0.028 (4.6)	0.032 (1.9)	0.025 (3.7)	-0.73 (3.6)	-2.95 (5.2)	-0.86 (2.6)	0.78	0.17	7.8
Industrial loans	-2.8 (1.1)	-0.0062 (0.1)	-0.0037 (0.2)	-0.037 (0.6)	-0.0046 (0.2)	-0.23 (0.7)	1.96 (0.9)	0.82 (1.2)	0.03	0.46	9.8
Property	0.52 (1.8)	-0.0037 (1.5)	0.0044 (1.4)	-0.0022 (0.9)	0.0085 (2.1)	-0.044 (0.6)	-0.33 (1.2)	-0.14 (1.1)	0.46	0.07	6.4
Foreign assets	-3.4 (1.8)	0.0025 (0.2)	-0.012 (2.0)	-0.005 (0.4)	-0.014 (1.9)	-0.51 (1.8)	1.61 (2.4)	1.26 (1.8)	0.14	0.18	4.5

Portfolio demand equations: German pension funds, 1968-85

	Constant	$\Delta r_{own}$	$\Delta r_{alt}$	$r_{own,t-1}$	$r_{alt,t-1}$	$\ln A_{t-1}$	$\Delta \ln W$	$\ln W_{t-1}$	$\bar{R}^2$	se	LM(2)
Short-term assets	-3.12 (4.7)	-0.09 (4.0)	-0.07 (3.9)	-0.09 (2.9)	-0.11 (4.3)	-1.6 (5.6)	0.26 (0.3)	1.0 (4.5)	0.76	0.13	5.8
Bonds	-1.66 (2.7)	0.0006 (0.4)	0.0067 (1.4)	0.0027 (10.4)	0.0072 (1.3)	-0.6 (2.8)	1.87 (8.9)	0.78 (2.6)	0.9	0.03	8.5
Equities	-0.85 (0.5)	0.0032 (1.5)	-0.009 (0.4)	0.005 (1.8)	-0.026 (0.8)	-0.18 (0.7)	0.94 (1.4)	0.34 (0.7)	0.05	0.15	3.0
Mortgages	0.24 (2.1)	0.0047 (0.2)	-0.0037 (0.8)	0.04 (1.4)	-0.0009 (0.2)	0.08 (0.4)	0.2 (0.8)	-0.15 (1.0)	0.58	0.04	4.3
Industrial loans	-0.21 (2.9)	-0.0042 (0.9)	-0.0021 (1.1)	-0.0072 (1.5)	-0.0046 (2.1)	-0.165 (1.4)	1.06 (8.9)	0.2 (2.0)	0.84	0.02	8.5
Property	0.1 (1.3)	-0.0007 (0.3)	0.0006 (0.2)	0.0019 (0.8)	0.006 (1.4)	-0.14 (1.5)	0.43 (3.3)	-0.002 (0.1)	0.74	0.02	4.2
Foreign assets	-11.8 (2.6)	0.35 (3.3)	0.25 (4.0)	0.21 (3.4)	0.20 (2.0)	-1.0 (14.1)	2.03 (0.7)	2.01 (1.4)	0.99	0.23	-

Portfolio demand equations: Japanese pension funds, 1968-85

	Constant	$\Delta r_{own}$	$\Delta r_{alt}$	$r_{own,t-1}$	$r_{alt,t-1}$	$\ln A_{t-1}$	$\Delta \ln W$	$\ln W_{t-1}$	$\bar{R}^2$	se	LM(2)
Short-term assets	10.8 (0.8)	0.045 (0.6)	0.032 (1.2)	0.048 (0.6)	0.034 (1.2)	-0.35 (0.8)	-10.2 (1.1)	-0.71 (0.5)	0.01	0.39	8.7
Bonds	2.0 (2.6)	0.0001 (0.5)	0.0069 (3.7)	0.0006 (2.3)	0.0093 (3.9)	-0.45 (4.5)	-0.24 (0.8)	-0.19 (2.8)	0.98	0.01	8.4
Equities	3.12 (1.5)	0.006 (2.0)	0.0095 (1.4)	0.0036 (1.1)	0.024 (2.5)	-0.22 (0.6)	-2.3 (1.0)	-0.12 (0.4)	0.73	0.11	6.2
Mortgages	8.31 (2.5)	0.15 (7.6)	-0.019 (3.1)	0.228 (10.4)	-0.059 (8.0)	-0.77 (63.9)	2.7 (1.1)	-0.43 (1.5)	0.99	0.10	4.6
Industrial loans*	2.72 (2.8)	0.014 (2.2)	0.003 (2.3)	0.013 (2.1)	0.0029 (1.8)	-0.49 (2.8)	-0.34 (0.6)	0.064 (0.6)	0.93	0.03	9.1
Property	4.13 (1.5)	0.002 (0.5)	-0.0005 (0.1)	0.013 (2.4)	-0.0007 (0.1)	-0.4 (2.0)	-1.36 (0.8)	-0.16 (1.0)	0.74	0.09	8.0

\* D75 0.1 (2.3).

Portfolio demand equations: Canadian pension funds, 1968-85

	Constant	$\Delta r_{own}$	$\Delta r_{alt}$	$r_{own,t-1}$	$r_{alt,t-1}$	$\ln A_{t-1}$	$\Delta \ln W$	$\ln W_{t-1}$	R <sup>2</sup>	se	LM(2)
Short-term assets	-8.1 (1.8)	0.013 (0.6)	-0.011 (1.8)	0.014 (0.8)	-0.014 (1.3)	-0.61 (2.0)	0.35 (0.1)	1.22 (1.9)	0.27	0.14	5.6
Bonds	-1.11 (0.4)	0.00015 (0.2)	-0.00036 (0.3)	0.0002 (0.3)	-0.001 (0.5)	-0.34 (1.7)	1.3 (3.2)	0.32 (2.0)	0.72	0.02	4.0
Equities	0.78 (0.12)	0.0031 (2.0)	0.0095 (2.3)	0.0058 (2.3)	0.0082 (2.2)	-0.15 (1.0)	-1.1 (0.8)	0.065 (0.4)	0.40	0.07	4.0
Mortgages	0.43 (0.7)	-0.019 (1.6)	-0.0067 (1.5)	-0.017 (1.3)	-0.01 (1.5)	-0.3 (1.6)	2.6 (1.6)	0.19 (1.0)	0.39	0.06	7.5
Industrial loans	-0.22 (0.4)	0.055 (3.0)	0.0081 (2.2)	0.062 (2.3)	0.011 (1.7)	-1.16 (2.7)	-0.2 (0.1)	0.87 (2.6)	0.60	0.07	9.4
Property	-3.08 (2.2)	0.0023 (0.8)	-0.0008 (0.3)	0.0051 (0.15)	-0.0086 (2.6)	-0.08 (0.8)	1.14 (1.5)	0.34 (1.8)	0.68	0.05	2.4

## VIII.

### Conclusions: summary of findings and public policy aspects

This paper has illustrated the increasing importance of long-term institutional investors to the portfolio of the household sector and to the supply of funds to the capital market. Reasons for the development of institutions have been suggested, notably their tax advantages and ability to pool risk, and aspects of their investment behaviour have been analysed. It has been shown that institutions differ both within and across countries with respect to asset selection, and reasons have been suggested for these contrasts, notably differences in capital market conditions and in the aims of the institutions, and the existence of regulations and controls. These aspects were also highlighted in the discussion of current techniques, instruments and organisation of fund management and in the econometric estimation of the determinants of portfolio demand which followed. The analysis generally shows that the institutions' operations in the capital market, while often tending to fulfil the predictions of modern portfolio theory (for example, assets whose

yields show negative covariances with the rest of the portfolio are often complements to other assets), tend not to do so in their entirety. These differences may be partly attributable to capital market imperfections, such as transactions costs and imperfect information, as well as regulations (and, in some cases, habits and inertia). We now go on briefly to consider some general normative questions in the light of this analysis.

Are institutions helpful to the development of capital markets? It may be the case that institutional sectors are well developed in mature capital markets such as those of the Anglo-Saxon countries, but it is more difficult to decide whether they have contributed to or have resulted from the pre-existing nature of the markets. One answer to the question could be couched in terms of the effects of institutional growth on saving. Putting this question aside, if, as the results given in Section VII (I) suggest, the institutions offer a substitute for direct equity and bond investment by households, then the growth of institutions has not given a strong fillip to capital market activity. On the other hand, in their absence the capital markets might well have declined, and research due to Friedman (1980) does suggest that the growth of institutions in the United States has had a sufficient effect on the supply of long-term funds to lead to a significant flattening of the yield curve. Meanwhile, in Germany and Japan the growth of institutions may have helped promote the development of capital markets in recent years, to the extent that they complement direct holdings of market assets. However, the limited size of the institutional sectors in these countries restricts the influence they can bring to bear.

Development, of course, is a term that goes beyond the magnitude of the supply of funds. The portfolio distributions and the analysis of current fund management techniques suggest that institutions readily shift funds between instruments and sectors and may adopt financial innovations rapidly where trustees or regulations permit, while the econometric analysis of portfolio distributions suggests that this is done more rapidly, and more sensitively in relation to relative returns, than is the case for the



household and company sectors. These differences result from contrasting aims, information and transactions costs. They suggest that the growth of institutions may have led to a more sensitive allocation of funds in the capital market, to uses where the returns are highest (given risk). One manifestation may be the increasing amplitude of merger waves in the Anglo-Saxon countries. Mergers are facilitated when a few fund managers who aim for short-run profitability own a large proportion of target firms. Institutions may also form a ready source of finance for such activity (notably junk bonds in the United States). Such a tendency could, in principle, increase economic efficiency, though one problem was noted: when institutions' portfolio re-allocation becomes rapid, corporate managers may be obliged also to concentrate excessively on short-run profit maximisation to avoid takeover, which may be inimical to long-run planning, investment and product development by non-financial firms.

The public policy issues raised by institutionalisation are manifold; for example, should fund surpluses be available to sponsoring firms or to take-over raiders? Should members be allowed to opt out of funds? Should a minimum of indexing of benefits and vesting be enforced? What should be the minimum levels of funding? In this paper tax and portfolio regulation have been shown to be important, though one might also highlight government guarantees to asset holders.

The tax benefits conferred on pension funds and (generally) life insurance companies can be defended in terms of their encouragement of saving for retirement: if households did not save by these means they might become a burden on the state in their old age. Tax benefits tend to increase with inflation (and interest rates) and offer a greater tax advantage to persons paying more than the basic rate of income tax. The latter may be distributionally undesirable. Rose (1983) concluded that any judgement concerning the direct tax cost of pension schemes should depend on a judgement concerning the relative desirability of different types of tax. Tax exemption of pension funds is similar to an expenditure tax,

and thus may be economically desirable (see Meade (1978)). However, to the extent that such a system is not fully introduced, for example, by abolishing taxes on other forms of saving, then the exemption may be highly distortionary, and on second-best arguments may not be a move towards optimality. The exemption of pension funds from taxation may also tilt firms' choice of finance towards debt, on which interest is tax-deductible. This implies extra costs of tax exemption of pensions, in terms of greater risk to firms and a greater net tax cost of the system.

Controls on portfolio distributions may be felt to be necessary to ensure that institutions do not incur excessive risk, for example, by concentrating funds on one asset, or by buying assets with a high risk of default. However, the message of modern portfolio theory is that a better approach would be to encourage portfolio diversification without any such controls, while instituting a form of "prudent man" rule (as in the ERISA act in the United States) to prevent excessive risk by "enjoining fund managers to take into account developments in the field of portfolio management which any prudent investor would consider in managing his own portfolio, including diversifying the investments within portfolios so as to minimise the risk of large losses". Diversification of portfolios enables a pooling of risk, with many individually risky securities being held with low covariances of yield, which thus minimise the risk on the portfolio itself. Portfolio theory distinguishes diversifiable risk, which may be minimised by this method, and non-diversifiable risk associated with the business cycle. However, to the extent that business cycles in different countries are imperfectly correlated, the latter risk may also be reduced. In the light of this, controls on portfolio distributions such as limits on foreign assets may actually increase the risk of the portfolio, while limits on equity investment may considerably reduce the return with very little reduction in risk. Thirdly, the concentration of institutions on certain assets, such as housing, resulting from such controls may severely distort the market. The prevention of external investment may lead to a chronically overvalued exchange rate. In the light of such considerations some

countries, such as Japan, Switzerland and Canada, are currently relaxing their restrictions on institutional portfolios.

Finally, one may note the issue of government guarantees. In the United States, for example, the Pension Benefit Guarantee Corporation (PBGC) guarantees the basic pensions of employees whose pension funds are terminated. (It guarantees vested benefits up to a specified dollar amount.) It is self-funded by pension fund premiums paid by participating employers and covers all defined benefit plans. Issues of moral hazard arise similar to those raised by deposit insurance; if benefits are guaranteed, there is correspondingly less incentive for fund managers or sponsoring firms to avoid risk or investments to fund the plan above legal minimum levels. The firm's bankruptcy may then impose vast liabilities on the PBGC. The experience of the PBGC has not been good in this respect: it has so many obligations that it is technically bankrupt.<sup>18</sup> Possible reforms may be to demand higher premiums from underfunded plans, to give the PBGC regulatory powers similar to the Federal Deposit Insurance Corporation or to tighten the laws regarding plan termination. In Germany, too, there is a guarantee fund for life insurers but it has never been used; given the controls on competition, there have been no bankruptcies. However, this must be balanced against the costs of such controls instanced above and discussed at length in Hammond and Kay (1985).

<sup>18</sup> This is largely a consequence of the transfer of four underfunded pension plans to the PBGC from the LTV corporation in 1985. See Buynak (1987).

**Appendix**  
**Characteristics of the real yields on financial**  
**and tangible assets, 1966-85**

As background for the discussion of portfolio distributions, the tables on pages 110-112 show the mean and variance of the estimated real return on the principal assets held by institutional investors together with the correlations. These tables also cast light on the econometric estimates of the determinants of the portfolio distributions reported in Section VII. The yields shown are total real returns (interest/dividend/rent plus capital gain less inflation) for bonds, equities and property, and real interest rates for loans, mortgages and short-term assets. The limitations of these estimates should be noted; they are based on annual average data and make no adjustment for the yields on fixed rate loans and mortgages.

The tables show that equities generally offer the highest mean real return among domestic assets as well as the highest variance, followed by loans for Germany, property for the United Kingdom and Japan and mortgages for the United States and Canada. The ranking of domestic assets other than equity in terms of variance is not the same as for yield. Bonds generally show the second highest variance of return, but, particularly for the United States and Canada, they do not show a high mean real return over the observation period. Meanwhile, loans in Germany offered a high return despite a relatively low variance, which may explain the large share of such assets in institutions' portfolios until the demand for such loans (from firms) began to decline. Property generally shows a sizable real return and variance. Of course, liquidity is far lower for this asset than for financial assets. For short-term assets the return is generally of less importance than liquidity, given the use of such assets for transactions and for a temporary home for funds when other markets are sour.

Yields on foreign assets include exchange rate changes as well as interest and capital gain. The proxies used were the US bond and equity yield in the case of the other four countries, and for the

United States the average bond and equity yields for the other four countries. In most cases the proxies do not indicate high returns relative to domestic yields, except for overseas equity investment in the United States and Canada, while variances are rather high. Germany and Japan have tended to have structurally appreciating currencies, which reduces the yield on foreign assets, in contrast to the United Kingdom, whose currency has tended to depreciate. Of course, these estimates for equities do not indicate the range of opportunities available, for example, by shifting the portfolio between equity markets. However, given the greater integration of the bond markets the proxy yields for foreign bonds are more likely to be accurate.

The correlation matrices for domestic asset yields suggest that many opportunities exist for increasing the stability of the yield on the portfolio, reducing the level of risk in the portfolio for the same real return, given the negative correlation of the returns on many assets with yields on most other assets. This is especially true in the case of property in Germany and in Canada. By contrast, the estimated real yields for the United Kingdom and Japan show relatively few negative correlations, indicating fewer opportunities for risk reduction via portfolio diversification. Concerning foreign assets, there are some negative correlations in the case of the United States, Germany and Canada, but none are indicated, somewhat surprisingly, for the United Kingdom and Japan, which have in recent years been the most prolific overseas investors. Even in the case of the United States and Germany, the correlations between real yields on foreign and domestic bonds and equities are all positive (in Canada yields on foreign bonds and domestic equities are negatively correlated). This indicates that little reduction in risk could be obtained by diversification for the same instrument from domestic to foreign securities; instead a shift out of assets such as loans, property, short-term assets and mortgages would be required.

It will be seen below that these estimates help to rationalise the concentration of UK and US institutions on equities, German institutions on loans and Canadian institutions on large holdings of

mortgages. It is rather more difficult to rationalise the large holdings of bonds by US and Canadian institutions, or of loans by Japanese institutions. As noted, the estimates may be inaccurate: they do not allow for the distinction between fixed and floating rate instruments which makes a mortgage in the United Kingdom (floating rate) rather different from those elsewhere. Nor do they indicate marketability: for several assets this has changed over time, particularly given the tendency for debt to be securitised. However, it may still be the case that binding constraints regarding portfolio distributions (particularly for life insurance companies) have forced onto the institutions large holdings of relatively low-return instruments, and prevented, for example, Canadian institutions from investing in foreign equities despite relatively high returns.

Mean and variance of real yields (annual averages), 1967-85

Mean real return (domestic currency)

	United States	United Kingdom	Germany	Japan	Canada
Loans . . . . .	3.1	-0.3	6.0	0.2	3.2
Mortgages . . . . .	4.0	0.4	4.3	2.2	4.7
Equities . . . . .	3.1	7.4	7.6	9.4	5.0
Bonds . . . . .	-0.3	2.3	5.0	2.0	-0.3
Short-term assets . .	1.7	0.3	2.7	-1.3	1.5
Property . . . . .	3.4	5.1	4.4	6.6	3.5
Foreign bonds . . .	-0.1	-0.4	0.9	-2.4	0.5
Foreign equities . .	3.9	3.0	4.3	1.0	3.9

Variance

	United States	United Kingdom	Germany	Japan	Canada
Loans . . . . .	9.5	24.7	2.7	19.4	6.5
Mortgages . . . . .	10.9	25.4	1.2	25.8	6.6
Equities . . . . .	199.3	366.3	308.3	324.8	312.8
Bonds . . . . .	247.5	448.4	39.8	207.2	153.0
Short-term assets . .	6.8	25.1	3.7	23.5	7.9
Property . . . . .	39.5	164.4	10.5	55.8	33.0
Foreign bonds . . .	111.8	409.4	290.4	340.2	240.1
Foreign equities . .	173.8	326.4	336.0	291.1	193.3

Correlations between real yields, 1967-85  
United States

	Loans	Mortgages	Equities	Bonds	Short-term assets	Property	Foreign bonds	Foreign equities
Loans . . . . .	1.0							
Mortgages . . . . .	0.92	1.0						
Equities . . . . .	0.32	0.53	1.0					
Bonds . . . . .	0.30	0.50	0.32	1.0				
Short-term assets . .	0.96	0.93	0.30	0.33	1.0			
Property . . . . .	-0.17	0.05	0.35	0.18	-0.04	1.0		
Foreign bonds . . .	-0.15	0.12	0.32	0.50	-0.05	0.51	1.0	
Foreign equities . .	-0.12	0.17	0.63	0.21	-0.01	0.55	0.72	1.0

United Kingdom

	Loans	Mortgages	Equities	Bonds	Short-term assets	Property	Foreign bonds	Foreign equities
Loans . . . . .	1.0							
Mortgages . . . . .	0.97	1.0						
Equities . . . . .	0.18	0.31	1.0					
Bonds . . . . .	0.31	0.34	0.33	1.0				
Short-term assets . .	0.99	0.96	0.13	0.27	1.0			
Property . . . . .	0.39	0.44	0.32	0.35	0.41	1.0		
Foreign bonds . . .	0.25	0.39	0.43	0.14	0.23	0.04	1.0	
Foreign equities . .	0.40	0.46	0.65	0.15	0.38	0.13	0.59	1.0

## Germany

	Loans	Mortgages	Equities	Bonds	Short-term assets	Property	Foreign bonds	Foreign equities
Loans . . . . .	1.0							
Mortgages . . . . .	0.77	1.0						
Equities . . . . .	-0.18	0.26	1.0					
Bonds . . . . .	-0.44	-0.11	0.69	1.0				
Short-term assets . .	0.94	0.61	-0.40	-0.55	1.0			
Property . . . . .	-0.12	-0.25	-0.27	-0.30	0.06	1.0		
Foreign bonds . . . .	0.04	0.21	0.35	0.57	-0.04	-0.19	1.0	
Foreign equities . . .	0.16	0.36	0.55	0.27	-0.03	-0.03	0.52	1.0

## Japan

	Loans	Mortgages	Equities	Bonds	Short-term assets	Property	Foreign bonds	Foreign equities
Loans . . . . .	1.0							
Mortgages . . . . .	0.99	1.0						
Equities . . . . .	0.61	0.66	1.0					
Bonds . . . . .	0.67	0.71	0.52	1.0				
Short-term assets . .	0.99	0.99	0.60	0.71	1.0			
Property . . . . .	0.11	0.16	0.18	-0.06	0.11	1.0		
Foreign bonds . . . .	0.48	0.46	0.08	0.39	0.49	0.1	1.0	
Foreign equities . . .	0.71	0.63	0.26	0.28	0.69	0.0	0.52	1.0

## Canada

	Loans	Mortgages	Equities	Bonds	Short-term assets	Property	Foreign bonds	Foreign equities
Loans . . . . .	1.0							
Mortgages . . . . .	0.90	1.0						
Equities . . . . .	0.18	0.14	1.0					
Bonds . . . . .	0.32	0.56	0.23	1.0				
Short-term assets . .	0.97	0.85	0.24	0.25	1.0			
Property . . . . .	-0.39	-0.27	0.36	0.15	-0.33	1.0		
Foreign bonds . . . .	0.17	0.42	-0.17	0.78	0.14	0.03	1.0	
Foreign equities . . .	0.37	0.43	0.75	0.59	0.41	0.34	0.30	1.0



## References

Anglo-German Foundation (1981): "The British and German banking systems: a comparative study", Economists Advisory Group Ltd., Anglo-German Foundation for the Study of Industrial Society.

Avery, R.B., Ellichausen, G.E. and Gustafson, T.A. (1985): "Pensions and social security in household portfolios: evidence from the 1983 Survey of Consumer Finances", Research Papers in Banking and Financial Economics, Board of Governors of the Federal Reserve System, Washington.

Bank for International Settlements; 57th Annual Report, BIS, Basle.

Bank of England (1983): "The Economics of pension arrangements", Bank of England Panel of Academic Consultants, Bank of England, London.

Bank of England (1986): "Life assurance company and private pension fund investment, 1962-84", Bank of England Quarterly Bulletin, Vol. 26, pp. 546-558.

Bank of Japan (1982): "Recent portfolio management of institutional investors", Bank of Japan, Research and Statistics Department, Special Paper No. 97, Bank of Japan, Tokyo.

Blinder, A.S., Gordon, R.H. and Wise, D.E. (1981): "An empirical study of the effects of pensions on the saving and labor supply decisions of older men", report prepared for the Department of Labor, Princeton, NJ: Machtech Inc.

Bodie, Z. and Shoven, J.B. (1983): "Financial aspects of the United States pension system", NBER Project Report, University of Chicago Press, Chicago.

Brontë, S. (1982): "Japanese finance: markets and institutions", Euromoney Publications, London.

Bruns, G. and Häuser, K. eds. (1982): "Institutionen des Deutschen Kapitalmarktes", Kolloquien-Beiträge 24, Fritz Knapp Verlag, Frankfurt am Main.

Bruns, G. and Häuser, K. eds. (1983): "Der nicht-organisierte Kapitalmarkt", Kolloquien-Beiträge 25, Fritz Knapp Verlag, Frankfurt am Main.

Buynak, T.M. (1987): "Is the US pension insurance system going broke?", Economic Commentary, 15th January 1987, Federal Reserve Bank of Cleveland.

Corner, D. and Mayes, D.G. eds. (1983): "Modern portfolio theory and financial institutions", MacMillan, London.

Corner, D., Mayes, D.G. and Woodward, R. (1983): "Modern portfolio theory and investment management" in Corner, D. and Mayes, D.G. eds.: "Modern portfolio theory and financial institutions", MacMillan, London.

Curry, T. and Warschawsky, M. (1986): "Life insurance companies in a changing environment", Federal Reserve Bulletin, Vol. 72, pp. 449-459.

Davis, E.P. (1986): "Portfolio behaviour of the non-financial private sectors in the major economies", Bank for International Settlements, Economics Paper No. 17, BIS, Basle.

Davis, E.P. (1987): "Rising sectoral debt/income ratios: a cause for concern?", Bank for International Settlements, Economics Paper No. 20, BIS, Basle.

Denny, M. and Rea, S.A. (1979): "Pensions and saving in Canada", in "Social Security versus Private Saving", ed. G.M. von Furstenberg, Ballinger, Cambridge, Mass.

Deutsche Bundesbank (1976): "Capital formation and investment policy of insurance enterprises since 1971", Deutsche Bundesbank Monthly Report, Vol. 28, No. 8, p. 18.

Deutsche Bundesbank (1980): "Capital formation and investment policy of insurance enterprises since 1975", Deutsche Bundesbank Monthly Report, Vol. 32, No. 4, pp. 11-19.

Deutsche Bundesbank (1984): "Company pension schemes in the Federal Republic of Germany", Deutsche Bundesbank Monthly Report, Vol. 36, No. 8, pp. 30-37.

Deutsche Bundesbank (1987): "Capital formation and investment policy of insurance enterprises since 1979", Deutsche Bundesbank Monthly Report, Vol. 39, No. 1, pp. 17-31.

Diamond, P. and Hausman, J. (1980): "Individual savings behaviour", paper prepared for the National Commission on Social Security.

Dodds, J.C. (1979): "The role of British life insurance companies in Britain's financial markets", SUERF Paper 26A, Tilburg, Netherlands.

Dougall, H.E. and Gaumnitz, J.E. (1980): "Capital markets and institutions", 4th Edition, Prentice-Hall, New Jersey.

Employee Benefit Research Institute (1986): "1985 year-end IRA and Keogh accounts", Employee Benefit Notes, Vol. 7, No. 4, EBRI, Washington.

Ehrlich, E.E. (1981): "International diversification by United States pension funds", Federal Reserve Bank of New York, Quarterly Review, Vol. 6, No. 3, pp. 1-14.

Economic Planning Agency (1985): "Aging society and economic vitality" in "Economic Survey of Japan (1984-85)", EPA, Japanese Government.

Fanning, D. (1982): "Pension funds in the United Kingdom financial markets", SUERF Paper No. 37A, Tilburg, Netherlands.

Feldstein, M.S. and Morck, R. (1983): "Pension funding decisions, interest rate assumptions and share prices" in "Financial aspects of the US pension system", eds. Bodie, Z. and Shoven, J.B., National Bureau of Economic Research, University of Chicago Press, Chicago.

Financial Times (1986a): "Japan: banking, finance and investment", Financial Times Survey, 17th February 1986.

Financial Times (1986b): "Pension fund investment", Financial Times Survey, 19th February 1986.

Financial Times (1987): "Pension fund investment", Financial Times Survey, 21st May 1987.

Friedman, B.M. (1977): "Financial flow variables and the short-run determination of long-term interest rates", *Journal of Political Economy*, Vol. 85, pp. 661-689.

Friedman, B.M. (1980): "The effect of shifting wealth ownership on the term structure of interest rates: the case of pensions", *Quarterly Journal of Economics*, Vol. 90, pp. 567-590.

Friedman, B.M. (1986): "Pension funds, capital markets and innovative investment from the US viewpoint" in "The challenge of private pension funds", eds. Gabrielli, G. and Fano, D., Special Report No. 1058, Economist Publications, London.

Friedman, B.M. and Roley, V.V. (1979): "Investors' portfolio behaviour under alternative models of long-term interest rate expectations: unitary, rational or autoregressive", *Econometrica*, Vol. 47, pp. 1475-1497.

Frost, A.J. and Henderson, I.J.S. (1983): "Implications of modern portfolio theory for Life Insurance Companies" in "Modern portfolio theory and financial institutions", eds. Corner, D. and Mayes, D.G., MacMillan, London.

Gabrielli, G. and Fano, D. eds. (1986): "The challenge of private pension funds", Special Report No. 1058, Economist Publications, London.

Göncü, R. (1985): "Le capital-risque et les technologies de l'information", OECD, Paris.

Green, F. (1981): "The effect of occupational pension schemes on saving in the UK: a test of the life-cycle hypothesis", *Economic Journal*, Vol. 91, pp. 136-144.

Hammond, E. and Kay, J. (1985): "Insurance regulation in the UK and the Federal Republic of Germany" in "Advances in monetary economics", ed. Currie, D., Croon Helm, London.

Heal, D. (1978): "Theory of planning", North Holland, Amsterdam.

Hemming, R. and Harvey, R. (1983): "Occupational pension scheme membership and retirement saving", *Economic Journal*, Vol. 93, pp. 128-144.

Hendry, D.F., Pagan, A.R. and Sargan, J.D. (1983): "Dynamic specification" in "Handbook of econometrics, Vol. 2", eds. Griliches, Z. and Intriligator, M.D., North Holland, Amsterdam.

Henning, C.N., Pigott, W. and Scott, R.H. (1981): "Financial markets and the economy", 3rd Edition, Prentice-Hall, New Jersey.

Jackson, P. (1987): "Management of UK equity portfolios", *Bank of England Quarterly Bulletin*, Vol. 27, pp. 253-260.

Kneeshaw, J. and Van den Bergh, P. (1985): "International interest rate relations: policy choices and constraints", Bank for International Settlements, Economics Paper No. 13, BIS, Basle.

Malkiel, B.G. (1985): "A random walk down Wall St.", 4th Edition, WW Norton, New York.

Meade, J.E. (1978): "The structure and reform of direct taxation", report of a committee set up by the Institute of Fiscal Studies, London: Allen and Unwin.

Mimms, R. (1980): "Pension funds and British capitalism", Heinemann, London.

Morgan Guaranty (1986): "The new worries about stock-price volatility", *Morgan Economic Quarterly*, December 1986, pp. 18-24.

Nardozi, G. (1983): "Structural trends of financial systems and capital accumulation: France, Germany, Italy", *Economic Paper No. 14*, Directorate General for Economic and Financial Affairs, Commission of European Communities, Brussels.

Neave, E.H. (1979): "Canada's financial system", John Wiley & Sons Canada, Toronto.

OECD (1985): "Liberalisation of Japan's financial system", Paper No. DAFFE/INV/85.5, Committee on Capital Movements and Invisible Transactions, OECD, Paris.

OECD (1986): "The origins of high real interest rates", *OECD Economic Studies*, No. 5, pp. 8-55.

Peasnell, K.V. and Ward, C.W.R. (1985): "British financial markets and institutions", Prentice-Hall International.

Pfaff, M., Huler, P. and Dennerlein, R. (1979): "Old-age security and saving in the Federal Republic of Germany" in "Social security and private saving", ed. G.M. von Furstemburg, Ballinger, Cambridge, Mass.

Prodano, S. (1987): "Pension funds; investment and performance", *Gower Studies in Finance and Investment*, No. 3, Gower Publishing Co., Aldershot, England.

Richardson, G. (1983): "The provision of pensions", *Bank of England Quarterly Bulletin*, Vol. 23, pp. 502-512.

Robinson, R.I. and Wrightsman, D. (1980): "Financial markets", 2nd Edition, McGraw-Hill, New York.

Rose, H. (1983): "Occupational pension schemes - economic background and issues" in "The economics of pension arrangements", Bank of England Panel of Academic Consultants.

Sametz, A.W. (1984): "The emerging financial industry", Lexington Books, D.C. Heath & Co., Lexington, Mass.

Sargen, N. and Khadjani, L. (1986): "Changing patterns of Japanese purchases of foreign securities", *Salomon Brothers Inc., Bond Market Research*, March 1986.

Shearer, R.A., Chant, J.F. and Bond, D.E. (1984): "The economics of the Canadian financial system", 2nd Edition, Prentice-Hall Canada, Scarborough, Ontario.

Suzuki, Y. (1983): "Changes in financial asset selection and the development of financial markets in Japan", *Bank of Japan Monetary and Economic Studies*, Vol. 1, No. 2, pp. 29-53.

Threadgold, A.R. (1978): "Personal savings: the impact of life assurance and pension funds", *Bank of England Discussion Paper No. 1*.

Wilson, H. Chairman (1979): "Committee to review the functioning of financial institutions", Vols. 2 and 3, HMSO, London.

WM Co. (1986): "1985 pension fund service annual review", WM, Edinburgh.

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