

Funding and asset allocation strategies - why firms and trustees behave as they do

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(Presented to the 2005 Finance and Investment Board Conference)

1. Introduction

In the UK, it is generally accepted that firms control the funding strategies for pension schemes and trustees control pension scheme asset allocation. This being the case, the funding strategies of pension schemes and the investment decisions taken with firm assets may appear irrational at first sight.

However, the situation is more complicated than this in reality. The responsibility for the setting of contribution rates differs from pension scheme to pension scheme, and is determined by each pension scheme's trust deed and rules. The contribution rule may leave responsibility solely with the sponsoring employer (as is often the case); it may (in rare occurrences) leave it with the trustees of the scheme; it may specify joint determination; or it may require one party to set the rate after consultation with or the approval of the other.

It might be thought that if the trustees had any power, then they would always ensure that the contribution rate was set so as to fully fund the pension scheme on a buy-out basis; however, this might not necessarily be the case. *Edge v Pensions Ombudsman* (2000) suggests that pension scheme trustees are allowed to take into account the consequences for active members of forcing the sponsoring employer to pay contributions if such payment might force the employer into insolvency. Even if insolvency is not an issue, the employer might still threaten to close the scheme in the event of a large contribution being demanded, thus causing members to forgo future accrual, although the importance of this will vary from scheme to scheme and will clearly be of no use when there are no longer any active members in the pension scheme.

In fact, the power to force such a contribution became available to some trustees in the UK when the Government announced regulations on 11 June 2003 that require the solvent employer of any scheme winding up after this date to make good any deficit on a buy-out basis. Previously, if trustees who were able to force wind-up had done so, the debt on the employer recoverable in respect of a scheme in deficit would have been minimal; however, the new regulations require solvent employers to make good any deficit on a buy-out basis in the event of a wind up. To enforce this would still require those still accruing benefits to forgo future accrual and any salary linking to past benefits, though, so the membership profile of the pension scheme would determine whether this course of action was desirable. The planned Statutory Funding Objective ("SFO") offers a less drastic way of demanding additional funding, although too high a demand might still encourage the sponsoring employer to wind-up the scheme and face funding the full buyout deficit, having saved the cost of future salary increases.

Even when the responsibility for determining contributions does rest with the employer, there is a complication. Company shareholders, who own firms, have only indirect control over the level of funding of pension schemes through the managers of the firm (as with most decisions), and managers may not always act in the interests of shareholders.

The question of who determines the asset allocation is also less straightforward than might be thought at first. Although trustees have the final say over pension scheme asset allocation and the firm has no statutory influence, there are ways in which pressure can be exerted. For any scheme, employer-nominated trustees may well act in the interests of the firm rather than in the interest of members. However, for a scheme with active members, the sponsoring employer has the added leverage of being able to threaten to reduce future benefits or even close the scheme, although scheme closure would result in a debt-on-the-employer payment, and the lower the future benefits, the more likely the trustees are to force wind-up anyway (if it is within their power).

It is worth noting that the balance of power between the trustees and the sponsoring employer will vary with funding levels. At present, pension scheme deficits are the norm, so an employer's threat to wind up a scheme is not as credible as it would be if the scheme was in surplus, due to the requirement to make good immediately any deficit.

One approach to explain the decisions made in relation to pension schemes is that of Exley *et al* (1999) who contrast what they describe as normative and positive views of pension scheme asset allocation; however, in this paper I consider a trade-off approach, allowing various theories to act in opposing directions. I also consider both pension scheme asset allocation and funding strategy.

2. Reasons to fund...

2.1 Introduction

Cowling *et al* (2005) point out four reasons that a firm might choose to fund its pension scheme:

- benefit security;
- tax incentives;
- regulation; and
- cash-flow management.

In addition, there are two further issues that I cover:

- industrial action; and
- signalling.

2.2 Benefit security

Benefit security is clearly of primary concern to the members; however, it is also of interest to the firm, since a well-funded pension scheme is more likely to result in a credible pensions promise and therefore be valued by employees and potential

employees. This itself will help in recruitment and retention of employees, and in pay negotiations, both of which are aligned with the interests of the management (except to the extent that management pay rises may be curtailed to reflect pay increases to other employees – although according to the press, management pay rises are rarely curtailed in such a way). The fact that managers are also pension scheme members, so they have an incentive to fully fund in order to protect their own pension benefits, a point made by Francis and Reiter (1987).

Benefit security is still issue even in the presence of insurance arrangements such as the Pension Protection Fund (“PPF”) since the level of guarantee under such an arrangement is invariably lower than the benefits due under the scheme rules.

2.3 Tax incentives

The tax incentives to fully fund are well-known. Tepper and Affleck (1974) demonstrate that since the interest payments on corporate debt are tax deductible, and that there is no tax on interest in the pension scheme, there is a present value tax benefit to borrowing in order to pre-fund benefits when compared with pay-as-you-go (“PAYG”) arrangements. Leaving a pension scheme in deficit is analogous to having a PAYG arrangement in respect of that deficit, and borrowing to fund benefits is equivalent to using free cash to pay contributions rather than reduce corporate debt.

It might be thought that borrowing in this way reduces the financial flexibility of a firm. However, for most corporate debt, the only regular payment that must be made (apart from the redemption payment, which may itself be met by further debt issuance) is the interest on that debt; however, for a pension scheme in deficit, the deficit will need to be amortised over a period comparable to the term of any debt issue, and the repayment is interest plus capital – it is unlikely that many sponsoring employers would be allowed to pay only the interest on any pension scheme deficit.

Feldstein and Seligman (1981) also point out that every \$1 by which the pension scheme is under-funded should, in theory, reduce the value of the firm to the extent that contributions to clear the deficit are tax deductible, suggesting that a firm wishing to maximise its share price has an incentive to fully fund its pension scheme.

Francis and Reiter (1987) point out that firms with higher marginal tax rates should be more likely to fully fund (or even over-fund) their pension schemes, to take advantage of tax advantages noted above. They point out that this is consistent with the use of non-debt tax shields discussed by DeAngelo and Masulis (1980), who point out that firms with tax-loss carry-forwards have lower marginal tax rates than those without.

Such a relationship is used by Alderson and Lee (1988), who construct a single-period state-preference model integrating pension funding decisions with corporate capital structure that allows for the tax advantages of full, debt funding, and non-debt tax shields as discussed by DeAngelo and Masulis (1980). This model implies an inversely proportional relationship between the size of the deficit and both the size of the firm’s tax shields and the quantity of conventional debt outstanding, and a directly proportional relationship between the deficit and the expected operating earnings before depreciation and pension expense.

Francis and Reiter (1987) test these theories by carrying out cross-sectional regressions on 255 firms using data from 1980 and 1981, and find a positive relation

between tax rate and funding level, as predicted, and between available capital and funding level.

Thomas (1988) also tests the relationship between pension funding and tax status. He considers a number of ways of determining tax status, including tax paid, tax carry-back and tax carry-forward, and tests the relationship using 677 firms with data from 1980 to 1984. Both the cross sectional and time series analysis support the hypothesis that pension funding and tax status are linked.

2.4 Regulation

The statutory limits on contribution rates are minimal: the minimum rate payable is that required to ensure a funding level (ratio of assets to liabilities) of 100% on the Minimum Funding Requirement basis as set out in GN27, with a transitional period allowed for under-funded pension schemes. In the current financial climate, this is a weak valuation basis, so will not seriously impact on the level of funding.

This is due to change with the introduction of the SFO, although there is considerable freedom around the assumptions used to determine any deficit, and the period over which any deficit may be cleared. There is also the risk that the employer will put pressure on the trustees to weaken the basis if the employer's financial position weakens, and that the trustees will be inclined to be sympathetic if they take Edge v Pensions Ombudsman (2000) as their lead.

Another regulatory factor that might affect the level of funding is the PPF or, to be more precise, the risk-based levy. This is payable by the pension scheme trustees, but this cost is ultimately borne by the sponsoring employer. The risk-based levy is intended to allow for (among other things) the level of funding of a pension scheme and the stronger the penalty for under-funding, the greater the additional incentive to clear any deficit.

2.5 Cash flow management

Cowling *et al* (2005) point out that if pension benefits are paid from a pool of assets rather than directly from corporate cash flows, then this allows the firm to smooth its payments in respect of these benefits. However, this smoothing does require the firm to fund the pool of assets in the first place, something that would not be needed if an unfunded arrangement were to be used.

2.6 Industrial Action

Employees and, more importantly, trade unions are focussing increasingly on company pension schemes. Several strikes have been threatened or taken place in response to proposed benefit reductions whether direct (as for United Airlines) or indirect (as for the increase public sector retirement age in the UK). It could be argued that a sponsoring employer might increase contributions to a pension scheme in the face of union pressure if strike action would have a significant adverse effect on the firm, and it is more likely that the worse the financial situation of the employer, the greater the pressure that would be applied, due to the increased chance of a members being left without their benefits. However, it could be argued that the chance of strike action might be lessened if it was itself likely to result in employer insolvency, as discussed later.

2.7 Signalling

It could be argued that pension funding is used as a method of signalling, with full funding being used to signal financial strength, either directly or through the fact that the tax saving is greater the lower the actual and anticipated borrowing costs of the firm, as mentioned by Cooper and Ross (2002).

This signalling might also take place through the basis used, with stronger firms using stronger actuarial assumptions. Indeed, Feldstein and Morck (1983) and Bodie *et al* (1985) both find that firms with under-funded pension funds which, according to Bodie *et al* (1985) appear to be weaker firms, select higher discount rates

Francis and Reiter (1987) also point out that, according to Myers and Majluf (1984), firms prefer to rely on internal sources of funds to finance new investment projects. This is because issuing debt or equity signals that the asset class chosen is overpriced, so a choice to raise additional funds will cause the price of that asset class to fall, even if the funds are for a profitable project. Due to the tax treatment of funded pension schemes, these vehicles are good places to build this slack by over-funding when excess funds are available, the funds being accessible through a pension contribution holiday.

3. and reasons not to fund

3.1 Introduction

The reasons to avoid fully funding a pension scheme can be gathered into five broad headings:

- low marginal tax rates;
- the pensions put;
- mismatching asset allocations;
- pension scheme insurance;
- pensions as compensation;
- agency issues; and
- behavioural issues.

3.2 Low marginal tax rates

Although there is a theoretical tax advantage to fully funding, this advantage is contingent on the size of the marginal tax rate. Graham (1996a, 1996b, 2000) shows that the marginal corporate tax rate, which he defines as the present value of current and expected future taxes paid on an additional dollar of income earned today, can be much lower than the stated tax rate. The marginal tax rate is affected in two main ways. The first of these relates to the volatility and level of income. Many firms are not profitable every year, and if no profit is being made, the tax advantage is at best deferred, and at worst lost. Even if a profit is made, it might be greater than the interest income that would be payable on the debt in issue. This would also limit the advantage of full funding. It is also worth remembering that other non-debt tax shields exist, as described by DeAngelo and Masulis (1980). These also limit the extent to which interest payments can be offset against operating income. In other

words, even for those firms able to borrow comparatively cheaply, the tax benefit of pre-funding might not be as great as first thought due to tax exhaustion. This means that in these cases, where the net-of-tax cost of corporate borrowing is greater than the tax-free rate of interest used to value the liabilities, the pension scheme might be regarded as a source of cheap funding giving the sponsoring employer an incentive to under-fund the scheme.

3.3 The pensions put

Sharpe (1976) points out that the sponsoring employer has a call and a put option on the assets of the pension scheme in respect of any potential surplus and deficit respectively, with a strike price of the value of the liabilities. Although any surplus can be offset against future contributions, the extent to which this is possible falls as the scheme becomes more mature, and disappears altogether once future benefits cease to be earned. Since in the UK the surplus that can be physically reclaimed is only that in excess of the Statutory Surplus, and even then only after benefit enhancements and a substantial tax charge, the call option becomes less valuable relative to the put option on the deficit the more mature the pension scheme becomes. This is in addition to the increase in the value of the put option relative to the call option due to a fall in the funding level (strike price), and an increase in the magnitude of the option value due to an increase in the risk level of the sponsoring employer (which increases the likelihood of the option being exercised).

Harrison and Sharpe (1983) believe that the tax benefits and the pension put should lead to different firms following one of two extreme strategies depending on which is the most valuable.

Francis and Reiter (1987) also recognise that riskier firms are more likely to want to under-fund their pension schemes, since the put option that the firm has on the deficit, outlined by Sharpe (1976), is more valuable. In a similar vein, they note that firms with restrictive debt covenants are more likely to use their occupational pension schemes as a source of finance by inadequate payment of contributions, and that such firms are more likely to be more levered than average. Francis and Reiter also note that such funding might be cheaper than using external funding once external funding has reached a particular level.

3.4 Mismatching asset allocations

One of the main causes of pension scheme under-funding in recent times has been the investment in poorly-performing non-matching assets, such as equities. The reasons behind such asset allocations are discussed later, but the fact is that the poor performance of equities relative to the liabilities has caused a large number of schemes to move to a position of deficit from a position of surplus attained as a result of the strong equity bull market at the end of the last century. In fact, according to the Punter Southall FRS 17 Survey (2001, 2002, 2003), the proportion of firms reporting an FRS 17 deficit rose from 54% for accounting periods ending in 2001 to 82 % for 2002 and to 95% for 2003 (although it should be remembered that only firms with years ending after 22 June 2001 would have produced FRS 17 disclosures in that year). However, asset allocations were partly responsible for under-funding even before the recent bear market, since sponsoring employers would be reluctant to fully fund a pension scheme where the assets and liabilities were not matched, in case strong equity performance resulted in surplus that would only be recoverable over

long periods (if ever) through contribution holidays, or net of a large tax cost and after benefit enhancements. Another way of looking at this is that the increased funding level volatility increases the value of the pensions put by much more than the value of the pensions call due to the irrecoverability of surplus.

3.5 Pension scheme insurance

The UK now has statutory pension scheme insurance in the form of the PPF, introduced in April 2005. This is similar in nature to the Pension Benefits Guaranty Corporation (“PBGC”) in the United States, in that it takes on the assets and (to a certain level) the liabilities from pension schemes whose sponsoring employers have become insolvent and left under-funded pension schemes.

Feldstein and Seligman (1981) point out that the insurance protection from the PBGC in the US reduces the incentives to fully fund pension schemes, although Bicksler and Chen (1985) describe how in the presence of insurance, the employer’s put option on the deficit is exercisable against the PBGC rather than pension scheme members. The important point to note is that in this analysis there is no change in the employer’s incentive to under-fund here, but there may be a change in the trustees’ incentive to require full payment (to the extent that they can), although this depends on the degree of protection afforded by the insurance. In the US, the level falls some way short of 100% security, and the same is true in the UK. In any case, the employer’s put option is certainly made no less valuable.

The employer’s incentive to under-fund a pension scheme in the presence of statutory insurance actually depends on the fairness of the premium paid for benefit protection. Jin, Merton and Bodie (2004) point out that the PBGC premium is not fairly priced, as it takes into account neither the credit quality of the plan sponsor or the risk of the plan’s assets. This means that although the incentive to under-fund is reduced, the premium is still not fair; the extent to which the PPF levy will be a fair one remains to be seen, although the regulations state that the difference between assets and liabilities, and the likelihood of employer insolvency will both be taken into account, so a struggling employer might have an incentive to better fund a pension scheme in deficit. However, it is worth noting that the levy is paid by the pension scheme rather than the employer. For financially strong employers, this difference is not material – they will effectively regard the levy as ultimately adding to the pension contributions payable. However, companies that are in serious financial difficulty will not necessarily be driven to clear a deficit if all a risk-based levy does is increase an off-balance sheet liability that they would be unlikely to honour in any case.

3.6 Pensions as compensation

Sharpe (1976) argues that employees take into account the level of funding of defined benefit pension rights when placing a value on their total remuneration, so they might be prepared to accept under-funding if the remainder of their compensation is sufficient. Of course, this argument only holds for pension scheme members who are still accruing benefits, and since pension scheme trustees represent deferred and current pensioners (those who are no longer accruing benefits but have not yet retired and those who have retired respectively), this should rarely be an over-riding factor. It also assumes a level of member insight that is unlikely to be present, even with the increased transparency of pension scheme valuations.

Arnott and Gersovitz (1980) also regard the occupational pension as a tool by which the employer can both defer employee compensation and share risk with employees by leaving unfunded a proportion of the pension benefits. They model a situation where pensions and wages are additional claims on a firm's earnings, so firms can adjust the risks they face by altering the proportion of remuneration that is deferred as well as adjusting the ratio of debt to equity. Arnott and Gersovitz consider the issue in the context of utility functions for shareholders and employees, and look at situation where shareholders and employees have constant but differing relative risk aversion. Their main result is that that full funding of pensions reduces the utility of employees, but improves the utility of shareholders.

Ippolito (1985) notes that from the employees' point of view, under-funding is undesirable, since this effective loan from employees to their employer is in addition to the dependence the employees already have on their employer in terms of human capital. However, he points out that an employer might under-fund a pension scheme in order to discourage industrial action, since if a strike were to result in firm insolvency, then the employees – who would now effectively be long-term bondholders in the firm – would lose benefits. According to this theory, the firm should trade off the strike-preventing advantages of running a deficit against the tax disadvantages. It could be argued that the threat of insolvency is meaningless, since if insolvency were to occur subsequently, then the pension scheme might be able to claim even less money from the employer to clear any deficit. This clearly depends on the outlook for the firm, but an additional factor where there are active members is the fact that these members would lose their salaries in the event of firm insolvency. It is also worth noting that cuts in benefits have actually resulted in strikes, so a reduction in benefit security might have the same effect – the opposite of that proposed by Ippolito.

Cooper and Ross (2002) consider the under-funding of pensions from the perspective of optimal contracting theory. They point out that if a firm has insufficient funds to pay for retirement benefits, then it might set up a pension fund both to show commitment to paying benefits and to allow deferment of paying those benefits by running deficit. They also believe that such a scheme might be less than fully funded due to capital market imperfections such as borrowing restrictions or lower returns on pension fund assets when compared with firm assets due to (for instance) management charges.

3.7 Agency issues

Looking at it from another angle, Jensen and Meckling (1976) point out that the smaller an owner-manager's stake in a firm – and it is smaller if a firm is partly funded by the deficit in its pension scheme – then the greater the owner-manager's incentive to take risks. In other words, deficits might make firms riskier as well as risky firms being more likely to run deficits.

However, Jensen (1986) points out that the smaller the resources under managers' control, the more rigorous the monitoring by capital markets, since new projects need to be funded externally. The exception is for funds with significant growth opportunities, whose management are less likely to have uncommitted funds available. This suggests that management should be happy to use a pension scheme as a "slush fund" to over-and under-fund in such a way as best meets their needs. It also implies that shareholders should prefer pension schemes to be fully funded in

order to control funds available to managers, and that pension scheme deficits are partly a results of managers acting in their own interests rather than those of the shareholders.

3.8 Behavioural issues

Clearly, when investigating why individuals or firms (which are just groups of individuals) act as they do, the issue of behavioural finance appears. One behavioural trait often seen in anyone regarding themselves as a specialist is overconfidence. One interpretation for under-funding might then be that managers would rather invest money in exciting new projects that are “bound to succeed” than in the pension scheme, particularly if contributions are to be invested in equities (more of which later). This could be regarded as the creation of a pension scheme deficit for use as a source of funding for company projects. However, as discussed elsewhere in this article, the pension scheme is not necessarily a cheap form of finance for a high quality company when compared with corporate debt, as there is a tax advantage to borrowing in the corporate debt market and using the proceeds to clear any deficit. Having said this, shareholders should prefer management to invest in the underlying business (or return shareholders money) rather than in a portfolio of equities (in the pension scheme) since shareholders can carry out this diversification themselves; the only issue (covered earlier) is that a pension scheme deficit might not be the most cost-effective way to do this.

4. Reasons to match...

4.1 Introduction

It is worth discussing what counts as a matching strategy. If, as is generally accepted, a pension scheme’s liabilities are bond-like in nature, then a matching strategy implies investment in bond-like assets, at least from an economic point of view. However, a number of valuation bases have in the past suggested alternative asset allocations to be matching, most notably the MFR. In the following analysis, however, I assume that a matching strategy is one where liabilities are treated as being bond-like.

There are three arguments for matching a pension scheme’s assets and liabilities:

- benefit security;
- tax and insolvency; and
- manager fear of failure.

4.2 Benefit security

The responsibility for setting the asset allocation quite clearly rests with the trustees, and this is stated in the 1995 Pensions Act. Arguably, the sponsoring employer could affect the asset allocation decision by threatening to close the scheme or through the influence of employer-appointed trustees, as I mention (and caveat) earlier. However, ignoring this influence, and in the absence of insurance, it is hard for trustees to make a case for investing pension scheme funds in anything other than matching assets – given that their primary role is to pay benefits to members as those benefits fall due, anything that risks a fall in this benefits could be viewed as undesirable. However, as I discuss later, insurance does exist and even if it did not, there are reasons that trustees might take risks. There are also a number of reasons that the employer might

have to want to mismatch pension scheme assets and liabilities, although I cover these later.

There may also be an agency issue here, in that pension scheme trustees are usually members of the pension scheme, so will want to secure their own benefits. This will be equally true for member- and employer-nominated trustees.

4.3 Tax and insolvency

If it is assumed that the employer is able to exert some influence over pension scheme asset allocation, then there are arguments for matching the employer wanting to adopt a matching strategy, and these have been repeated in a large number of recent actuarial papers, including Exley *et al* (1997), Chapman *et al* (2001). They were also put into practice by the Boots Pension Scheme in 2000 and 2001, as described by Ralfe (2001). However, the theory is much older than that.

Tepper and Affleck (1974), in their analysis of the tax advantage to pre-funding pension benefits, point out that if equity is used instead of debt to pre-fund, then this is equivalent to reducing the gearing in a Modigliani-Miller context – it is like funding with debt and then performing an equity financed repurchase of the debt. They believe that this removes the tax advantage of the debt funding and, therefore, removes the advantage of pre-funding the benefits. However, they point out that pre-funding from retained earnings is still better from a tax perspective than pay-as-you-go, since the alternative payments, dividends, would otherwise be taxed.

Black (1980), however, is unequivocal: “My message is simple: Almost every corporate pension fund should be entirely in fixed dollar investments”. The starting point for this now well-known analysis is that pension scheme liabilities can be regarded as debt liabilities of the firms, and pension scheme assets can be regarded as assets of the firm, since their investment performance more directly affects the sponsoring employer than pension scheme members. He points out that the pension fund’s special tax status has no value if the fund is invested in stocks, but has great value if it is invested in bonds. This is because there is no great tax advantage to funding a pension scheme more by equity than by debt, but there is potentially a substantial tax advantage to funding a firm more by debt than by equity. Therefore, the firm’s leverage should be reduced by fully matching the liabilities with bonds, and then increased again by performing a debt-financed equity share buyback.

Tepper (1981) questions the conclusions in Tepper and Affleck (1974) due to that paper’s reliance on Modigliani and Miller (1958). He believes that when a more general framework is used, it is not as crucial that the pre-funded benefits be funded by debt – equity funding works almost as well. Like Black (1980), he also points out that under the Modigliani and Miller framework, there is no advantage or disadvantage to the pension scheme being invested in either equity or debt, but under his broader framework, the tax advantages only exist if the pension scheme is invested in debt.

Tepper concludes that pension funds should always be funded; that the fund should be invested in debt if the personal tax rate on equities is less than that on debt; that debt financing is always optimal; that equity financing is only inferior if there is a positive value to corporate leverage; and that if there is a clientele effect, then there is no optimal financing policy.

There might also be a signalling aspect to the Tepper-Black solution, in that a move to bond investment and an increase in corporate debt might be used to demonstrate confidence that there will be sufficient future profits against which debt interest payments can be offset.

4.4 Manager fear of failure

According to Hirshleifer and Thakor (1992), manager's interests should be aligned with those of bondholders, since managers are only concerned with minimising the probability of failure (which the job market will recognise) rather than maximising the expected value of the firm. This would seem to imply that managers should prefer pension schemes to be invested in matching bonds (to the extent that they can influence this decision). It also suggests that in the presence of pension scheme insurance, managers should be keener even than pension scheme trustees to adopt a matching strategy, since pension scheme insurance protects only members' benefits, not managers' reputations.

5. ...and reasons to mismatch

5.1 Introduction

Although there are several reasons why a matching strategy might be adopted, there are even more reasons why this might not happen. The explanations that I cover are:

- discretionary benefits;
- agency issues;
- signalling; and
- behavioural issues.

5.2 Discretionary benefits

As mentioned earlier, there are strong arguments in favour of the view that trustees should invest pension scheme funds in matching assets. However, there is an incentive for trustees to choose an aggressive investment strategy in order to generate surplus for discretionary benefits, particularly given the difficulty faced by any employer wishing to reclaim any surplus. This incentive is greatest if the sponsoring employer is financially secure, and so likely to be around to meet any deficit arising from poor investment returns, and ought to be most unpopular with sponsors of schemes without a significant proportion of the membership accruing benefits, since these schemes offer employers the least opportunity to reclaim surplus through a reduced ongoing contribution rate.

The presence of pension scheme insurance also gives an incentive to invest in non-matching assets with higher expected returns, since the downside risk is reduced. This moral hazard is lessened by the fact that the PPF levy is paid by the trustees rather than the employer, and by the fact that the benefits covered by the PPF are not the full benefits due to members. In theory, this second point should lead to the risky strategies being taken only by trustees of pension schemes with assets at or below the level of benefits guaranteed by the PPF, since otherwise there is still some downside risk present, even if it is lower than without insurance.

5.3 Agency issues

The arguments that Jensen (1986) makes about free cash flow also apply to pension scheme asset allocation. If the assets and liabilities of a pension scheme are mismatched, then a pool of assets is needed within the firm to allow for the corresponding volatility in the funding level. This pool of assets can be (mis)used by company managers. Therefore, whilst shareholders should prefer the assets and the liabilities to be as closely matched as possible in order to reduce the funds available to managers, the management is likely to want to increase the degree of mismatching. If markets take account of the economic value of the liabilities (which implies a risk-free valuation rate of interest), then shareholders should prefer pension schemes to be invested in matching bonds or bond-like assets equities. For this argument to hold any weight as a cause of mismatching, it must of course be assumed that the sponsoring employer has a significant degree of influence over pension scheme asset allocation, an assumption that is not necessarily valid.

Exley *et al* (1999) point out that although limited by the earnings cap, managers' membership of occupational pension schemes might encourage them to push for higher equity content, in order to generate surplus for benefit enhancements, providing they are confident of the firm's ability to cover any deficit, as mentioned earlier. This point is made more generally in the previous section.

Exley *et al* also point out that there is an incentive for pension scheme advisors to propose theories that maximised their fee incomes, such as:

- suggesting mismatched investment strategies in order that there will be additional advice required to amortise surpluses or deficits;
- supporting active management in order to generate fee income from manager selection and monitoring.

They also suggest that professional indemnity premia might encourage this moral hazard by limiting the downside risk without the risk being adequately reflected in the premium rate.

However, the largest agency effect for managers is the incentive to indulge in what they term "the creative accounting afforded by equity investment". The four instances highlighted by Exley *et al*, which are themselves taken from a talk by Levitt (1998), are:

- big baths (taking a large "exceptional" loss to set up a reserve from which future smooth profits can be drawn) – Exley *et al* point out that the equity risk premium assumption offers an opportunity to do this with the pension scheme;
- cookie jar reserves ("hiding" funds in good times that are later used in bad times) – again, the equity risk premium offers the ability to use the pension scheme for this purpose, if it is invested in equities;
- materiality – Exley *et al* point out that this allows actuarial smoothing;
- revenue recognition (taking credit now for future earnings) – Exley *et al* note that allowing in the valuation basis for a yet-to-be-received equity risk premium is an example of this practice.

However, although asset allocation has an impact on the pensions cost under FRS17, it has no effect on the reported value of liabilities under this measure. This being the case, why have more pension schemes not moved out of equities into bonds? Partly because the bottom line is still important, but also partly due to inertia, an issue mentioned later.

5.4 Signalling

Exley *et al* point out that there may be a signalling argument behind pension scheme asset allocation, or at least the changes in investment strategy. They suggest that a major change in investment policy might be interpreted as a solution to a newly found problem in the pension scheme, so sudden changes are avoided. They also note that the disclosure of something that other firms can hide might be a sign that a firm is short of slack elsewhere, or is preparing for something worse, although they also give the example of Boots plc disclosing true economic reserves for executive share options, where this disclosure caused the share price to rise.

5.5 Behavioural issues

Herding is a significant influence on the pension scheme asset allocations, as Patel, Zeckhauser and Hendricks (1991), Filbeck, Gorman and Preece (1996) and Bikhchandani, Hirshleifer and Welch (1998) describe for corporate financial leverage. Indeed, a (declining) number of occupational pension schemes measure their investment performance relative to that of other schemes rather than their liabilities through the use of peer group benchmarks, as noted by Myners (2001) in his review on institutional investment. The 2004 progress report into the Myners principles found that the problem remained. Such benchmarks inevitably lead to schemes having similar asset allocations. More subtly, a reluctance to consider asset classes unless they are already being extensively used by similar institutions – the original reason for the 2001 Myners review – is another instance of herding behaviour. This is compounded by the issue of inertia – committees generally move very slowly. One reason for this, suggested by Hirshleifer and Welch (2002) is that in a stable environment, individuals can remember the decision that was made but not the reason for that decision, so a particular course of action is continued in the absence of a reason for that continuation. This is particularly important given that valuations using actuarially smoothed equity values – including the MFR – were the prevalent valuation method until comparatively recently, and these methods made equity investment far less traumatic (at least in the short term).

There is also an issue around the way in which information is framed. In particular, a number of valuation bases are available, and until recently the focus has not necessarily been on those which best reflect the economic (in other words, market-based) value of assets and liabilities. The Minimum Funding Requirement, because it is a statutory basis, attracts significant attention, even if the basis itself hides the volatility in economic values by effectively smoothing the values of liabilities and assets, especially equities.

The use of the trustee group to make decisions is itself an issue, since groups tend to exhibit a number of behavioural biases. For example, Heath and Gonzales (1995) find that with group decision making the confidence in opinions increased, even though there is no increase in quality of the decision making.

There is also a tendency for members of groups to abandon individual views and to choose to agree with others that they believe know more. These informational cascades can lead to more outspoken members of groups having a disproportionate level of influence, as described by Bikhchandani *et al* (1992).

Those who perceive themselves to be of a relatively low status – as member nominated trustees might relative to company appointed “experts”, and as all trustees might relative to the chairman – are particularly unlikely to offer dissenting opinions, as described by Wittenbaum and Park (2001). This could lead to another situation where the employer was able to exert influence over the asset allocation of the pension scheme.

A further risk is that initial beliefs are confirmed after discussion in spite of evidence to the contrary, a process known as polarisation, and that this can further lead to “groupthink”, as described by Janis (1972). Groups experiencing groupthink do not consider all alternatives and desire unanimity at the expense of quality decisions, to the extent that individuals will self-censor to avoid “rocking the boat”.

Many of these issues can be compounded by overconfidence. Whether trustees are investment experts or only see themselves as such, experts often perform less well than those with less confidence. For example, Barber and Odean (2001) show that for individuals with discount brokerage accounts, investors perform worse the more frequently they trade, and Torngren and Montgomery (2004) demonstrate that professional investors perform less well on average than lay people when choosing stocks, and both are right less than half of the time.

Taylor (2000) points out a number of other instances in which behavioural finance affects actuarial advice. In particular, he points out that when potential investment strategies are being discussed with trustees, the way in which the strategies are framed and presented can have a big impact on the final decision. He points out that telling trustees that there is a 20% chance that the funding level will rise above 100% may well result in a more positive view than saying that there is an 80% chance that the funding level will remain below 100%. This is as a result of prospect theory, a theory developed by Kahneman and Tversky (1979), which suggests that losses carry a greater weight than gains only relative to the chosen reference point.

6 Conclusion

At first sight, there are strong arguments in favour of adopting the Tepper-Black tax arbitrage model and, indeed, there are a number of other non-tax reasons for fully funding pension schemes and investing their assets in bonds. However, there are a number of sponsoring employers and pension schemes for whom this is not necessarily appropriate. In addition, what might be best for the shareholders might not be aligned with what is best for the managers and the trustees who make the decisions, or the consultants who give the advice. Finally, what is best might never be implemented if behavioural biases get in the way.

If the reasoning of Harrison and Sharpe (1993) is followed, the various forces should lead to extreme funding and asset allocation strategies. However, regulatory maxima and minima form upper and lower bounds, and it is possible that the large number of offsetting factors lead to trade-off strategies that are further affected by the herding activities of the various parties.

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