PRUDENT PERSON RULES OR QUANTITATIVE RESTRICTIONS? THE REGULATION OF LONG-TERM INSITUTIONAL INVESTORS' PORTFOLIOS

E Philip Davis[1]

Abstract: This paper examines the rationale, nature and financial consequences of two alternative approaches to portfolio regulations for life insurers and pension funds, namely prudent person rules and quantitative portfolio restrictions. The argument draws on the financial-economics of investment and the differing characteristics of institutions' liabilities, as well as evidence drawn from major OECD countries. The overall conclusion is that prudent person rules are superior to restrictions, particularly for pension funds, except in certain circumstances that may hold temporarily in emerging market economies

Introduction

This paper seeks to assess the justification, nature and consequences of asset regulations on the portfolios of life insurance companies and pension funds. There are two main alternative approaches, namely "prudent person rules" which enjoin portfolio diversification and broad asset-liability matching, and "quantitative portfolio regulations" which limit holdings of certain types of asset within the portfolio. Both seek to ensure adequate portfolio diversification and (notably for insurers) liquidity of the asset portfolio, but in radically different ways. These are not, however, polar opposites and there are certain gradations between the two, as is revealed by the experience of a range of OECD countries which are used as raw material for the analysis.

We develop the argument by first showing the particular considerations that apply for asset management of life companies and pension funds, respectively, abstracting from regulation. We focus in particular on the distinctive risks incurred by the different institutions. We then present the overall case for and against the different types of portfolio regulations. We show how considerations differ between life insurance companies and pension funds, depending largely on differences in liabilities. We also show how differing circumstances (such as in emerging market economies) may lead to varying prescriptions. We then compare and contrast portfolio regulations in nine OECD countries, and thereafter highlight the differences in portfolios between these countries, considering the extent to which the restrictions actually bind and noting some of the other factors that may affect portfolio composition. We finally assess the differences in terms of real returns achieved on portfolios as between prudent person and restriction-based regimes.

1 Life insurance and pension fund assets and liabilities

[1] Professor of Economics and Finance, Brunel University, Uxbridge, Middlesex UB3 4PH, United Kingdom (e-mail 'e_philip_davis@msn.com', website: 'www.geocities.com/e_philip_davis'). Work on this topic was commissioned by the OECD, see Davis (2001a). This paper draws on Davis and Steil (2001).

In this introductory section, we seek to define the business of life insurance and pension funds in a manner that is relevant for the evaluation of portfolio regulations.

1.1 Life insurance

One may distinguish several parts of an insurance company's asset portfolio (Dickinson 1998a). First, there are assets which are held to cover obligations to policyholders, so-called technical provisions. These are generally purchased with inflows of premium income and are expected to be repaid in the future. Second, there are assets which correspond to the capital funds of the company, in other words the surplus over policyholder liabilities (so called technical provisions). There are also fixed assets and current assets (forms of trade credit or other receivables). Our main focus is on investments held against technical provisions and investments held against the capital base. The investment of the former is constrained by the risk characteristics of the liabilities, derived in turn from the guarantees inherent in the contracts that have been sold. Investments against technical provisions are also the part of the portfolio which is most commonly subject to investment regulation.

A general point regarding liabilities is that it is fundamentally a matter of actuarial calculation (notably using mortality tables as well as assumptions on asset returns) to assess and project how much a policyholder may be paid in the case of a claim. Errors in mortality estimates, as well as in asset-return expectations, are hence key sources of risk. Life insurance company liabilities tended historically to be defined in nominal terms, such as those arising from term policies (purchased to provide a certain sum in the event of death), whole-life policies (term policies with a saving element) and annuities (to give a fixed income for the remainder of the insured's life). Guaranteed investment contracts (GICs) - a form of zero coupon bond typically sold to pension funds - are a modern variant. Insurers may also offer nominal, insured defined benefit pension plans.

However, life companies are increasingly also offering variable policies such as variable life policies, variable annuities, with-profits endowment and unit (mutual fund) linked policies. These typically combine a term policy with a saving element aimed at capital appreciation, where for the latter there is no explicit guarantee regarding the rate of return. Or policies may have option features, with, for example, variable returns but a guaranteed floor. Such policies may offer higher returns - and also risks - to policyholders while posing less shortfall risk to the surplus of the life insurer. In many countries, including the US, there is a deferred-taxation benefit to such investment. Targets for the size of bonuses are typically determined by the need to attract new business in the light of competition in the market. Unlike for pension funds, discussed in the section below, there is no specific objective for capital appreciation defined in terms of

average earnings, although this may enter implicitly via "policyholders' reasonable expectations", to use a current UK expression. A positive real return (i.e. exceeding consumer price inflation) would certainly be a minimum objective of related investment. Besides the popularity of variable policies, insurance companies are heavily involved in investing pension monies. This may occur directly on the balance sheet, generally on a defined contribution basis, or externally as asset managers in segregated accounts on behalf of defined contribution or defined benefit funds.

A life insurer's liabilities will reflect the chosen balance between these different types of policy, which can change over time as insurers choose which markets to serve. The following risks arise:

- errors in mortality projections which may affect all life contracts, but especially term policies with a high sum insured relative to reserves, and annuities (in the opposite direction);
- discontinuance risk, when policies are surrendered before the expenses have been recovered
- where there is mandatory or customary early surrender guarantees, or rights to take policy loans, there will be liquidity risks from this source.
- interest rate risks which arise in the context of guaranteed rates of return, notably for policies with high reserves relative to the sum insured and for new business (where duration of liabilities may be so long that there are no assets to match).
- there are links between liquidity and interest rate risks, since the demand for policy loans is likely to increase when interest rates rise, as policy holders buy high yield, low price bonds. When interest rates fall again, the value of bonds rises and the policy holder sells the bonds and repays the loan. The exercise of the surrender option will also take place when rates of return on assets exceed those expected on the policy.
- for variable contracts, the risk is also one of inflation affecting real returns that investors anticipate, and broader asset-liability matching risk (of which interest rate risk is a special case).

As regards investment strategies, nominal liabilities could be matched or immunised, usually using long term bonds. Portfolios also need some short term liquidity to cover liabilities arising from early surrender of policies and policy loans. On the other hand, the introduction of financial derivatives should provide a cheaper way of covering these risks (Blake 1999). Meanwhile, unlike traditional policies, variable policies imply active investment in equities, real estate and international investments which may be expected to keep pace with inflation. The related assets may often be held in the form of mutual funds. Growing pension-related business, as discussed below, is another factor increasing equity and foreign investment.

The surplus over guaranteed liabilities is intended to protect the firm against insolvency over time, and to finance future growth. Not held explicitly to back liabilities, it is likely to be aggressively invested for return to shareholders and development of reserves. The size of the surplus has an independent effect on

investment from the nature of liabilities. This is because its size will affect the prudent degree of investment risk, i.e. the appropriate degree of mismatching of the embedded risks of liabilities and the assets held to cover them (Dickinson 1998b).

1.2 Pension funds

Pension funds collect, pool and invest funds contributed by sponsors and beneficiaries to provide for retirement income of beneficiaries (Davis (1995), Bodie and Davis (2000)). Returns to members may be purely dependent on the market (defined contribution funds) or may be overlaid by a guarantee of the rate of return by the sponsor (defined benefit funds). Annuities for members of defined contribution funds must generally be purchased separately, from an insurance company, while annuities in defined benefit plans are paid from the fund itself[2]. For both defined benefit and defined contribution funds, the portfolio distribution and the corresponding return and risk on the assets seek to match or preferably exceed the growth of average labour earnings. This will maximise the replacement ratio (pension as a proportion of final earnings) obtainable by purchase of an annuity at retirement financed via an occupational or personal defined contribution fund and reduce the cost to a company of providing a given pension in a defined benefit plan. This link of liabilities to labour earnings points to a crucial difference with insurance companies, in that pension funds face the risk of increasing nominal and real liabilities (for example, due to real wage increases during periods of inflation), as well as the risk of holding assets, and hence need to trade volatility with return. In effect, their liabilities are typically denominated in real terms and are not fixed in nominal terms. Hence, they must also focus on assets which offer a positive real return and inflation protection. This implies a particular focus on equities and real estate.

An additional factor which will influence the portfolio distributions of an individual pension fund is maturity - the ratio of active to retired members. The duration of liabilities (that is, the average time to discounted pension payment requirements) is much longer for an immature fund having few pensions in payment than for a mature fund where sizeable repayments are required. Blake (1999) suggests that given the varying duration of liabilities it is rational for immature funds having "real" liabilities as defined above to invest mainly in equities (whose cash flows have a long duration), for mature funds to invest in a mix of equities and bonds, and funds which are winding-up mainly in bonds (whose cash flows have a short duration). Flexibility in the duration of assets, which may require major shifts in portfolios, is hence essential over time; in contrast, while life insurers' liabilities also have variable duration, the declining duration of a nominal life policy can be matched more readily by conventional bonds as they themselves approach maturity.

---

[2] Note that in many countries, annuities are not compulsory.

Pension funds are often subject to pressures to invest according to non-financial objectives. Notably there is often pressure to invest in "socially responsible" ways. Funds may also be directed to invest in local infrastructure projects (see Clark 1999). Further key distinctions arise in the liabilities and investment approach of defined contribution and defined benefit funds:

1.2.1 Defined contribution pension funds

The financial risks to which the provider of a defined contribution plan (as opposed to beneficiaries) is exposed are minimal. In some cases, solely the sponsor and the investment managers it employs choose the portfolio distribution, and hence there is a risk of legal action by beneficiaries against poor investment. But increasingly, employees are left also to decide the asset allocation via choice of mutual funds (e.g. in the US 401(k) plans). The remaining obligation on the sponsor is to maintain contributions.

As regards portfolio objectives, a defined contribution pension plan should in principle seek to maximise return for a given risk, so as to attain as high as possible a replacement ratio at retirement. As noted by Blake (1997), in order to choose the appropriate point on the frontier of efficient portfolios (which indicates where return is maximised for a given risk), it is necessary to determine the degree of risk tolerance of the scheme member; the higher the acceptable risk, the higher the expected value at retirement[3]. The fund will also need to shift to lower risk assets for older workers as they approach retirement[4], thus reducing duration as outlined above and reducing exposure to market volatility shortly before retirement which might otherwise risk to sharply reduce pensions. They will imply marked portfolio shifts over time.

Until the approach of retirement necessitates a shift to bonds, the superior returns on equity are likely to ensure a significant share of the portfolio is accounted for by equities, depending on the degree of risk aversion. Where employers choose the asset mix, the degree of risk aversion is likely to be related to the fear of litigation when the market value of a more aggressive asset mix declines, where employees choose the asset allocation it is more direct risk aversion.

1.2.2 Defined benefit pension funds

Unlike defined contribution funds, defined benefit funds are subject to a wide range of risks:

---

[3] Blake (1997) conceptualizes this as maximizing risk-adjusted expected value; the expected value of pension assets less a risk penalty, defined as the ratio of the variance of the funds assets to the degree of risk tolerance.

[4] Booth and Yakoubov (2000) cast doubt on the need for such "lifestyle investment".

- Real labour earnings will affect the replacement ratio which can be financed by the pension fund, and given there is usually a guarantee of a certain replacement rate, the fund is subject to risk from this source.
- Liabilities will also be influenced by interest rates at which future pension payments are discounted, and hence there are important interest rate risks.
- Mortality risks affect the cost of the annuities provided by the fund.
- Falling asset returns will affect asset/liability balance.
- There are also risks of changes in government regulation (such as those of indexation, portability, vesting and preservation) that can vastly and unexpectedly change liabilities[5]. The example of the UK, where such changes have been marked, is discussed in Davis (2001b).

Defined benefit fund liabilities are, owing to the sponsor's guarantee, basically a form of corporate debt (Bodie 1991). Appropriate investment strategies will depend on the nature of the obligation incurred, whether pensions in payment are indexed and the demographic structure of the workforce. Investment strategies will also be influenced by the minimum-funding rules imposed by the authorities which determine the size of surplus assets. These, as for life insurers, imply a focus on shortfall risk. Risk aversion of the sponsor may also impinge. One may distinguish strategies related to a target of the accumulated benefit obligation (ABO) and the projected benefit obligation (PBO).

If the sponsor seeks to fund the ABO, and the obligation is purely nominal, with a minimum-funding requirement in place, it will be appropriate, as for life insurers, to immunise the liabilities with bonds of the same duration to hedge the interest rate risk of these liabilities. Unhedged equities will merely imply that such funds incur unnecessary risk (Bodie (1995), although as for insurance companies they may be useful to provide extra return on the surplus over and above the minimum funding level.

With a PBO target, an investment policy based on diversification may be most appropriate, in the belief that risk reduction depends on a maximum diversification of the pension fund relative to the firm's operating investments (Ambachtsheer 1988). Moreover, it is normal for defined benefit schemes which offer a certain link to salary at retirement for the liability to include an element of indexation. Then fund managers and actuaries typically assume that it may be appropriate to include a significant proportion of real assets such as equities and property in the portfolio as well as bonds. By doing this, they implicitly diversify between investment risk and liability risk (which are largely risks of inflation), see also Daykin (1995).

---

[5] Changes in asset regulations – the topic of this paper – may also impact.

As shown by Black (1980), for both defined benefit and defined contribution funds, there is a fiscal incentive to maximise the tax advantage of pension funds by investing in assets with the highest possible spread between pre-tax and post-tax returns. In many countries this tax effect gives an incentive to hold bonds. There is also an incentive to overfund with defined benefit to maximise the tax benefits, as well as to provide a larger contingency fund, which is usually counteracted by government-imposed limits on funding.

As noted by Blake (1997), minimum funding levels and limits on overfunding provide tolerance limits to the variation of assets around the value of liabilities. If the assets are selected in such a way that their risk, return and duration characteristics match those of liabilities, there is a "liability immunising portfolio". This protects the portfolio against risks of variation in interest rates, real earnings growth and inflation in the pension liabilities[6]. Such a strategy, which determines the overall asset allocation between broad classes of instrument, may be assisted by an asset-liability modelling exercise (ALM) (see Peskin (1997), Blake (2000))[7]. Meanwhile, the importance of pension liabilities as a cost to firms, and hence the benefit from higher asset returns, is underlined by estimates by the European Federation for Retirement Provision that a 1% improvement in asset returns may reduce companies' labour costs by 2-3%, where there is a fully funded, mature, defined benefit pension plan.

1.3 Key differences between life insurance companies and pension funds

Drawing on the discussion above, we can note a number of key differences which exist between life insurers and pension funds, which one would expect to be reflected in investment strategies and correspondingly could be affected by any portfolios regulations:

- pension fund liabilities are linked explicitly or implicitly to average earnings, which grow in real terms. In contrast, life insurance liabilities are either nominal, or have an objective of matching or beating price inflation, for competitive reasons;
- as a corollary, falling inflation and hence bond yields may affect life insurance business (where they are guaranteeing nominal returns) but would not affect pension funds (which seek real returns);
- defined benefit pension liabilities most closely resemble those of life insurers in the sense that they have guaranteed obligations which are subject to shortfall risk. Defined contribution liabilities resemble more closely those of a mutual fund, having no guarantee element;
- even for defined benefit funds there is no explicit capital base of a pension fund, unlike an insurer. There may be surplus assets, but these are typically limited by tax regulations, and may be run down by the

---

[6] Note that this is distinct from classic immunization, which relates to interest rate risk only.

[7] Note that the ALM does not integrate the pension fund with the company balance sheet as may be warranted by

sponsor (via "contribution holidays") in order to boost its profitability. In contrast, life companies have their capital as a cushion against errors, and also non-guaranteed bonuses on variable policies;

- a corollary is that any excess returns on defined benefit pension funds only accrue to the sponsor gradually over time (via "contribution holidays"), while excess returns on investments against technical provisions profit the insurance company directly. This could affect risk-taking incentives in the absence of investment regulations, which might thus be higher for life insurers under certain market conditions. Hence regulations might need to be tighter;
- on the other hand, unlike insurance companies, occupational pension funds have a link to a non financial firm, whose own capital is effectively the backup for a defined benefit fund. This link is formalised in the accounting practice which puts uncovered pension liabilities on the sponsoring firm's balance sheet. Where the firm is solvent, this is often a more extensive source of capital than a life insurer's capital base, as well as being subject to shocks which are relatively independent of those affecting pension assets. Pension funds can also require variations in contributions from employees in some circumstances. Arguably this more extensive backup could justify riskier strategies in pension funds;
- life insurance companies are subject to risks not present for pension funds to the same degree, such as liquidity risk (for policy loans and guaranteed early surrender values) and expense risk (that policies will be surrendered before selling costs have been recouped). As noted, these have traditionally been seen as requiring heavy investment in low yielding, capital certain assets - but they could also be hedged by derivatives if regulations permit;
- given the unexpectedly strong upward trend in longevity, pensions and annuities business is more at risk of errors to mortality (since they profit from shorter longevity) than term life business (which profit from higher longevity);
- life companies offer a diverse range of products allowing a degree of diversification (for example selling annuities and term policies to protect against longevity risk) while pension funds offer only one form of liability[8];
- correspondingly, life insurers are better able to control the duration of their liabilities (by varying the mix of products sold) than pension funds (where duration is not only difficult to control but may also change abruptly due to government policies). Matching of duration is thus more straightforward for life insurance companies. More generally, liabilities of pension funds are regulated more closely than those of life insurers (apart from personal pensions offered by the latter), in terms of aspects such as indexation and transferability;
- insurance companies are selling their products in a competitive market and competing both with each other and with competing savings products, while (occupational) pension funds are typically monopoly

---

its status as a collateral for the firm's guarantee, but treats it as an entirely separate financing vehicle.

[8] The pension product may nevertheless bundle different elements such as life insurance and disability insurance.

providers[9] of pensions to workers in a given firm, suggesting a greater need for consumer protection. Life insurers are arguably more likely to make errors in premia due to competitive pressures than are pension funds in their contributions. As a result of competition, life companies may also have a greater incentive for risk taking on the asset side than do pension funds;

- as noted, pension funds as non-profit making institutions profiting from tax privileges are more subject to social pressure on their investments than are insurance companies.

These contrasts are in our view sufficiently marked to mean that there is not a strong case for identical regulations as between life insurers and pension funds. Broadly speaking, defined benefit pension funds appear to need more flexibility on the asset side, in order to cater for more dynamic liabilities over which they have much less control than is the case for life insurers; while defined contribution funds have no guaranteed liabilities at all, hence implying a strong case for freedom to optimise risk and return. Pension funds generally have a greater need for positive real returns. In the light of the above discussion of investment by life companies and pension funds, we now turn to regulatory issues.

2 Regulation of life insurers and pension funds

In order to show the context for investment regulations, the broad issues which life insurance and pension regulation seeks to address are shown in Table 1, together with the types of regulation. The main focus of regulation of life insurance contracts is that there should be sufficient and appropriate assets to meet obligations to consumers, and that consumers should be sold appropriate financial products for their needs, while pension regulation has the broader core objective of aiming to ensure that retirement income security for individuals is ensured. This is of particular importance where private pension provision is compulsory at the national or company level. As is evident from the table, asset regulations are only a subset of the total range of regulations which apply. The table shows that pension regulation is typically much more wide ranging than that of life insurance, notably on the liabilities side. Pension regulations include those of transferability, indexation and annuitisation, none of which are typically regulated for life insurers. This in turn reflects the broader objective of pension regulation, including retirement income security rather than merely protecting against market failures in finance. The general issue arises of whether the wider range of pension regulations (notably on the liabilities side) make portfolio controls more or less necessary. In our judgement they imply a premium on flexibility on the asset side. A further issue also shown in Table 1 arises from the fact that life insurance companies often offer personal or group pensions as well as life insurance contracts. This means their overall regulation has to cover two different kinds of financial contract.

[9] Here, particularly for defined benefit funds, the competition aspect arises in the market for asset management skills, where the sponsor has an incentive to minimise the costs of funding the obligation.

2.1 Prudent person and portfolio restrictions - general considerations

We now go on to assess the different types of investment regulation in more detail. To begin with definitions: a quantitative portfolio regulation is simply a quantitative limit on holdings of a given asset class. Typically, those instruments whose holding is limited are those with high price volatility and/or low liquidity. Meanwhile, a prudent person rule stipulates that investments should be made in such a way that they are considered to be handled "prudently" (as someone would do in the conduct of his or her own affairs). The aim is to ensure adequate diversification, thus protecting the beneficiaries against insolvency of the sponsor and investment risks.

As discussed by Goldman (2000), the logic of the quantitative restriction or "prudent investment" approach is that prudence is equal to safety, where security of assets is measured instrument-by-instrument according to a fixed standard. The focus is placed on the investment itself. The overall risk of a life insurance or pension portfolio must not go beyond a certain level, while allowing for the desire of life companies or pension fund sponsors to be as competitive or low-cost as possible. This leads to a quantitative view of prudence which is focused on the idea that the investment itself can be tested as to whether or not the decision was prudent at the time. The model effectively tests the investment category, the asset class and the outcome of the investment. Such quantitative regulation of portfolio distributions entail limits on holdings of assets with relatively volatile nominal returns, low liquidity or high credit risk, such as equities, venture capital/unquoted shares and real estate, as well as foreign assets, even if their mean return is relatively high. The aim is to protect beneficiaries against insolvency of operators and investment risks, by ensuring adequate diversification of assets. On the other hand, explicit allowance is by definition not made for potentially offsetting correlations between types of financial instrument. It thereby overrides the free choice of investments which was assumed in Section 1. It may be added that there is a strong link to the civil law tradition typical of Continental Europe, where rules are codified, rather than in the common law tradition of the Anglo Saxon countries.

Meanwhile the prudent person rule is focused on the behaviour of the person concerned. The process of making the investment is the key test of prudence. More specifically, the test in this case is of the behaviour of the asset manager, the institutional investor and the process of decision making. It needs to be assessed whether, for example, there has been a thorough consideration of the issues, there is not blind reliance on experts and a form of "due diligence" investigation has been undertaken in formulating the strategic asset allocation. The institution would also be expected to have a coherent and explicit statement of investment principles.

In general terms, a prudent person approach is a standard that measures a course of conduct and not an investment outcome. Nevertheless, such rules are often accompanied by an implicit or explicit presumption that diversification of investments is a key indicator of prudence. The prudent person rule, in effect, allows the free market to operate throughout the investment process while ensuing, along with solvency regulations and appropriate decisions regarding contributions in the light of market conditions, that there is both adequacy of assets and appropriate levels of risk. Rather than the focus being on the external rules, the onus is rather on internal controls and governance structures in which the authorities may have confidence. The authorities correspondingly require information on these aspects rather than purely focusing on the composition of the asset portfolio, as is feasible with quantitative restrictions. Correspondingly, a wider degree of transparency is needed for the institutions (including in particular identification of lines of responsibility for decisions and of detailed practices of asset management). Such monitoring may be delegated to self-regulatory bodies, which have incentives to maintain compliance in order to protect the reputation of the industry and if there are forms of mutual insurance against losses.

The polar extremes are rarely adopted. Notably, prudent person rules are typically accompanied by a quantitative restriction on self investment, while some countries with asset restrictions also introduce concepts of maximising safety and profitability to their investment laws. Furthermore, there are commonly restrictions on the proportion of the assets of an investor that may be exposed to a single borrower or piece of real estate. On the other hand, quantitative restrictions are rarely extended to require specific methods and targets for maturity matching.

The general case against quantitative portfolio regulations is put succinctly by European Commission (1999), namely that they are “in the way of optimisation of the asset allocation and security selection process, and therefore may have led to sub-optimal return and risk taking”. In more detail, and drawing on the discussion above, they:

- prevent appropriate account being taken of the duration of the liabilities (which may differ sharply between companies and between funds, as well as over time), and related changes in risk aversion;
- render difficult or impossible the application of appropriate immunisation or asset-liability management techniques for maturity matching, because such techniques may require sharp variations in the portfolio between equities to bonds, and use of derivatives;
- in terms of risk and return optimisation, they are likely to enforce holdings of a portfolio below the efficient frontier, because they typically insist on high proportions of bonds and domestic assets;

- they focus unduly on the risk and liquidity of individual assets and fail to take into account the fact that, at the level of the portfolio the default risk and price volatility can be reduced by diversification, while liquidity risk depends on the overall liquidity position of the investor and not the individual instruments;
- if portfolio regulations limit use of derivatives, abstracting from other operative limits, they will force the institution either to hold low-yielding assets or expose itself to unnecessary risks;
- they are inflexible and cannot be changed rapidly in response to changing conjunctural economic circumstances and movements in securities, currency and real estate markets[10]; they also may find it difficult to adapt to structural changes in financial asset markets such as the reduction in government bonds outstanding in the UK and US and the development of corporate bond markets in the euro area;
- if enforced strictly, they may give incentives to asset managers to hold proportions of risky assets which fall well short of the limits, to avoid breaching them when markets perform well and prices rise;
- they may encourage low levels of surplus assets, given the low returns on equity that they entail;
- they encourage strategies to be conducted so as to conform with legal restrictions rather than attaining good returns, reducing risk and other desirable objectives. Notably they may limit tactical asset allocation;
- they encourage national governments to treat institutions as means to finance budgetary requirements, in a way that could not occur under a prudent person rule;
- they reduce the extent to which the diversification benefits of international investment may be attained, and can even be said to expose policy holders to currency risk, given that they will want to spend some of their income on foreign goods and services, and the domestic currency may depreciate;
- conversely, whereas regulations on domestic assets may seem appropriate in a small domestic market where there is high volatility and undiversifiable risk in equities, so as to ensure adequate diversification and portfolio liquidity, the widening and deepening of capital markets may make the regulations less necessary;
- portfolio regulations are `not needed to bolster solvency in the case of policies which pass risk to the consumer, such as unit linked life policies and defined contribution pension funds. Prudent diversification is still warranted, but could be mandated by prudent person rules;
- limits on exposures to single borrowers are unnecessary for the most part, since diversification mandated by prudence would require small stakes in any case.

There may also be deleterious effects of portfolio regulations on the asset management industry and the economy as a whole:

[10] The threat to some insurance companies from the fall in inflation, which has driven bond yields below policy guarantees made in an era of high inflation, are a case in point. Arguably, a more diversified portfolio with more “real assets” and hedging could have offered better protection.

- there is no incentive for the institutional investor to nominate investment managers with skills to achieve higher return and lower risk, by equity and international investment;
- competition among asset managers is discouraged if their main function is to meet quantitative asset restrictions;
- the development of the industry per se is likely to be set back, especially if entry by foreign managers is restricted[11];
- quantitative restrictions may lead to inefficient allocation of capital and hence hold back economic growth and employment;
- in particular, limits on unquoted shares and venture capital (including limits on the proportion of a firm's equity that can be held) can hinder the dynamic small firm sector, which generate the bulk of new employment;
- they increase costs for employers providing pensions or life insurance, hindering job creation.

Some possible exceptions may be made to this argument, which may apply notably in emerging market economies:

- there could be a rationale for portfolio regulations (albeit not minima) if fund managers as well as regulators are highly inexperienced and the markets volatile and open to manipulation by insiders. They in a sense ensure portfolio diversification in a rough and ready way, and avoid risk becoming excessive in such cases. A corollary is that restrictions may justifiably be eased as expertise develops;
- this point applies more generally where regulators have initial doubts about internal controls in institutions, as well as about the industry's capacity for self-regulation and related governance structures;
- compliance with portfolio limits is more readily verified and monitored by supervisors than for prudent person rules. The latter requires a high degree of transparency of institutions, and strict supervisory controls on investor malpractice (such as occurred in the Maxwell case) as well as on self-regulatory bodies. There may also be legal difficulties with enforcing prudent person regulations, e.g. in civil law countries;
- the regulations may be used as a safeguard against imprudent companies, and as a signal to the market and consumers;
- if they reduce insolvencies[12], restrictions may reduce the need for an insurance fund that might otherwise lead to moral hazard;

---

[11] The traditional lack of competitiveness of the Japanese asset management sector, low resultant asset returns, the consequences for the funding of pension funds and life insurers, and the benefits of deregulation of entry and portfolio regulations, are considered in Davis and Steil (2001).

[12] In practice, there is little evidence from OECD countries that insolvencies of life insurers and pension funds have been significantly higher with prudent person than with asset restrictions.

- following the general case above, regulation should become more liberal as financial markets become more sophisticated and mature, and should be reviewed frequently;
- governments may, by use of asset restrictions, seek to avoid bearing the burden of bailing out individuals from losses following imprudent investments in products such as personal pensions, where the individual bears the risk;
- further issues arise in the context of capital outflow controls in developing countries. As noted by Fontaine (1997), exchange controls have in the past been - justifiably - imposed during foreign exchange crises to deal with capital flight, to avoid a sharp and costly overshooting of the currency, but often kept in looser form once normal conditions were re-established;
- foreign investment may be seen as risky in the absence of appropriate derivatives markets for risk control;
- some countries also argue that restrictions are needed to boost development of domestic capital markets – but openness to foreign investment may also achieve this objective, while permitting international investment by institutional investments reduces their exposure to diversifiable risk;
- even in OECD countries, limits on self investment are appropriate to prevent concentration of risk;
- meanwhile a difficulty with prudent person rules lies in the fact that court judgements (or desire to avoid litigation) may lead to narrow interpretations of risk and safety, see Del Guercio (1996)[13]. Of course, avoidance of individually high-risk assets that could improve the overall risk and return profile of the portfolio may actually be contrary to beneficiary protection, which was the intention of prudent person rules.
- Such interpretations may also encourage a focus on portfolio indexation. Indexing to narrow core market indices (such as the FTSE-100 and S and P 500) artificially drives up the value of the firms that are included and may increase the volatility of the investors' assets.

2.3 Prudent person versus portfolio restrictions for life insurance companies and pension funds

We now go on to examine the case separately for life insurance companies and pension funds. In order to protect insurance firms from insolvency in the shorter term, supervisory rules typically impose stricter regulations on assets backing technical provisions (i.e. guaranteed liabilities) than for the surplus (Dickinson 1998a). For example, a number of assets types are often forbidden to be held against technical provisions, but these restrictions typically do not apply to the surplus. This is also the case for the quantitative restrictions on asset holdings. Hence, the assets backing technical provisions are more likely to be invested in bonds, with only the surplus including a share of equities. A similar issue arises for defined benefit pension funds, discussed below. On the other hand, the size of the surplus is itself affected by the degree of

[13] She found that bank managers hold 31% of their equities in stocks of companies rated A+ by Standard and Poor's while the corresponding figure for mutual funds is 15%.

conservatism of the regulatory and accounting framework. For example, surplus calculations are affected by valuation methods (e.g. whether assets are valued at market value or book value) and discount rates used to calculate the present value of future liabilities. Undervaluation of the capital base may significantly increase the leverage of investment restrictions. Life company sectors having low discount rates and book value accounting for the assets tend to have smaller surpluses and correspondingly lower allocations to equities than those with high discount rates and market value accounting.

The case in favour of quantitative portfolio restrictions may be put most strongly for life insurance companies which have nominally-fixed liabilities, especially if there are rights to early surrender. For such institutions, matching with assets of similar duration may indeed be a desirable portfolio strategy, as set out above, and a high degree of liquidity will be needed. This will be particularly the case for assets matching technical provisions. Hence, portfolio regulations (which usually do not restrict bond holdings) may not strongly distort free-market portfolios. On the other hand, as argued by Dickinson (1998a), restrictions may make it more difficult to cope with some of the underlying risks of traditional life insurance business, notably interest rate risk on annuities and term policies, arising from the implicit interest rate guarantee implicit in the price of the contract. This can only be evaluated in the context of the asset and liability composition (immunisation characteristics) of the whole portfolio and not asset-by-asset. If there are strict investment restrictions, combined with restrictions on minimum premia, these may also give rise to economic inefficiency, as resulting low competition perpetuates a fringe of high cost firms (Rees and Kessner 1999).

More generally, a competitive insurance market will involve firms seeking to earn higher rates of return on their financial assets in order to develop new products and compete with alternatives such as mutual funds. They may then seek to have a wider and more flexible choice of financial assets than regulations may allow, including taking advantage of the risk diversification, offered by international investment. As noted, even traditional liquidity risks can be handled at lower cost by use of derivatives. It can be argued that prudent person based diversification plus solvency rules[14], as well as comprehensive conduct of business rules to protect consumers are sufficient protection for policy holders without the overlay of asset restrictions. This will be so especially if the latter are imposed on an annual basis.

This may be a particularly relevant argument for long-term policies where any mismatched position can be corrected well before liabilities are due, and where appropriate asset-liability management techniques are undertaken. It applies even more strongly for the surplus over and above the level of technical provisions. Furthermore, assets corresponding to non-guaranteed liabilities (such as the bulk of variable-life or unit

[14] Where the latter may include suitable stress tests, conservative valuation methods and/or risk based capital

linked policies) are subject to inflation risk (as policyholders will anticipate a positive real rate of return on the policy). Such risks are minimised by investment in assets with real returns (indexed bonds, or in their absence international equities and real estate), which are often restricted by regulations Meanwhile, the restrictions on large exposures, while unnecessary in the context of diversification (since diversification would in any case lead to small stakes), may inhibit strategic stakes between insurance companies.

The case for portfolio restrictions is even weaker for pension funds, where it may be noted that any portfolio restrictions typically apply to the whole of the portfolio. Indeed, for advanced countries, apart from the control of self-investment, the degree to which such regulations actually contribute to benefit security is open to doubt. This relates to the link of liabilities to average earnings growth (as well as the vulnerability of liabilities to regulatory changes)[15]. Moreover, appropriate diversification of assets can eliminate any idiosyncratic risk from holding an individual security or type of asset, thus minimising the increase in risk. Again, if national cycles and markets are imperfectly correlated, international investment will reduce otherwise undiversifiable or "systematic" risk (see Davis 1995). In the case of restrictions which explicitly or implicitly[16] oblige pension funds to invest in government bonds, which must themselves be repaid from taxation, there may be no benefit to capital formation and the "funded" plans may at a macroeconomic level be virtually equivalent to pay-as-you-go. Meanwhile, changes in duration depending on the maturity of a fund require marked shifts in portfolios.

For defined contribution funds, it is hard to argue a sound case for such rules, given the superior alternative of prudent person rules. There seems little evidence that defined contribution investors need "protecting from themselves" i.e. prevented from taking high risks by quantitative restrictions. Indeed, in practice, experience suggests that US investors in individual defined contribution funds at least historically tended to be too cautious to develop adequate funds at retirement, while companies running defined contribution funds may invest excessively cautiously to avoid lawsuits. A case could be made (as in Chile, see Davis (1998)) that a danger with unrestricted investments would be that firms providing pension contracts would seek to boost yield to attract clients, at a cost of excessive risk which could ultimately be borne by the government. But these tendencies could also be dealt with by a prudent person rule.

It would still be essential to have a self investment or concentration limit on such defined contribution funds, as is compatible with prudent person rules. This is, to avoid exposing the beneficiaries to excessive risk. The Enron case (Financial Times 2001) revealed a major flaw in the regulation of US 401(k) plans, in

---

requirements.

[15] Indeed, in several countries, a false parallel seems to be drawn by regulators between life insurers and pension funds.

[16] For example, by closing down all alternative investment strategies such as international diversification.

that regulation permitted unlimited investments in the employer's stock[17]. When the energy company Enron went bankrupt in late 2001, the beneficiaries made huge losses on their pension assets.

Portfolio limits would also appear to be inappropriate for defined benefit pensions, given the "buffer" of the company guarantee for the beneficiaries and risk sharing between older and younger workers, and if benefits must be indexed. Clearly, in such cases, portfolio regulations may affect the cost to companies of providing pensions, if it constrains managers in their choice of risk and return, forcing them to hold low yielding assets, and possibly increasing their risks and costs by limiting their possibilities of diversification. Even solvency rules may not be essential if there is an appropriate actuarial and accounting framework[18].

A very weak argument for portfolio regulation of pension funds - but nevertheless one which is occasionally heard - is the need for a level playing field in terms of competition between life insurance and pension funds. Differences between types of liabilities are sufficiently radical to offset this, and one could also question whether there is in fact direct competition, given pension fund membership is typically compulsory as part of the contract of employment, while purchase of life insurance is voluntary. At most, it is only the pension contracts offered by life companies that compete directly.

3 National experience

In this final section we compare the types of restrictions set in a number of OECD countries and make an evaluation of the effects they have had on portfolios and investment performance.

3.1 Comparing asset regulations of insurance and pension funds in nine OECD countries

Table 2 provides details of the types of restrictions which hold in a number of key OECD countries (see OECD (2000 and 2001)). Note that although the article reflects information available to the author at the time of writing, regulations are not infrequently subject to amendment. The details presented on life regulations (from OECD (2000) and Dickinson (1998a)) are likely to be less up to date than those on pension funds (from OECD 2001).

---

[17] Investment Company Institute (2001) reveals inter alia that 19% of total 401(k) balances at end 2000 were in own-stock, but the figure rises to 28% for plans with equity, bond, money, balances funds, company stock and GIC options, and 32% when there is no GIC option. Company stock is 25% for funds with over 5000 participants and 10% or less for smaller funds. When there is an element of employer as well as participant direction of portfolios and company stock as an "option" the figure rises to an average of 53%. Apparently only 0.5% of funds require employer contributions to go in company stock, but these account for 6% of participants and 10% of assets in the relevant subgroup.

[18] See the discussion of the pre-1995 regime in the UK in Davis (2001b).

Concerning the overall approach to investment regulation, prudent person rules are much more common for pension funds than for insurance companies. Only the UK, US and the Netherlands have prudent person rules for both types of institution. Canada, Finland, Italy and Japan have prudent person rules for pension funds and not for life insurers, while in Germany and Sweden neither sector has prudent person rules. This predominance for life insurance is consistent with the suggestion above that quantitative restrictions may be more suited to this sector by the nature of the liabilities than for pension funds. Both types of regulation are often accompanied by diversification rules. These tend to be more stringent for life insurers than pension funds, with the latter often having a general requirement to diversify (as in the UK, US, Finland and the Netherlands) while life insurers' diversification rules are generally quantitative, even in the Netherlands and the United States where there is also a prudent person rule. Where both types of institution are subject to quantitative diversification rules, the limits are often lower for life insurance than for pension funds, as in Sweden or Italy. There are also maturity-matching requirements for life insurers in Finland, the Netherlands and the UK, while no country imposes maturity matching on pension funds.

Quantitative restrictions on domestic assets are naturally more detailed where they form the basis of asset regulation than where they do not, (i.e. a prudent person rule operates). They are not, however, absent in all cases of prudent person rules, as for Canadian and Finnish pension funds. In the latter, the array of restrictions casts into doubt the classification of the overall sector regulation in OECD (2000) as based on prudent person. Comparing quantitative restrictions between life insurance and pension funds, we see that in some countries they are tighter for pension funds, as in Finland and Germany. It could again be questioned whether this is in line with the differing nature of liabilities. These cases are however exceptional, and elsewhere the life insurers tend to have more onerous quantitative restrictions. Only the Netherlands and the UK have no restrictions on share holding for life insurers, whereas only Finland, Germany and Sweden (at a very high level) limit the share holdings of pension funds. Unquoted shares, real estate and loans are also commonly restricted for life insurers. The UK has no restrictions at all on domestic asset holdings, except for a 3% cash limit for life insurers. Note that in Canada, Japan and the US, life insurance regulations apply to all assets of the company, whereas in the EU the restrictions only apply to investments against technical provisions. It has been suggested in Section 1.1 above that the latter is more appropriate, because the surplus and free capital correspond to the equity of the firm and not to its liabilities.

Self-investment is typically banned for life insurers altogether, while for pension funds it is typically limited to 10% (whether or not there are prudent person rules), to protect against insolvency of the sponsor. Finland is unusual in that the maximum is 25%. US defined contribution funds and Japanese funds also have no limits, as is also the case for German and Japanese book-reserve pensions. As noted, this proved catastrophic for employees of Enron in the US. Only for a few countries are there ownership concentration

limits for unrelated firms, as in Canada and Sweden (these rules seek to prevent concentration of power in corporate governance, rather than avoiding insolvency of the institutional investor).

As regards foreign asset restrictions, these tend to be more stringent for life insurers than pension funds, in line with the nature of the liabilities. There are typically two types, namely matching limits that usually apply to investments against technical provisions, and overall restrictions which apply to the portfolio as a whole. For example, Netherlands, UK and US life insurers are subject either to currency matching or foreign asset restrictions, despite a “prudent person” rule. In some countries, such as Canada, Germany and Finland, pension fund rules are more restrictive than those for life insurers are, which is a paradox given the longer-duration and wage-linked nature of the liabilities.

This section has shown that in general, pension fund asset regulation is lighter than life insurance, with prudent person rules being more common, while quantitative regulations which apply tend to be easier. This is consistent with the argument presented in Section 2, that portfolio restrictions are more appropriate - or at least less damaging - for life insurers than for pension funds. There are some exceptions, as in Canada, Germany and Finland, where pension funds face tougher restrictions for some or all asset types.

3.2 Assessment of portfolios in the light of asset restrictions and other influences

We set out to consider how sectoral portfolios differ, depending on whether there are quantitative restrictions, as well as seeing whether the restrictions actually bind. We also note some other key influences on portfolios. Tables 3 and 4 present data for end-1998, derived from various sources, on the life insurance and pension fund sectors in the countries noted above, together with France. Taking the countries together on average, portfolios with prudent person rules have fewer bonds, and more equities and foreign assets, than those with quantitative restrictions. The differences for domestic assets are slightly greater for pension funds than for life insurance, and markedly so for foreign assets. Such a contrast would be much greater if the countries which have recently switched to a prudent person approach for pension funds (such as Japan) were excluded, as they are slowly adjusting to the new regime.

Whereas portfolio restrictions are aimed to prevent overconcentration of risk in individual assets, they may operate contrary to this; Swedish pension funds have considerable exposure to housing markets via mortgages, mortgage related bonds, and loans to housing credit institutions. These amounted to no less than 35% of Swedish funds' assets in 1998. These imply a sizeable exposure to potential effects of recession and falling house prices. Even countries with “prudent person rules” may not leave equity investment entirely unrestricted. Trzcinka (1998) maintains that US defined benefit fund managers target a fixed income ratio of

around 40% owing to the prudent person rule (although the minimum-funding regulation may be more influential).

Table 5 shows some tentative estimates of the degree to which constraints on portfolios bind. For pension funds, Swedish limits on foreign assets are close to being attained. Elsewhere, average portfolios fall well short of limits. For life insurers, it will be recalled that restrictions in the EU tend to apply to assets backing technical provisions. Foreign asset limits (for all insurance companies) are breached in Sweden probably for this reason. Similarly, the overshoot shown for the US reflects the fact that only some states, following New Jersey, impose a 15% limit. Equity limits seem tight in Canada and Sweden, and foreign currency limits in the UK. Elsewhere there is considerable headroom. Note that the interpretation of headroom could be on the one hand that there is no effect of the restrictions on normal business - or on the other that the existence of such restrictions may lead to very cautious portfolio management to avoid ever breaching them even if markets soar. The distinction is hard to test. Caution in portfolios may also link to accounting and solvency limits, as discussed below.

Also of interest are the econometric results of Davis (1988) regarding the scope of tactical asset allocation for life insurers and pension funds in the US, UK, Germany, Japan and Canada. These estimates showed that changing portfolios are strongly influenced by relative asset returns (implying tactical asset allocation) where there are few regulations governing portfolio distributions and low transactions costs, as in the US and UK. Adjustment to a change in such returns in these countries is generally rapid. Assuming adequate information and appropriate incentives to fund managers, this should imply an efficient allocation of funds and correct valuation of securities. In Davis' research, these results did not all hold where transactions costs are high and portfolio regulations are strict - e.g., in Germany, Japan and Canada. In these countries, adjustment to a change in returns is somewhat slower, implying that portfolios are relatively invariant to changes in asset market conditions. These estimates illustrate the inflexibility of portfolios to market conditions when portfolio restrictions apply.

We now go on to note some other influences on portfolios which may complement, interact with or override those of portfolio regulations:

- solvency and minimum funding rules and their interaction with associated accounting arrangements may play a crucial role in influencing portfolios, and may account for the non binding nature of the portfolio restrictions themselves. This is because they determine the size and volatility of the surplus, as well as defining the rules for dealing with a corresponding deficit. They hence influence the likelihood and cost[19] of

[19] As an example, in the UK, the accounting rule FRS17 introduced at the time of writing, enforces mark to

any deficiency, and hence the importance for life insurers and pension funds of maintaining a stable valuation of assets relative to liabilities, independent of portfolio limits.

- minimum rates of return set annually by regulation can constrain diversification even when quantitative limits are not stringent (OECD 2000). This is because they limit holdings of volatile assets which could reduce returns below the limit in one year, even if they offer a high mean return;
- application of accounting principles which insist on positive net worth of the fund at all times, carry equities on the balance sheet at the lower of book value and market value[20] and calculate returns net of unrealised capital gains (as in Germany and Switzerland) restrain equity holdings independently of portfolio regulations (see Hepp 1992).
- liabilities have a major influence, for example on the share of bonds, in that (i) inflation sensitivity of liabilities will determine the demand for assets acting as inflation hedges such as index linked bonds, as well as assets whose return is unaffected by inflation such as real estate and equities; (ii) the need for cash flow will play an important role by determining the need for liquidity to meet (known or uncertain) cash flows, for example in the context of growing maturity of pension funds, and policy loans/early surrender for life insurers; (iii) duration of liabilities in combination with the strictness of minimum funding and solvency rules will set a benchmark for the duration of assets - or if they are not matched, to the scope of interest rate risk. Besides differing between countries, these factors will differ strongly between individual institutions;
- higher taxation on bonds than equities makes the former an attractive investment to tax-exempt investors such as pension funds
- ownership and control of pension funds may influence portfolios, via the degree of risk aversion of those controlling the fund and the degree to which those holding residual risks can control asset distributions. Similar differences may exist between mutual and listed insurance companies, where the latter may be more aggressive in risk taking.
- concerning international diversification, in small countries the assets of institutional investors may exceed the entire domestic equity market, and hence simple liquidity considerations necessitate international investment, abstracting from risk/return considerations, if regulations permit.
- the structure of insurance and asset management markets and related levels of competition is likely to impact on the efficiency of investment, whereby protection of fund managers from external competition may lead to a sub-optimal investment strategy from the point of view of beneficiaries;
- whereas in principle capital market activity should ensure that asset returns are equalised across countries, owing to international investment restrictions, exchange controls etc. this has not always been the case in the past, resulting in markedly different real returns on assets;

---

market, on balance sheet accounting for pension liabilities with no smoothing and use of a corporate bond yield discount rate. It is considered to be leading to widespread abandonment of defined benefit funds altogether (Davis 2001b).

[20] These regulations were abolished in Germany after the impact on life insurers' solvency of asset price falls following the terrorist attacks on the US on September 11th 2001 became apparent.

- financial structure more generally may have an important role to play. In traditionally bank-dominated economies where capital markets play a subordinate role, it is loans that often dominate the portfolios of long-term institutional investors.

3.3 Returns on life insurance and pension fund portfolios

In order to assess the effects of portfolio regulations more directly, we estimated the returns on life insurers' and pension funds' portfolios, using aggregate data for the respective sectors in seven of the nine countries considered in Section 3.1. This was done by weighting the various components of the asset portfolio by the annual total holding period returns obtained on the corresponding instruments in the market. The implicit assumption is that the institutions are holding the index portfolio in each instrument, while transactions and administrative costs, which would otherwise act to reduce returns, are disregarded. Clearly, this is a simplistic exercise and conclusions should be drawn cautiously. No account is taken of the liability mix including pension fund maturity. Moreover, the degree to which the (nominal or real) return and the standard deviation alone can be used to assess the optimality of portfolio choices is limited, given that the liabilities may justify some alternative approaches to investment (such as immunisation or shortfall risk minimisation) not focused on risk and return alone, see Borio et al (1997).

Data for life insurers are only available for the period since 1980, so for comparison we show the data for pension funds over the same period. This is rather shorter than is ideal, since it covers mainly a period of falling inflation and favourable market returns, that may not be typical of experience over longer periods. We include as a memo item longer-term returns for pension fund sectors (Davis and Steil 2001). With these caveats in mind, we present the results in Tables 6 and 7. Pension fund sectors are shown on average to have similar real returns to life insurance sectors, despite the difference in liabilities discussed in Section 1. The sectors with prudent person rules have higher returns than those with restrictions, both for life insurance and pension funds. The average difference between prudent person and restrictions is however greater for pension funds - of the order of 200 basis points, as compared with 90 basis points for life insurers. In effect, if we assume that sectors with prudent person rules are optimising, and product mix is similar, the loss of returns arising from quantitative restrictions is implied to be much less for life insurers than for pension funds.

While comparing sectors with prudent person rules, the average annual return for pension funds is 30-50 basis points above those for life insurers. This is consistent with the stronger link of liabilities to real earnings for pension funds, which would necessitate higher returns. For countries with restrictions, the returns are lower for pension funds than for life insurers by 80 bp. This is a large difference, which is not

consistent with the differing nature of liabilities. As regards risk, the data suggest that the volatility of real returns for countries with asset restrictions is actually higher than with prudent person rules. (This is however largely a consequence of high volatility in Sweden.) The 1970-95 data for pension funds, included as a memo item, suggests that the difference between prudent person and restrictions is rather less over a longer period - around 80-100 basis points. Meanwhile, the standard deviations are higher for prudent person, as might be anticipated. These outturns nevertheless show that superior returns by prudent person sectors are not just a quirk of the 1980-95 data period.

These comparisons of absolute real returns are problematic in that the returns that can be obtained in national markets often vary sharply[21]. Hence, it is also relevant to compare realised returns with benchmarks, namely 50-50 domestic bonds and equities, a global portfolio of 50-50 international bonds and equities, distributed across the other markets with rough GDP weights, and real average earnings. Are life companies and pension funds optimising given the opportunities, which may differ markedly between countries? Looking at the comparison of the portfolio returns with the benchmarks, it is evident that sectors do not always profit fully; this is notably the case for Japan, the Netherlands and Sweden (for domestic assets) and Sweden (for the global portfolio), where returns are more than 400 basis points below a 50-50 portfolio of bonds and equities. On the other hand, risks on the institutional sectors' portfolios are generally lower than for the benchmarks, reflecting wider diversification. Looking at the averages for different types of portfolio regulations, the results are revealing. For life insurers there is rather little difference between prudent person and quantitative restrictions in the average shortfall for a 50-50 domestic portfolio, which is 2.2% for prudent person and 2.7% for restrictions. There is an 80 basis point lower shortfall for prudent person sectors on a global portfolio. In contrast, for pension funds there are major differences. For a 50-50 domestic portfolio, the difference in the shortfall between prudent person and quantitative restrictions is no less than 280 basis points, 4.6% against 1.8%. It is 220 basis points for the global portfolio. The excess over average earnings, while it is adequate on average during this bull market for both sectors, is nevertheless 2 percentage points higher for prudent person sectors.

Despite all the caveats, one conclusion is clear, namely that pension fund sectors with quantitative restrictions tend to suffer much more relative to prudent person sectors than do life sectors with restrictions. Over 1980-95 there was not even an offsetting benefit in terms of risk reduction, if one focuses on the volatility of real holding-period returns. This indicates that portfolio restrictions raise costs unduly and are damaging to employee retirement security. In contrast, restrictions appear to be less damaging for life companies, although some reduction in return is apparent for no reduction in risk.

---

[21] Reasons include varying development of the capital market, interest rates, economic growth and exchange rate

Conclusions

Summarising the main points of the paper, the nature of liabilities are the key to understanding appropriate investments of life insurance companies and pension funds. There are a number of fundamental differences between the two types of institution which make it unlikely that identical asset regulations will be appropriate; in particular, pension funds are likely to have a returns-benchmark of average earnings, while life companies need at most to seek to beat inflation. Varying duration of pension liabilities - and difficulty of matching with a single asset class - may necessitate major shifts from one asset category to another over time, and major differences between funds at any given time. Life insurers are better able to control the duration of liabilities via the mix of policies sold.

Turning to regulatory issues, there are a wide range of potential regulations, some of which may substitute for others. In terms of portfolio regulations, both prudent person regulations and quantitative restrictions seek principally to ensure diversification, albeit by differing routes. The former focuses on the process of investment, while the latter focuses on the individual instruments held. There are strong arguments in terms of financial economics for a prudent person rule for institutional investors, especially if it is combined with appropriate solvency regulations and limits on self-investment. The case is particularly strong for pension funds in the light of the need for real returns and flexibility. There are major differences between OECD countries in terms of the actual approach adopted; in some countries, the rules vary markedly between life insurance and pension funds, while in other cases identical rules apply, even though liabilities may differ. In most countries, it is life regulations which are tighter than those for pension funds, although this is not universal.

The actual portfolios of life insurance companies and pension funds in OECD countries reflect a number of factors in addition to the portfolio restrictions and hence the effect of the restrictions is not easily evaluated. On the other hand, a general tendency can be discerned for sectors facing prudent person rules to have a grater share of equities and foreign assets. Constraints vary in the degree to which they bind, but this need not mean that the restrictions have no effect on portfolios. Whereas returns on pension fund sectors are comparable between 1980 and 1995 with those for life insurers, the difference of returns between pension fund sectors with prudent person and portfolio regulations are greater than the difference for life insurers. This conclusion is greatly strengthened when looking at returns relative to feasible benchmarks. Pension funds are shown to be much more adversely affected by quantitative restrictions in this sample that are life insurance companies. These estimates thus underline the conclusion that quantitative restrictions are particularly inappropriate for pension funds.

---

developments.

REFERENCES

Black F (1980), "The tax consequences of long-run pension policy", Financial Analysts Journal, September-October, 17-23.

Blake D (1997), "Pension funds and capital markets", Discussion Paper No PI-9706, The Pensions Institute, Birkbeck College, London.

Blake D (1999), “Portfolio choice models of pension funds and life assurance companies, similarities and differences”, Geneva Papers on Risk and Insurance, 24, 327-57.

Blake D (2000) “Two decades of pension reform in the UK - what are the implications for occupational pension schemes?”, Employee Relations, 22, 223-45

Bodie Z (1991), "Shortfall risk and pension fund asset management", Financial Analysts Journal, May/June 1991.

Bodie Z (1995), “On the risk of stocks in the long run”, Financial Analysts Journal, 52, 67-68

Bodie Z and Davis E P (eds) (2000), "The Foundations of Pension Finance", Edward Elgar

Bodie Z, Kane A and Marcus A J (1999), "Investments", Irwin.

Booth P M and Yakoubov Y, (2000), Investment Policy for Defined Contribution Pension Schemes Close to Retirement: an Analysis of the "Lifestyle" Concept, North American Actuarial Journal, Volume 4, No. 2.

Borio C V, Chincarini L and Tsatsaronis K (1997), “Institutional investors, asset management and financial markets”, mimeo, Bank for International Settlements, Basel.

Clark G L (1999), “Pension fund capitalism”, Oxford University Press Davis E P (1995), “Pension funds”, Oxford University Press.

Davis E P (1988), "Financial market activity of life insurance companies and pension funds", Bank for International Settlements, Economic Paper No 21, BIS, Basle.

Davis E P (1995), “Pension funds, retirement-income security and capital markets - an international perspective”, Oxford University Press.

Davis E P (1998), "Investment of mandatory funded pension schemes", in eds J Turner and D Latulippe "Funding of Social Security Pensions", International Labor Office.

Davis E P (2001a), “Portfolio regulation of life insurance companies and pension funds”, Financial Market Trends, OECD, Paris

Davis E P (2001b), “The regulation of funded pensions, a case study of the UK”, Occasional Paper OP15, Financial Services Authority, London, see http://www.fsa.gov.uk/pubs/occpapers/op15.pdf

Davis E P and Steil B (2001), “Institutional investors”, MIT Press

Daykin C (1995), “Occupational pension provision in the United Kingdom”, in eds. Z Bodie, O S Mitchell and J Turner, “Securing employer-based pensions, an international perspective”, University of Pennsylvania Press.

Del Guercio D (1996), “The distorting effects of the prudent-man laws on institutional equity investments”, Journal of Financial Economics, 40, 31-62

Dickinson G (1998a), “Issues in the effective regulation of the asset allocation of life insurance companies”, in Ed. H Blommestein and N Funke, "Institutional investors in the new financial landscape", OECD, Paris

Dickinson G (1998b), “The impact of the euro on the investment and treasury management polices of European insurance companies” paper presented at the SUERF conference, Frankfurt

European Commission (1999), “Rebuilding pensions, security, efficiency, affordability - recommendations for a code of best practice for Second Pillar Pension Funds”, prepared by Pragma Consulting for DG-XV, European Commission, Brussels.

Financial Stability Forum (2000), “Report by the study group on insurance issues and developments”, FSF, Basel

Financial Times, (2001), “A poor retirement: The bankruptcy of Enron has brought into uncomfortably sharp focus broader doubts about the way that US employees invest for their old age”, FT, 12 December 2001

Fontaine J A (1997), "Are there good macroeconomic reasons for limiting external investments by pension funds? The Chilean experience", in ed. Valdes-Prieto S "The economics of pensions", Cambridge University Press.

Goodman R (2000), “The development of the prudent man concept in relation to pension funds”, Journal of Pensions Management, 6(3), 219-224

Hepp S (1992), "Comparison of investment behaviour of pension plans in Europe implications for Europe's capital markets.", in ed. Mortensen J, "The Future of Pensions in the European Community", Brassey's, London.

Investment Company Institute (2001) "401(k) plan asset allocation,account balances and loan activity in 2000" ICI, Washington DC, available on http://www.ici.org/pdf/per07-05.pdf

Mercer W (1999), "European pension fund managers guide 1999", William M Mercer, London

OECD (2000), “Issues paper on investment regulation”, Paper No DAFFE/AS(2000)3, Insurance Committee, Organisation for Economic Co-operation and Development, Paris

OECD (2001), “Survey of investment regulation of pension funds”, Working Party on Private Pensions, Organisation for Economic Co-operation and Development, Paris, see http://www.inprs.org/data/policies/files/surveyinvregulation.pdf

Peskin M W (1997), "Asset allocation and funding policy for corporate sponsored defined benefit pension funds", Journal of Portfolio Management, Winter 1997, 66-73.

Rees R and Kessner E (1999), “Regulation and efficiency of European insurance markets”, Economic Policy, October 1999, 365-397

Targett S (2000), “Pension industry faces closer scrutiny”, Financial Times, 3/7/00

Trzcinka C (1998), “The conflicting views and management practices of institutional equity investing”, Financial Markets, Institutions and Instruments, 7, 20-53

Table 1: Principal regulations for life insurance companies and pension funds

Abbreviations: LI Life insurance contracts; PP Defined Contribution Personal Pensions, DB Defined Benefit Pension Funds, DC Defined Contribution Pension Funds, PPR prudent person rule, QR, quantitative restrictions

Issue	**Regulation**	**Applies to life insurance?**	**Applies to pension funds? Which type?**	**Main economic issue**
Are portfolios of life insurance companies and pension funds adequately diversified and matched to liabilities?	Portfolio distributions	Yes (either PPR or QR)	Yes- Both DB and DC (either PPR or QR)	Monopoly/ asymmetric information
Are there adequate funds to pay life insurance obligations/pension promises?	Funding/Solvency	Yes	Yes- DB	Monopoly/ asymmetric information
Who should benefit from assets accumulated in excess of guaranteed life insurance/pension benefit promises?	Surpluses/reasonable expectations	Yes	Yes – DB	Fiscal/equity
Regulation of minimum levels of contributions or premia	Contri-butions, premia and commissions	Yes in highly regulated markets	Yes – DC	Monopoly/ Fiscal
Should individuals and companies be obliged to have private pension schemes or life insurance?	Membership	Not LI – possibly PP	Yes – Both DB and DC	Moral hazard/fiscal
Should annuities be inflation-indexed?	Indexation/ contract design	Yes – PP only	Yes – Both DB and DC	Monopoly
Should private pensions or life insurance be an addition or partly a substitute for social security?	Integration	Not LI – possibly PP	Yes – Both DB and DC	Fiscal
Should individuals be forced to take annuities from life insurance companies , or are lump sums acceptable?	Annuities	Yes – for PP	Yes - Largely DC	Adverse selection
Should rights under life insurance or pension benefits be insured?	Insurance	Yes, in liberalised markets	Yes - Largely DB	Monopoly/ asymmetric information
Can losses on pension funds be avoided when individuals change job, or when individuals wish to shift their assets between life insurance companies?	Portability	Yes – for PP – not LI	Yes - Largely DB	Monopoly/ economic efficiency
Should there be controls on the distribution of costs and benefits from life insurance and pension schemes?	Benefits, contract conditions	Yes in highly regulated markets	Yes - Largely DB	Monopoly/equity/efficiency
How can one ensure adequate governance and member representation?	Trustees, fit and proper controls	Yes	Yes – Both DB and DC	Asymmetric information/ Monopoly
What information is essential for members to judge the soundness of life insurance companies and pension plans?	Information/ consumer protection	Yes	Yes - Largely DC	Asymmetric information
How best to organise these various regulatory tasks?	Regulatory structures	Yes	Yes – Both DB and DC	Economic efficiency

Table 2: Portfolio regulations for pension funds and life insurance companies

CANADA

	Prudent person rule/diversification rules	Quantitative restrictions on domestic assets	Self investment and ownership concentration	Foreign asset restrictions
Pension funds	PPR, maximum 10% in liabilities of one company	Real estate limit to 25%	Maximum 10% self investment; maximum 30% of shares of one company	No currency matching limit but foreign assets maximum of 30% of fund
Life insurance (maxima applied to all assets)	No PPR	5-25% in real estate and stocks combined; 10% in non mortgage loans (Non life : 25% in shares and 10% in real estate)	Self investment banned, localisation rules apply	No currency matching rules (Non life: foreign investment prohibited)

FINLAND

	Prudent person rule/diversification rules	Quantitative restrictions on domestic assets	Self investment and ownership concentration	Foreign asset restrictions
Pension funds	PPR, assets to be diversified and decentralised. Concentration limits apply.	Maximum 50% in shares, 10% unquoted shares, 70% mortgage loans, 40% real estate	Maximum 25% self investment.	80% currency matching limit, 5% in non-EEA countries, 20% in currencies other than the euros
Life insurance (maxima applied to investments against technical provisions only)	No PPR, EU diversification rules (10% maximum of technical reserves in one piece of real estate, 5% shares and 5% loans of one borrower), maturity matching rules apply	Maximum 50% in domestic shares, 10% unquoted shares, 40% real estate, 40% mortgage loans, 50% in secured non mortgage loans or corporate bonds, 3% cash	Self investment banned, EU localisation rules apply	80% currency matching limit, non-OECD shares limited to 25%, technical reserves must be covered by real estate in Finland, securities issued by residents or assets guaranteed by residents

GERMANY

	Prudent person rule/diversification rules	Quantitative restrictions on domestic assets	Self investment and ownership concentration	Foreign asset restrictions
Pension funds	No PPR, maximum 5% in liabilities of one company, deposits with single credit institution limited to 30%	Maximum 30% quoted shares, 10% unquoted shares, 25% real estate, 50% in loans, 30% mutual funds and 50% bonds	Maximum 2% self investment	80% currency matching limit; 30% limit on EU equity, 6% on non EU equity
Life insurance (maxima applied to investments against technical provisions only)	No PPR, EU diversification rules (10% maximum of technical reserves in one piece of real estate, 5% shares and 5% loans of one borrower)	Maximum 30% quoted shares, 10% unquoted shares, 25% real estate, 50% in loans, 30% mutual funds and 50% bonds	Self investment banned, localisation rules apply	80% currency matching limit overall; 5% of premium reserve and 20% of other restricted assets

ITALY

	Prudent person rule/diversification rules	Quantitative restrictions on domestic assets	Self investment and ownership concentration	Foreign asset restrictions
Pension funds	PPR, debt and equity of one issuer limited to 15% of fund	Maximum 20% liquidity and 20% in closed end funds	20% in one company or 30% for multiple sponsors. May not hold more than 25% of a closed end fund's assets	Minimum 33% matching. Securities of OECD countries not traded in regulated markets limited to 50%; non OECD securities traded in regulated markets limited to 5% (forbidden if traded in non regulated markets)
Life insurance (maxima applied to investments against technical provisions only)	No PPR, EU diversification rules (10% maximum of technical reserves in one piece of real estate, 5% shares of one borrower and 5% loans of one borrower)	Maximum 20% quoted shares, 20% unquoted shares, 50% real estate, 50% mortgage loans. Non mortgage loans prohibited (Non-life: 35% real estate and 50% mortgage loans)	Self investment banned, localisation rules apply	80% currency matching limit overall; 20% may be held in foreign shares and 50% in other foreign securities (Non-life, 10% in foreign shares and 30% in other foreign securities)

JAPAN

	Prudent person rule/diversification rules	Quantitative restrictions on domestic assets	Self investment and ownership concentration	Foreign asset restrictions
Pension funds	PPR	None	Self investment permitted	None
Life insurance (maxima apply to all assets)	No PPR, 10% limit on debt or equity exposures to one borrower	Maximum 30% shares, 20% real estate, 10% non-mortgage loans, 10% corporate bonds, 30% mutual funds (mortgage loans prohibited for life companies)	Self investment banned, localisation rules apply for foreign companies	No matching rules, 30% limit on foreign currency assets

Note: rules for pension funds apply to Employee Pension Funds, while Tax Qualified Pension Funds bear no investment restrictions. Both EPFs and TQPPs were subject to quantitative restrictions till the late 1990s.

NETHERLANDS

	Prudent person rule/diversification rules	Quantitative restrictions on domestic assets	Self investment and ownership concentration	Foreign asset restrictions
Pension funds	PPR, investment policy to be sound consistent and transparent, diversification required by sectors, countries and currencies	None	Self investment limited to 5%, except for surplus assets where it is 10%	None
Life insurance (maxima applied to investments against technical provisions only)	PPR, , EU diversification rules (10% maximum of technical reserves in one piece of real estate, 5% shares of one borrower and 5% loans of one borrower); maturity matching rules apply	Maximum 8% in unsecured loans, 10% in real estate and 3% in cash (Non-life: 5% in unsecured loans)	Self investment banned, EU localisation rules apply	80% currency matching

SWEDEN

	Prudent person rule/diversification rules	Quantitative restrictions on domestic assets	Self investment and ownership concentration	Foreign asset restrictions
Pension funds	No PPR, investment in one company limited to 10%	Maximum 60% to be held in shares	Self investment limited to 10% Maximum 5% of shares of one company	Currency matching required. Foreign assets limited to 5-10% of the fund
Life insurance (maxima applied to investments against technical provisions only)	No PPR, Maximum 5% in a single item of real estate and for exposures to a single borrower	Maximum 25% in shares, 25% in real estate and mortgage loans together, 50% in corporate bonds and 3% in cash	Self investment banned, EU localisation rules apply	80% currency matching, maximum 20% of technical reserves in foreign currency and foreign securities; overall 25% limit on foreign shares

UNITED KINGDOM

	Prudent person rule/diversification rules	Quantitative restrictions on domestic assets	Self investment and ownership concentration	Foreign asset restrictions
Pension funds	PPR, concentration limit to DC funds	None	Self investment is limited to 5%	None
Life insurance	PPR, maturity matching required	Maximum 3% in cash		80% currency matching

UNITED STATES

	Prudent person rule/diversification rules	Quantitative restrictions on domestic assets	Self investment and ownership concentration	Foreign asset restrictions
Pension funds	PPR, general requirement for diversification	None	Self investment limited to 10% for DB funds. No limits on self investment (in employers' stock) for DC funds.	None
Life insurance (maxima apply to all assets)	PPR, per-issuer limitation of 3-5% of issues other than US government	Imposed at state level, e.g. Delaware 250% of capital and surplus in shares, 25% in real estate, 50% in mortgage loans (Non-life 40% in shares) New Jersey 15% in shares, 10% real estate, 60% mortgages (Non-life 5% real estate and 40% mortgage loans)		No currency matching rule; aggregate limits on foreign assets of 0-10% imposed at state level. Canadian investment more liberalised

Sources OECD (2000) (2001), Dickinson (1998a)

Table 3: Pension funds' portfolio composition 1998

percent	Liquidity	Loans	Domestic Bonds	Domestic Equities	Property	Foreign assets
UK	4	0	14	52	3	18
US	4	1	21	53	0	11
Germany	0	33	43	10	7	7
Japan	5	14	34	23	0	18
Canada	5	3	38	27	3	15
France	0	18	65	10	2	5
Italy	0	1	35	16	48	0
Netherlands	2	10	21	20	7	42
Sweden	0	0	64	20	8	8
Finland	13	0	69	9	7	2
Average	**3**	**8**	**40**	**24**	**9**	**13**
Prudent person	**5**	**4**	**33**	**29**	**10**	**15**
Restrictions	**0**	**17**	**57**	**13**	**6**	**7**

Sources: National flow of funds balance sheets, Mercer (1999). In Tables 3-8 the categories "prudent person" and "restrictions" reflect the classification in Table 2.

Table 4: Life insurers' portfolio composition 1998

percent	Liquidity	Loans	Domestic Bonds	Domestic Equities	Property	Foreign assets
UK	5	1	25	48	6	13
US	6	8	52	26	0	1
Germany	1	57	14	17	4	0
Japan	5	30	36	10	0	9
Canada	7	28	55	26	7	3
France	1	2	74	15	7	0
Italy	0	1	75	12	2	0
Netherlands	1	29	24	24	5	10
Sweden	4	2	35	27	5	27
Finland	1	61	0	21	12	0
Average	**3**	**22**	**39**	**23**	**5**	**6**
Prudent person	**4**	**13**	**33**	**33**	**4**	**8**
Restrictions	**3**	**26**	**41**	**18**	**5**	**6**

Source: National flow of funds balance sheets, OECD. Data for Sweden cover all insurance companies

Table 5: Shortfall relative to main portfolio restrictions

Pension funds	Equities	Property	Foreign assets
Germany	20	18	13
Canada		22	15
Italy			33
Sweden	40		2
Finland	37	33	18
Life insurers			
UK			7
US	-11	25	9
Germany	23	21	20
Japan	20	20	21
Canada	-1	18	
Italy	28	48	20
Netherlands		5	10
Sweden	-2	20	-7
Finland	39	28	20

Data for Sweden cover all insurance companies

Table 6: Estimated returns on pension funds' portfolios (1980-95)

	Nominal return	Standard deviation	Real return	Standard deviation	Memo: 1970-1995 real returns	Memo: 1970-1995 Standard deviation
UK	15.8	8.7	9.8	9.7	5.9	12.8
US	13.2	9.2	8.4	10.9	4.5	11.8
Germany	9.7	7.0	6.7	6.9	6	5.9
Japan	8.9	9.1	6.9	9.4	4.4	10.2
Canada	12.4	10.0	7.5	10.6	4.8	10
Netherlands	9.2	6.3	6.3	6.7	4.6	6
Sweden	11.5	15.2	4.9	15.9	2	13.1
Average	**11.5**	**9.4**	**7.2**	**10.0**	**4.6**	**10.0**
Prudent person	**11.9**	**8.7**	**7.8**	**9.5**	**4.8**	**10.2**
Prudent person (excluding Japan)	**12.7**	**8.6**	**8.0**	**9.5**	**5.0**	**10.2**
Restrictions	**10.6**	**11.1**	**5.8**	**11.4**	**4.0**	**9.5**

Source, Davis and Steil (2001), own calculations.

Table 7: Estimated returns on life insurers' portfolios (1980-95)

	Nominal return	Standard deviation	Real return	Standard deviation
UK	14.5	7.4	8.7	8.4
US	11.4	8.4	6.7	9.8
Germany	10.8	3.8	7.8	3.7
Japan	7.5	6.4	5.5	6.7
Canada	11.9	6.5	6.9	6.6
Netherlands	9.9	4.9	7.1	5.1
Sweden	12.8	13.9	6.1	14.4
Average	**11.2**	**7.3**	**7.0**	**7.8**
Prudent person	**11.9**	**6.9**	**7.5**	**7.8**
Restrictions	**10.7**	**6.1**	**6.6**	**7.9**

Table 8 Comparing pension fund and life insurance real returns with benchmarks

Real return on	Life insurance less:			Pension funds less:		
	50-50	Global	Real earnings	50-50	Global	Real earnings
Canada	0.3	-3.7	6.6	0.9	-3.2	7.2
Germany	-2.6	-1.5	6.4	-3.7	-2.6	5.3
Japan	-4.1	-3.4	4.1	-2.7	-2.0	5.5
Netherlands	-4.3	-2.8	7.0	-5.0	-3.5	6.2
Sweden	-4.2	-4.3	5.8	-5.4	-5.6	4.6
United Kingdom	-0.5	-1.5	5.7	0.6	-0.4	6.9
United States	-2.0	-3.3	7.5	-0.3	-1.6	9.2
Average	**-2.2**	**-2.9**	**6.5**	**-2.2**	**-2.7**	**6.4**
Prudent person	**-2.2**	**-2.5**	**6.7**	**-1.8**	**-1.9**	**6.9**
Prudent person excluding Japan	**na**	**na**	**na**	**-1.6**	**-1.8**	**7.4**
Restrictions	**-2.7**	**-3.3**	**5.7**	**-4.6**	**-4.1**	**4.9**

Source, Davis and Steil (2001), own calculations