Research report 114

Pension Plan Risk: The Impact upon the Financial Markets

Pension Plan Risk: The Impact upon the Financial Markets

Donal McKillop
Queen's University Management School

Michael Pogue
University of Ulster

Certified Accountants Educational Trust (London)

The Council of the Association of Chartered Certified Accountants consider this study to be a worthwhile contribution to discussion but do not necessarily share the views expressed, which are those of the author alone. No responsibility for loss occasioned to any person acting or refraining from acting as a result of any material in this publication can be accepted by the author or publisher. Published by Certified Accountants Educational Trust for the Association of Chartered Certified Accountants, 29 Lincoln's Inn Fields, London WC2A 3EE.

ACKNOWLEDGEMENTS

The authors would like to thank Ronan Gallagher for research support.

ISBN: 978-1-85908-457-1

© The Association of Chartered Certified Accountants, 2009

Contents

Executive summary

BACKGROUND

The 'perfect storm' of negative equity returns and low interest rates in the early years of this millennium has resulted in a deficit in the majority of defined-benefit pension schemes, whereby the liabilities of the schemes exceed their assets. This situation has been made more obvious by the requirements of FRS17 and IAS19, which have required companies to disclose such deficits on their balance sheets instead of merely mentioning the deficit as a note to the accounts.

Although some differences do exist, these deficits are debt-like in nature, a significant difficulty being that of measuring the value of future liabilities of the pension fund because of the need to make numerous assumptions regarding, for example, wage increases and mortality rates within each scheme. If we accept that pension deficits are equivalent to debt then there are further implications for estimating aggregate debt and hence corporate gearing. Emanating from such implications is a question about the perception of such deficits by the financial markets in terms of credit ratings and equity returns.

According to Lane, Clark and Peacock (2006), the aggregate FTSE100 deficit for defined-benefit schemes (operated by 92 of the companies) was £36 billion in July 2006 compared with £35 billion at the end of July 2005. In April 2009, the Pension Protection Fund estimated a deficit of £242 billion: 'Britain's 7,411 defined-benefit pension schemes face a net funding shortfall of £242 billion – more than 10 times the aggregate deficit recorded a year ago'.

To place the present magnitude of the deficit in context, David Cule, principal at Punter Southall, pointed out that the deficit is already 'significantly greater than the quantitative easing package' and 'on a par with the level of support being put together for the banking system' (*Pensions Management* 2009).

AIMS AND OBJECTIVES

This study has two primary objectives. First, a review of the composition of pension funds, incidence of pension scheme deficits and the impact of pension risk, variously measured, on equity risk and debt ratings. The latter component is based on an econometric analysis of a panel data set of FTSE100 companies for the period 2002 to 2006. The primary objective of the econometric component is to ascertain whether the respective debt and equity risk metrics reflect pension plan risk. If they do, this would suggest that, with respect to pension plan funding debt and equity, markets are informationally efficient. On the other hand, if pension risk is not accurately reflected, markets may be viewed as informationally inefficient, resulting in the underestimation of risk and the resultant overvaluation of firms.

To undertake an econometric analysis in isolation runs the risk of failing to encapsulate a holistic understanding of the complexities of the funding of defined-benefit pension schemes. A second primary objective is therefore to provide a systematic analysis of issues surrounding the pension debate in the UK, within which the econometric analysis is eventually located. This overview is achieved through a review of current literature and, importantly, a series of semi-structured interviews with identified key stakeholders, including scheme and consulting actuaries, lay and independent trustees, finance directors and academics. The interviews focus upon stakeholder attitudes to accounting disclosure, the actuarial input and scheme governance, along with reactions to continuing developments in pensions legislation. Information garnered from these interviews, integrated with the conclusions from the econometric analysis, then forms the basis for a number of policy recommendations and directions for further research.

SUMMARY FINDINGS AND POLICY RECOMMENDATIONS

We report the summary findings and recommendations under six main themes.

Prospects for defined-benefit schemes

Defined-benefit schemes have a limited long-term future, but if a company can continue to offer a defined-benefit scheme it will have a competitive advantage in the labour market. Given current market conditions, it will be very difficult for companies to sustain their provision unless government provides some incentives. The most effective incentives are likely to be financial and could take the form of a taxation incentive for operators of defined-benefit schemes. If such financial incentives are not forthcoming, then government could alleviate the burden on employers by removing some of the guarantees that are currently in place, for example allowing pension increases to be made on a discretionary basis taking into account funding levels.

Pension scheme reporting

There are competing views regarding the impact of accounting disclosure on defined-benefit schemes. Some suggest that accounting disclosure resulted in the introduction of a volatile, uncontrollable number on the balance sheet, which has encouraged the closure of defined-benefit schemes. Others suggest that the problem for defined-benefit schemes is more economic in nature. Irrespective of whatever viewpoint one accepts, it is evident that the transparency of disclosure regarding defined-benefit schemes has improved dramatically but has still some way to go. A significant current issue is that of pension buyouts, and our interviews suggest that the pension buyout cost would be a welcome addition to accounting disclosure and without it there remains scope for inappropriate managerial and investment decisions.

The changing role of the actuary
The growing significance of deficit management has become apparent from our interviews with consulting actuaries. The underlying rationale behind such exercises is a significantly lower value for the liabilities reported on a transfer basis compared with the value of those reported on an FRS17/IAS19 basis. The consequence is that the scheme pays out of its assets something that is equivalent to a transfer value liability and it saves on an FRS17 basis something that is equivalent to an FRS17 liability, thereby reducing the deficit.

From a policy perspective this raises issues regarding asymmetric information and the establishment of transfer values. Advice from the scheme actuary regarding the implications of accepting a transfer value should be made transparent to the scheme member. In addition, there may well be a case for more standardisation in the establishment of transfer values.

Pension buyouts
The number of firms offering to tackle pension schemes' investment or mortality risks through a partial or full buyout has rapidly increased, with general opinion being that it is only a matter of time before the first £1 billion buyout. Such competition is both driving down prices and swelling the number of products offered to schemes. In addition, if the Accounting Standards Board proceeds with proposals to use a risk-free rate to value future pensions liabilities, then the buyout option will become increasingly attractive to sponsoring companies. Various opinions suggest that such a move would increase liabilities by 25% to 40%, thereby reducing the gap between the ASB risk-free valuation and the buyout valuation.

Pension deficits and equity risk
The econometric component of this study examined pension plan risk and its impact upon equity risk for FTSE100 companies over the period 2002 to 2006. In general terms, our analysis indicates that, for FTSE100 companies, pension plan risk does contribute to firm equity risk. This suggests that the market views the assets and liabilities of the company pension scheme as part of the assets and liabilities of the firm itself. This raises the possibility that there may be a weakness in the informational efficiency of equity markets, and this stresses the importance of the continuous process aimed at achieving transparency and consistency in the actuarial and accounting frameworks.

Pension deficits and and credit risk
Pension risk was also demonstrated as being factored into credit ratings, with the analysis indicating that the greater the pension risk, the greater the probability of obtaining a lower debt rating. From a rating agency viewpoint this is positive news, particularly at present when agencies are being criticised for a perceived failure to reflect sub-prime mortgage problems in firm-specific ratings. Notwithstanding this, our analysis offers only a relative perspective and provides little insight into whether ratings agencies systematically underestimate or overestimate pension risk in their debt ratings. If we draw parallels from the sub-prime market, the more likely scenario is that pension risk has been underestimated in debt-rating estimates.

FUTURE RESEARCH OPPORTUNITIES

Defined-benefit pensions schemes are likely to feature prominently on the research agenda for some time to come. The current 'credit crunch' is likely to focus increased attention on corporate credit ratings in general and credit rating agencies in particular. The impact of the crunch upon pension deficits is more difficult to predict, leading, on one hand, to increased volatility on the equity markets but, on the other, to higher interest rates and enhanced corporate bond yields. The continuing trend in asset allocation away from equities and into bonds may in fact improve the overall general picture. Our research has suggested that pension risks do indeed affect both equity betas and credit ratings and that the market is informationally efficient (subject to certain provisos) in recognising pension deficits. This also has implications for the cost of capital and therefore corporate investment decisions. More directly, additional contributions to pension funds, in an attempt to reduce deficits and meet Pension Protection Fund recovery plans, will diminish the funds available for investment and/or dividend decisions. This interaction between pension contributions, investment decisions and dividend payouts would appear to warrant further investigation.

1. Introduction

Defined-benefit (DB) pension schemes have recently emerged from relative obscurity to evolve into one of the most significant factors affecting both corporate financial decision making and accounting disclosure requirements. Such schemes compete for funds alongside investment and dividend decisions, and both national and international accounting standards bodies are, and will for the foreseeable future, be devoting substantial resources to the quest for increasingly comprehensive and transparent disclosures. Furthermore, the actuarial profession provides an important input into the valuation of the pension funds prior to disclosure in the financial statements.

Perhaps the major issue with DB schemes is that all the associated risk rests with the scheme provider (ie the company), which is required to provide a pension based upon a specific proportion of the scheme member's final salary. This contrasts with defined contribution (DC) schemes whereby the company simply contributes to the scheme and the 'pool' of funds available upon retirement is used to purchase an annuity, with no guarantees as to the amount of the pension, ie the scheme member is the sole risk taker. Clearly some method of sharing the risk between the provider and the member would appear an obvious compromise in the development of alternative approaches.

During the 1990s DB schemes enjoyed the combination of booming stock markets and relatively high interest rates, which resulted in substantial scheme surpluses (as measured by comparing scheme assets and liabilities) and comparatively inexpensive annuity costs (which vary inversely with interest rates). Such surpluses allowed companies to reduce or even temporarily cease payments to the scheme ('pensions holidays') and retiring members enjoyed healthy pensions. The pension scheme was largely viewed as a separate entity managed by trustees and advised by actuaries, and had little impact upon financial decision making within the company itself. Furthermore, accounting disclosure requirements, though increasing, meant that pension schemes remained, relatively speaking, in the backwater of corporate reporting.

This period of relative calm was, however, to be radically disturbed by the financial markets of the early years of the 21st century. Buoyant stock markets were replaced by a general slump and increased market volatility in the wake of the bursting of the 'dot com' bubble. In addition, interest rates declined markedly as governments struggled to avoid recession. Consequently, the perfect calm of the 1990s was transformed into a 'perfect storm' combining declining scheme assets with increasing annuity costs, a situation that was reflected in scheme liabilities. In the case of a number of FTSE100 companies, the magnitude of scheme liabilities exceeded their market capitalisation. To exacerbate matters, standard-setting bodies had focused attention on the disclosure of pension information: scheme deficits were no longer confined to a note to the accounts but instead assumed a prominent position on the balance sheet. In addition, there was a growing tendency to regard such deficits as equivalent to debt finance, with obvious consequences for real or implied gearing ratios and, in turn, credit ratings.

The magnitude of these deficits has oscillated considerably in recent years. Lane, Clark and Peacock (2006) estimate that the aggregate FTSE100 deficit for defined-benefit schemes (operated by 92 of the companies) was £36 billion in deficit in 2006, £12 billion in surplus in 2007 and £41 billion in deficit in 2008. In April 2009, the Pension Protection Fund (2009) estimated a deficit of £242 billion. Such amounts clearly suggest that any attempt to reduce pension deficits will have significant implications for corporate financial decisions.

Pension Capital Strategies (2008) present an overview of company contributions to their pension schemes. They report that FTSE100 companies contributed £14.5 billion to pension schemes in 2007, with this figure falling marginally to £12.6 billion in 2008. In 2007 the cost of providing benefits was £8.2 billion so the remaining £6.3 billion was directed towards reducing pension scheme deficits. In 2008 the cost of providing benefits was £7.9 billion with £4.7 billion in consequence directed towards reducing pension scheme deficits.

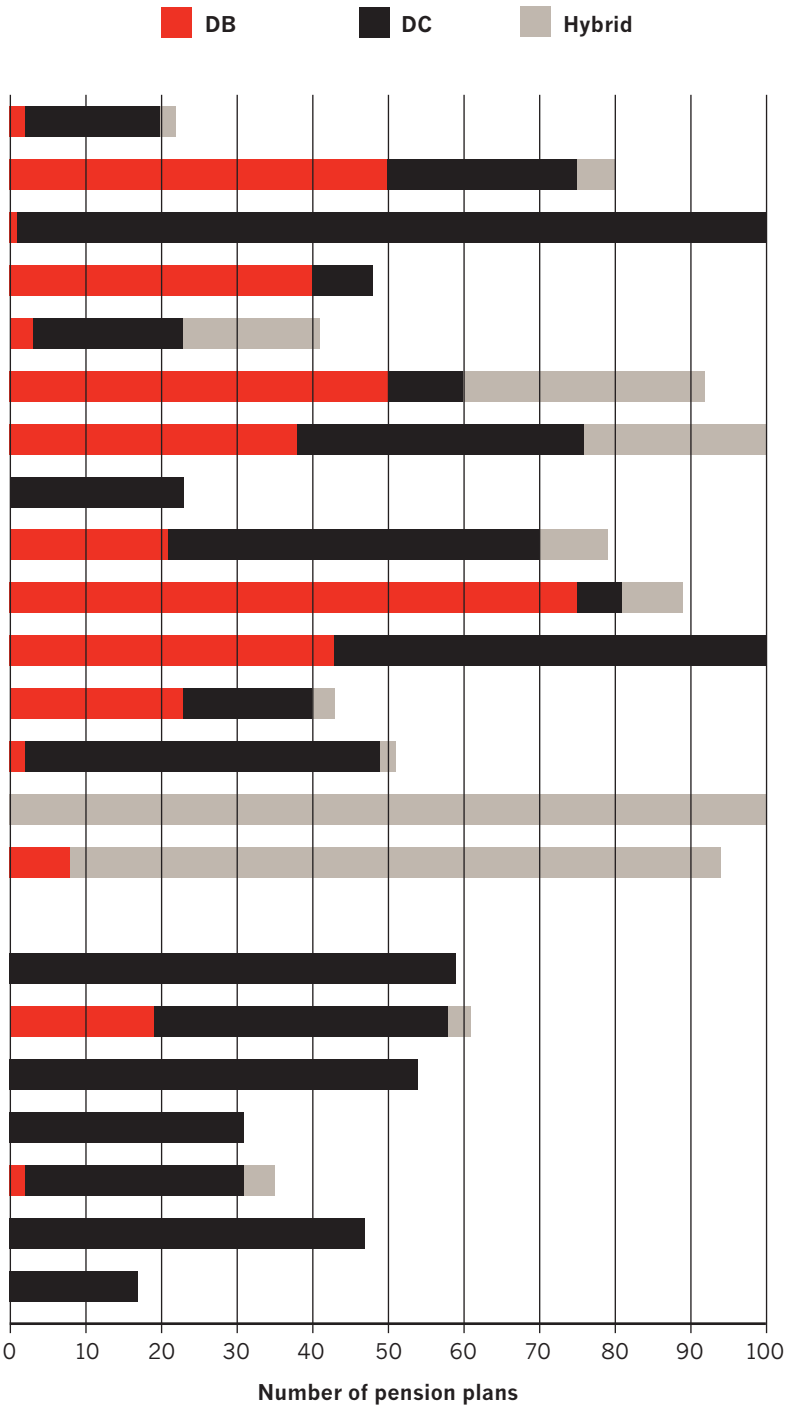
Perhaps unsurprisingly, companies sought to contain the problem initially by closing DB schemes to new members, before considering other options such as ceasing future accrual of benefits or requiring increased contributions from scheme members. The most recent report (ACA 2009) suggest that fewer than 15% of DB schemes remain open and such schemes appear increasingly to be the domain of public sector employees. The number of private sector employees in open DB schemes has declined from five million in 1995 to fewer than one million in November 2007 (ACA 2009).

The cost of maintaining DB schemes has also escalated dramatically from approximately 17% of employee earnings in 2002 to 29% of earnings in 2007, with most of the increase being borne by the scheme provider. Recent developments in the legislation have increased the burden further by the introduction of an imposed levy designed to protect members of schemes that are unable to fulfil their obligations (the Pension Protection Fund) as well as a commitment to reduce existing deficits over a reasonable time period.

Besides scheme closure, another trend has been the tendency to alter the asset allocation within schemes by switching from equities to bonds and other investments, most notably property and derivative-based securities. An extreme version of this trend was the decision by Boots in 2002 to liquidate its equity investments completely and invest the entire fund in bonds. A gradual switch is more typical, however, with recent figures (ACA 2009) showing that 55% of DB assets were invested in equities in 2007 compared with 60% a year previously. Interestingly, the proportion invested in equities by UK schemes has generally exceeded that of other countries (for example, in the Netherlands, which has a strong DB tradition, the average pension fund is around 40% invested in equities, and in Switzerland the average exposure is even lower at around 30%).

Figure 1.1: Types of pension plan in European countries

	DB	DC	Hybrid
Western			
Austria	2	18	2
Belgium	50	25	5
Denmark	1	99	0
Finland	40	8	0
France	3	20	18
Germany	50	10	32
Italy	38	38	24
Luxembourg	0	23	0
Netherlands	21	49	9
Norway	75	6	8
Portugal	43	57	0
Spain	23	17	3
Sweden	2	47	7
Switzerland	0	0	100
UK	8	0	86
Eastern			
Czech republic	0	59	0
Greece	19	39	3
Hungary	0	54	0
Poland	0	31	0
Russia	2	29	4
Slovakia	0	47	0
Turkey	0	17	0



Source: Mercer 2008

Europe is historically divided into sectors that have either very strong DB traditions and strong state pensions or very limited pensions. But even sectors with limited pensions are now generally moving or have moved into DC models of some kind (for example, in Eastern Europe). In fact, across Europe the trend to DC is gaining momentum, with many new DC plans being introduced (Figure 1.1).

The foregoing discussion clearly suggests that the existence of DB pension funds has a direct influence upon corporate financial activities because of pension funding obligations. This research project investigates whether there is a less obvious impact on the risk assessment of corporate securities by the financial markets. More specifically, do the financial markets efficiently process available information about DB pension schemes in their risk assessment of corporate equities and bonds? The most prevalent risk measures are the beta factor (for equities) and credit ratings (for bonds) and these provide the basis for the empirical research.

If these risk metrics are shown to be influenced by the financial position of DB pension schemes then their impact may resonate further. Credit ratings tend to influence the cost of borrowing, which then affects corporate financing and investment decisions. More recently, credit ratings have been used by the Pension Protection Fund in establishing individual company contributions. Beta factors may exert a less direct impact on corporate activities but variations in the beta factor may alter the perspective of the investment community with regard to the company.

Two main research methodologies were employed in the project. An econometric approach was used to examine the impact of pension deficits on both equity and credit risk. Various proxies were identified as a surrogate for equity risk and the strength of the relationship between pension deficits and these proxies was studied for those FTSE100 companies with defined-benefit schemes over the period 2002–7. A similar methodology was employed to examine the relationship between pension deficits and credit ratings for the same group of companies.

The second methodology used was a series of telephone and face-to-face semi-structured interviews with a number of parties identified as key stakeholders in the defined-benefit scheme environment. The relevant parties were actuaries (both scheme and consulting), trustees (both lay and independent), finance directors and academics. The semi-structured interviews were intended to sample opinion regarding, in particular, the impact on current developments in both accounting disclosure and pension scheme legislation. Of specific interest was the conflict of interest encountered by some of the stakeholders in their various activities connected with defined-benefit schemes.

Chapter 2 analyses the roles of the various stakeholders involved, namely the company providing the pension, the scheme actuary and the scheme trustees, whose role is to protect the interests of the members. Potential conflicts of interest that impinge upon both the actuary providing advice and corporate members of the board of trustees are identified and discussed. The influence on these roles of significant changes in the pension legislation, enacted particularly through successive Pensions Acts, is evaluated, together with that of the formation of the Pension Protection Fund and the introduction of the pension levy.

Chapter 3 describes the earlier and current developments in accounting disclosure brought about by national and international reporting bodies, which have increasingly focused attention on the provision of comprehensive and transparent information about DB pension schemes.

Chapter 4 discusses the input of the actuarial profession, which has traditionally had the unenviable task of placing a valuation on the pension fund on the basis of economic and demographic assumptions. In particular, the impact of recent improvements in mortality rates and the difficulty of predicting future trends is identified as a significant input into the valuation problem.

Chapters 5 and 6 contain the empirical analysis, which used a panel data approach in investigating whether pension scheme risk is efficiently processed by the financial markets and, more specifically, reflected in equity beta factors and corporate credit ratings.

Chapter 7 proposes a number of policy recommendations based upon the findings of the project and suggests potential opportunities for further research.

2. Stakeholders and scheme governance

2.1 INTRODUCTION

The existence of a DB pension scheme brings together a significant number of related stakeholders, often with competing and conflicting interests. The most obvious participants are the company (sponsor) and those employees who are members of the scheme. In addition, there are a board of trustees, actuaries who provide advice and, more recently, the extraneous impact of the Pensions Regulator with the longer-term objective of strengthening scheme funding. This chapter examines the roles and responsibilities of the main stakeholders associated with the pension scheme together with the impact of recent legislative changes. More specifically, the roles and duties of the stakeholders are outlined individually and then collectively under the umbrella of pension scheme governance. Subsequently, developments emanating from the Pensions Acts of 1995 and 2004 will be analysed, assessing their impact upon both the funding of pension schemes and the formation of policing bodies to intervene in the event that the regulations are breached. Throughout this chapter we have incorporated relevant opinions voiced by stakeholders through their participation in semi-structured interviews.

2.2 THE STAKEHOLDERS

2.2.1. The trustees

Each pension scheme is required to appoint a board of trustees whose primary role is that of administering the trust and exercising discretion when required, while considering only the best financial interests of the scheme members. Other responsibilities include acting in accordance with prevailing legislation and establishing the investment strategy of the scheme. Finally, the trustees should take advice on matters outside their expertise and be effective communicators with the membership.

A particular area of interest is the composition of the membership of the board of trustees. Potential conflicts of interest arise for company representatives, who act on behalf of the shareholders rather than the members of the scheme, as evidenced by the following comment from a trustee:

> *if you've got the finance director on board...the main role of the trustee is to protect the member benefits and if, say, that requires contributions to be doubled because the scheme is in deficit and one of your trustees is the finance director who is concerned about making sure the company makes a profit, then it is difficult for him to work out what hat he is actually wearing when making these decisions.*

Other related comments are shown in Box 2.1.

Box 2.1: Conflicts of interest and the board of trustees

There is a trend for the finance director to come off the trustee board. We tend to find there are a lot more independent trustees appointed these days. (Trustee)

Whilst there is a need to manage conflicts there are still personalities, like politics, at stake on any trustee board that will always come to the surface at some stage. In theory there should be no conflicts but in practice they will always be there and will never be eliminated unless you have a full set of independent trustees on the board. But even then there can be conflict. (Independent trustee)

You are definitely going to have some serious people in the company wanting to be on the trustee board...they'll want to have some input into what's going on in the pension scheme, which does lead to a potential conflict of interest. (Trustee)

Trustees and the company are at either sides of the spectrum. The trustees are interested in making sure the members are still getting benefits. The company is interested in ensuring that they can keep their pension scheme as cheap as possible. Between them they have to come to a decision. The trustees are definitely involved; [the] *sponsor cannot just close the scheme without consulting with the trustees.* (Scheme actuary)

Major conflicts occur where somebody who is a chief executive or financial director of the company...is also a trustee, and there is obviously a duty on trustees to tell their fellow trustees if there is something that could impact upon the scheme. The sort of event that might cause a problem is a major sale, a major acquisition, something like the payment of a special dividend. The sort of thing the regulator is interested in is where money is going to leave the company and go outside the company's reach. A special dividend is a good example of that, where the company may be planning to pay, say, £20m out in special dividends to shareholders and that money is going to leave the company for ever and go out of the reach of the trustees, and therefore reduce the covenant. Now...as a finance director you know that's going to happen and you know you can't tell the trustees before it happens, that causes real problems. Most people get round that by not having the finance director or chief executive as a trustee. (Scheme actuary)

The way I've seen less serious conflicts dealt with is trustees having a declaration of a conflict of interest at the start of each meeting. People leaving the room for certain discussions, people resigning as trustees for a period of time or permanently. (Trustee)

If we've got people on the trustee board who have knowledge of the company, then we would rather keep them because they have the experience that an independent or lay trustee would not have. (Independent trustee)

A trustee board that contains no directors or senior officers of the employer when vital discussions are taking place is unlikely to be in the best position to make well-informed decisions. (Independent trustee)

A further issue relates to the seemingly onerous duties placed upon trustees and the degree to which they are effective in performing such duties. Previously some doubt was evident regarding the effectiveness of trustees.

> *In the past there were cases where trustees didn't really understand what was going on with their pension scheme, in some cases I guess they didn't even understand pensions, the calculations that were being done and why they were being done. The requirement now is that they have a much better understanding.* (Scheme actuary)

The general consensus would seem to be that the effectiveness of trustee boards has improved, enhanced to some degree by the emergence of professional independent trustees.

> *A lot of trustee boards are now getting independent trustees, independent professionals, because the role of the trustee has expanded so much over the past few years. On a typical board you might have one independent trustee but you will have a number of employer-appointed trustees and a number of member-nominated trustees.* (Scheme actuary)

Other related comments are shown in Box 2.2.

Box 2.2: Trustee effectiveness

The requirement now is that one-third of the people on the board are nominated by members of the scheme. As for the other two-thirds, it is not set out in stone as to how you decide who they are. But the one-third representation is supposed to protect the members…although whether members actually do vote is questionable…. I'd be surprised if you'd actually get [a situation] *where everyone is interested in who their trustees are.* (Independent trustee)

Trustees which have decent advisers are pretty effective, provided they listen to their advisers. I think the ones that tend to suffer are the ones who employ advisers who are cheaper in cost and not as mainstream. (Scheme actuary)

The bigger the board, the more unwieldy and slow the board gets; if it is too small, however, it may not be able to do business quickly and effectively. There was some research done around corporate boards, I think the magic number was nine. (Independent trustee)

At the end of the day what is important is the people around the table and if you have the enthusiasm and commitment they will deal with the size of the board – it is as much about the quality of the people around the table as it is about board size. (Trustee)

Our main thrust is to get trustees to work more effectively. Have they got the right people on the board? Have they structured the board well enough? Do they need to have subcommittees? We look at helping them to be effective in their decision making so we encourage them to take the right advice at the right time and provide an audit trail. (Consulting actuary)

We would encourage trustees to have a strategy focus [on] *what they are doing in their particular scheme. So they might have objectives around funding and investment but they will also have objectives around service delivery and communication with members. They might also have objectives around how they themselves govern the scheme.* (Consulting actuary)

The most common subcommittee by far is the investment subcommittee. Alongside that you may have an audit committee, an administrative committee, which is reasonably common. You might have a governance committee which thinks about trustee training, you might have a risk committee. Whatever the trustee board thinks it needs. (Finance director)

2.2.2. The actuary
The main role of the actuary is that of advising the trustees through his or her appointment as scheme actuary, but it is also likely that the sponsor, too, will require actuarial advice. There would seem to be a potential conflict of interest if the same actuary was to occupy both these roles, although there are currently no obstacles preventing this from happening. The majority of the schemes surveyed by PWC (2007) appeared to appreciate the implications of such dual roles and 72% of respondents had separate individuals as actuaries advising trustees and sponsors. Even so, of these respondents almost 50% used actuaries from the same, rather than distinct, firms thereby calling into question the degree of independence. The remaining 28% had the same actuary fulfilling both trustee and sponsor roles, although a quarter of these companies claimed to be currently considering the question of securing separate advice.

> *We are being forced, which I think is a good thing, to think far more about our own conflict of interest. And it is far more common now for the scheme actuary not to have any significant discussions with the company and for the company to talk to another actuary, whether that be from the same firm or from a different firm again because of a potential conflict of interest.* (Scheme actuary)

Other comments appear to suggest that the extent to which this may occur may depend significantly upon the size of the scheme:

> *The bigger schemes have a lot more issues and a lot more complications; for example, those run by companies quoted on the stock exchange need to show that they use separate advice because they need to show that they are doing things in the right way, that they are squeaky clean.* (Scheme actuary)

In contrast:

> *The smaller schemes out there see disproportionate costs if you are going to appoint two sets of advisers. What you are seeing more and more is that there would be one main scheme actuary who will give advice to the trustees, and the trustees will discuss the advice with the employer. If the employer wants to ask some difficult questions, and wants some answers independent of the trustees, they will go out and seek independent advice. But, in general, for the smaller ones there is one scheme actuary and it is up to the scheme actuary to manage the conflict.* (Consulting actuary)

The scheme actuary is required to act in accordance with the legal obligations and advise the trustees as the primary client when required. More specifically he/she is required to certify the transfer value basis, the minimum funding requirement (MFR) position (though now superseded in most cases by the recovery plan originating from the Pensions Act 2004), any debt of the company in winding up, and finally that the contribution schedule meets MFR (or recovery plan) requirements.

The role of the actuary advising the sponsor would be likely to place greater emphasis on managing the risk of the scheme and advising about opportunities to manage and alleviate the impact of the cost burden of the scheme on company activities. This may involve increasing the contribution levels, changing the terms of the scheme (for example, the accrual rate or salary upon which the pension is based) or, more radically, closing the scheme or considering the pension buyout option.

2.2.3. The company (sponsor)
The company should act in accordance with the best interest of the shareholders while, at the same time, creating incentives for employees and motivating them by communicating the merits of the scheme effectively. Initially, the company is involved in the benefit design for the scheme and is required thereafter to meet its obligations under the trust deed and rules. In particular, it must pay the requisite contributions to the scheme and make good any underfunding. It must also, more recently, inform the Pensions Regulator of any 'notifiable events' and pay the assessed levy to the Pension Protection Fund (PPF).

2.2.4 The importance of good governance
The profile of good governance in the pensions industry has grown significantly since the middle of the decade as a consequence of a series of less than positive news stories. The creation of the Pensions Regulator (2005) was designed to give teeth to the Pensions Act 2004 in its objective of protecting members of pension schemes. The new legislation also provides trustees with a framework to support them in their responsibility of acting in members' interests.

Trustees are now required to have knowledge and understanding of the law relating to pensions and trusts, of the funding of pension schemes and of the investment of assets. In addition, they need to be familiar with scheme-specific documentation, including trust deeds and rules, statements of investment, and funding principles. A good governance framework will underpin these requirements.

Most trustees do feel confident in their governance practices but, according to the Pensions Regulator (2006), there are some areas where shortcomings remain:

- 70% of defined-benefit schemes do not have specific policies to manage conflicts of interest
- 37% of defined-benefit schemes do not review sponsoring employer's credit ratings
- 20% of all schemes with a pensions provider do not have any service-level agreement in place.

There is also wide variety in the composition of trustee boards, with a growing tendency to use the services of independent trustees. This is illustrated by the fact that 50% of trustee boards include at least one independent trustee and 25% of all boards are led by an independent chairman (PWC 2007).

Although the use of independent trustees may be regarded as improving scheme governance, a further issue concerns the involvement of the sponsor on the board of trustees. According to PWC (2007), 50% of boards of trustees include a director from the main sponsor, with 20% having a company director as chairperson. The potential problems are evident, and in fact 15% of schemes reported trustees who had resigned within the past three years to avoid a potential conflict of interest.

Although the overall impression of the current state of pension scheme governance is one of general improvement, there remain major challenges. In their survey of pension scheme governance, PWC (2006) reports that 54% of trustee boards either have not established a formal governance policy or are not using it to assist with decision making. In addition, only 48% of trustee boards assess the performance of their advisers using consistent criteria set by themselves. This is despite the fact that the management of advisers is a critical factor for effective scheme governance. PWC's most recent survey (2008) suggests that only 18% of trustees agreed that action points were completed within the agreed timescale.

Cocco and Volpin (2007) examine the composition of the board of trustees in relation to both the asset allocation of the scheme and contributions to the scheme. They hypothesise that 'insider' trustees may have an incentive to increase the riskiness of the assets and also favour shareholders over scheme members. Their conclusions suggest the existence of an agency problem, with those trustee boards that have a relatively high proportion of insider trustees investing a relatively high proportion of scheme assets in risky securities and also appearing to favour dividend payments at the expense of scheme contributions. The Pensions Regulator (2008) has recently produced a report advising trustees about such conflicts of interest.

2.3 CURRENT LEGISLATION

2.3.1 Introduction

The primary vehicles for current pension scheme legislation have been the Pensions Acts of 1995 and 2004, with the latter Act removing and replacing the main requirements and institutions of the former. The earlier Act saw the formation of the Occupational Pensions Regulatory Authority (OPRA) and the implementation of the highly prescriptive Minimum Funding Requirement (MFR). The Pensions Act 2004 abolished the MFR in favour of the more flexible statutory funding objective (SFO) and provided for the replacement of OPRA by the Pensions Regulator. In addition, the formation of the Pension Protection Fund (PPF) required companies operating defined-benefit schemes to pay a levy which could then be used to compensate members of schemes whose sponsor was unable to fulfil its obligations to the scheme (this was similar to the PBGC (Pension Benefit Guaranty Corporation), which has existed in the US since 1974).

2.3.2 Pensions Act 1995

This piece of legislation was one of the most important influences upon pension schemes for many years. The catalyst for a significant number of the reforms enacted in the legislation was the publication of the Goode report in 1994. A Pension Law Review Committee (PLRC) had been set up in 1992 under the chairmanship of Professor Roy Goode, following the Maxwell affair, when in excess of £400 million had been pilfered from the pension scheme to shore up the finances of the ailing Maxwell Group.

One of the main recommendations of the PLRC was the introduction of a minimum funding requirement (MFR) to ensure security of pension rights for scheme members. The primary objective of the MFR was to ensure that the assets of a scheme were sufficient to meet its liabilities. The initial proposals of the PLRC regarding the timescale to restore full funding were subsequently relaxed by the UK government in light of comments received following publication of the White Paper. In summary, the requirements of the Pensions Act 1995 concerning under-funding were:

- schemes that are less than 90% of the MFR must have their funding level restored to 90% within one year and to 100% within five years, and

- the calculation of the asset and liability values is to be averaged over a period of seven months, which may be on either side of the valuation date.

In a further attempt to avoid another Maxwell scandal, section 48 of the Act ('the whistle-blowing section') imposed a duty upon auditors and scheme actuaries to report to OPRA if they became aware of any legal breach by the trustees or managers of the scheme that was likely to be of material significance in the exercise of any of their functions. In the early days, trustees and advisers appeared to be overcautious about the new regulations and OPRA was inundated with reports of insignificant matters. As a consequence, OPRA issued an updated version of section 48, which signalled a change towards a more risk-based, proactive regulatory approach. Under the new system, breaches were to be classified as red, amber or green with a duty to report all 'red' breaches and not to report 'green' breaches. This leaves the 'amber' category as one in which the actuary or auditor is required to exercise professional judgement in deciding whether the breach is likely to prove material to members' interests.

2.3.3 Pensions Act 2004

The Act of 2004 was viewed as a landmark in securing and strengthening the UK's tradition of private pension provision and a major step towards meeting the demographic challenges posed by an ever-healthier, but ageing, population. The three key dimensions of the Act were:

- the creation of a Pension Protection Fund (PPF) to change radically the protection offered to members of DB pension schemes
- a new Pensions Regulator to replace OPRA but with a wider remit and a new set of powers
- a set of measures designed to empower people to plan, work and save for their retirement.

Perhaps the most radical innovation of the Act was the creation of the PPF, which was designed to protect scheme members from the possible loss of their pension rights in the event that the sponsoring employer went into liquidation. This applied to events happening after 5 April 2005, with the creation of a separate Financial Assistance Service to assist members of schemes that had entered winding up before that date.

The PPF was to be partly funded by the assets of schemes that it took over and partly by a compulsory levy on all the schemes that it covered. The levy consists largely of a risk-based element (80% of the levy) along with a scheme-based element. The high risk-based weighting, based primarily on funding levels and the likelihood of the employer's insolvency (as measured by the Dun & Bradstreet credit score), implies that costs will be reduced for well-funded schemes. The additional costs imposed on companies by the PPF levy have been alleviated to some extent by a reduction in the limited price indexation cap from 5.0% to 2.5%.

Comments regarding the role of the PPF are often positive. As one trustee put it: 'PPF gives members more reassurance, they are more confident now in the regulator regime that is out there'.

Nonetheless, the imposition of the levy results in more mixed opinions as illustrated by the following comment:

> *it is a good idea, each pension scheme* [is] *required to pay a levy, a flat levy and a risk-associated levy and the risk-based levy is based on how strong is the sponsor, what kind of funding position is the scheme in at the moment, so it is a bit odd as if you are seriously under-funded you are higher risk and pay a higher levy but that makes you even less well funded.* (Trustee)

In contrast:

> *I have one very large scheme where frankly the odds of it*[s] *going bust* [are] *practically zero…and yet their PPF premium is very high because they have a large number of members; the risk-based levy is virtually nil but the scheme-based levy is very significant…their perspective is 'why are we stumping up all this money when we have no prospect of ever needing the scheme?'…there is no point buying house insurance if there is no chance of your house ever burning down.* (Scheme actuary)

Other feedback regarding the role of the PPF and the levy is shown in Box 2.3.

Box 2.3 Pension protection fund

[The] *other argument is that all the schemes that are very well funded have to pay the levy so those trustees think we have to bail out the schemes that aren't well funded. Why should we pay insurance when we don't need it?* (Finance director)

PPF is having more influence on how companies try to affect credit ratings, there is some of that going on with companies looking at how they can improve their scores in order to influence the levy. (Consulting actuary)

Not sure it is having an effect on trustees looking at their funding, [the] *main focus of trustees is getting the funding assumptions right and the investment strategy right.* (Independent trustee)

In terms of employers dealing with pension schemes I think it is an additional cash call, for the most part they are paying for insurance that they will never use. I think they just see it as an additional cash drain on their resources. It doesn't really influence their funding policy unless they want to try and mitigate [the] *levy to a reasonable extent.* (Scheme actuary)

The levy is based on the funding position of the pension scheme and a D&B rating. Companies can't control the funding position unless they pump in more cash. Companies don't want to do that so they try to control D&B ratings: more and more companies are trying to improve their rating. (Scheme actuary)

My view strongly is that it is not the PPF that is the problem: it should have been met by taxpayers, not put a burden on other well-run final salary schemes and employers who are already paying, on a voluntary basis, to fund their own scheme and are being hit by a double whammy in terms of the pension levy. (Scheme actuary)

The level[s] *of these PPF premiums in some cases are just astronomic.* (Finance director)

The PPF, unlike the PBGC in the United States, is not underwritten by the government and it was predicted that it would rapidly face funding difficulties. Indeed, the PPF reported a deficit of £323 million in its first annual report, as at 31 March 2006. The initial target for 2006/7 was £575 million but the actual amount raised was £271 million. The PPF is expecting to collect £585 million from the levy in the 2007/8 levy year. This is £90 million less than the levy estimate of £675 million set out by the PPF in December 2006. The amount collected for 2007/8 differed from the estimate owing to deficit reduction contributions, contingent assets and schemes or challenges from sponsoring regarding their insolvency probabilities. The under-collection for 2007/8 is much less than the £304 million shortfall of 2006/7.

The Act also provided for a new Pensions Regulator to replace OPRA from April 2005. There had been a perception that OPRA had been a bureaucratic and reactive regulator and that a more proactive approach was desirable. The main objectives of the Regulator are:

- to protect benefits for members of work-based schemes
- to promote good administration of work-based schemes
- to reduce the risk of claims on the PPF.

The first objective, protecting member benefits, involved the replacement of the one-size-fits-all approach of the MFR by a new statutory funding objective (SFO). The MFR did not guarantee that a scheme was solvent and had been based on a discounted income approach to valuing equity, which was no longer valid. It did, however, remain as the minimum requirement for all schemes until they had their first triennial valuation after September 2005.

The government, in responding to the Myners Review, announced its intention to replace the MFR with a scheme-specific SFO. The deliberations were complicated, however, by the enactment of the *EU Pensions Directive 2003* (European Parliament 2003), which caused some nervousness in pension circles. In particular, the directive states that: 'a scheme must have at all times sufficient and appropriate assets to cover its technical provisions'.

This could potentially have caused massive problems for UK companies, depending upon the interpretation of the above clause; for example, it could have meant that all schemes must always be fully funded on a buyout basis. The UK legislation made it clear, however, that the trustees and employers can decide how the technical provisions should be calculated.

In February 2006 the Pensions Regulator published a Regulatory Code of Practice – *Funding Defined Benefits* – and soon after, in May 2006, followed this with a statement entitled *How the Pensions Regulator will Regulate the Funding of Defined Benefits*. The code was primarily aimed at trustees but obviously also affected sponsoring companies. The key elements of the Code are:

- a statement of the funding principles specific to the circumstances of each scheme, setting out how the statutory funding objective will be met
- periodic actuarial valuations and actuarial reports
- a schedule of contributions
- a recovery plan where the SFO is met.

There remained a degree of vagueness about the term 'technical provisions' although the Regulator does state that: 'in particular, legislation does not require technical provisions to be set at the level needed to buy out the accrued liabilities with an insurance company'.

The longer-term objective is to strengthen scheme funding through the effective implementation of the SFO. By the end of 2009 all defined-benefit schemes will have completed scheme-funding valuations on the new basis and those with a shortfall should have agreed a recovery plan.

The Regulator portrays itself as a referee rather than a player and emphasises the overriding importance of a good relationship between the sponsoring company and the trustees. This requires effective communication in which the finance director plays a crucial role. The Regulator will focus upon the technical provisions (a range between the section 179 and FRS17/IAS19 liability values is acceptable) and the recovery plans (ideally within 10 years and not significantly back-loaded) together with any cases where disputes arise.

Box 3.4 Comments on the Pensions Regulator

Overall the PR is good and making a substantial difference. Its seeming reluctance to use its 'moral hazard' powers in the early years [has] *been a set-back. It is a bit early to say what its influence is on Scheme Specific Funding but initial signs are positive.* (Independent trustee)

I think that the Pensions Regulator is far more effective than its predecessor but then it has got a different set of powers. (Independent trustee)

I get mixed views on what people think of the Regulator. I think in a lot of areas the Regulator is providing a lot of information to help trustees manage their schemes. (Consulting actuary)

My perception is that they tend to be quite helpful when you go to them with a query...They are conscious that they do not want to become a player... They are there as a referee...If they can encourage the employer and trustees to go away and sort the problem out then they would rather do that than dictate what the outcome should be. (Scheme actuary)

PR has been pretty effective so far. I think cash funding has become more conservative just by the regulator being there and knowing that whatever you agree is going to be scrutinised by the Regulator. (Consulting actuary)

I think the big test will come when somebody tests his powers. There are some legal views out there that if his powers are tested and do not hold up in court then the whole system will become undone. The main power that the Regulator can hold to the head of corporate [bodies] *is to dictate the level of contributions. If that doesn't hold up in court then the whole principle of having a regulatory regime and being able to dictate the level of contributions falls down.* (Consulting actuary)

The expectation was that most schemes would experience a shortfall against the technical provisions and be obliged to prepare a recovery plan. Indeed, a preliminary survey by the Regulator of approximately 1,300 scheme valuations during late 2005 and early 2006 found that around 70% 'triggered' on technical provisions alone, 17% on the recovery plan alone and 26% on both. When deciding whether or not to take action when a recovery plan is initiated, the Regulator would carefully consider the potential impact of any change upon employer viability. It was also emphasised that the triggers should not be regarded as targets by the schemes but are simply designed to prioritise and manage the work of the Regulator.

Although the primary focus was directed towards protecting scheme members through both the Pensions Regulator and Pension Protection Fund, the Pensions Act 2004 also introduced significant changes to the efficient functioning of trustee boards, with a view to enhancing scheme governance. A new requirement was implemented whereby at least one-third of the trustees are member-nominated (MNT) and the previous option for an employer to opt out, which had existed under the Pensions Act 1995, was removed. Any existing opt-out arrangements had to be discontinued by 31 October 2007 and it was further envisaged that the MNT proportion will increase to 50% by 2009.

3. Accounting disclosure

3.1 INTRODUCTION

Corporate reporting requirements for pension plans in general, and DB schemes in particular, have changed dramatically during the past two decades and indications suggest that companies need to prepare themselves for even more detailed and rigorous disclosure requirements in the near future. A series of accounting regulations, commencing with SSAP24 in 1988, have attempted to provide an increasingly comprehensive and transparent disclosure of a subject which rests uneasily between the accounting and actuarial professions. More recently FRS17, which controversially superseded SSAP24 and was itself modified into IAS19, attempted to provide a more realistic and less flexible approach to pensions accounting. Finally, IFRIC14, which was issued in July 2007 and became effective for accounting periods beginning on or after 1 January 2008, provides guidance on the accounting treatment of the increasingly prevalent phenomenon of pensions surpluses. In addition, current research projects initiated by both the ASB and IASB suggest both a continued focus on and allocation of resources to a topic which is not only complex from an accounting perspective but may also be exerting an influence upon corporate financial activity and, perhaps more significantly, company values.

3.2 THE EARLY YEARS

The establishment of the Accounting Standards Committee (ASC) in 1970 was a significant development in the intrusiveness of financial reporting into actuarial practice. A flourish of activity saw the establishment of both the Pension Research Accountants Group (PRAG) and the Pensions Management Institute (PMI) in 1976. The actuarial profession reacted to such developments by issuing actuarial guidance notes and publishing a codification of actuarial terms in the early 1980s.

Eventually, a pensions accounting standard emerged, namely SSAP24 (Accounting for Pension Costs) in 1988. Prior to SSAP24, most companies merely disclosed their pension contribution as the pension cost for the period. It was not necessarily the case that such contributions related solely to the requirements of the pension fund, and consequently their disclosure provided little assistance to users of the accounts when attempting to assess total employment costs. The primary accounting objective of SSAP24 was to require companies to recognise the costs of pension provision in a more systematic and rational fashion.

Under SSAP24 the profit and loss account is charged with the 'regular pension cost', which was expected to be a stable proportion of pensionable pay. In practice, the complex world in which business operates always results in variations from the regular cost and a substantial portion of SSAP24 is devoted to the treatment of such variations.

Experience surpluses or deficiencies arise because outcomes in the real world do not coincide precisely with the assumptions of the actuary. Other principal causes of variations to the regular cost include alterations to the actuarial assumptions and discretionary pension increases. Material surpluses or deficiencies would then be spread across the expected remaining service life of the current employees in the scheme.

Although SSAP24 attempted to bring some order to an important aspect of financial reporting that had previously been largely unregulated, it did not enjoy a long honeymoon period and was soon criticised for its deficiencies. Greenwood and Reynolds (1989) suggest that the standard offered 'too much choice, too little disclosure' and differed significantly from FAS87, which had been issued almost two and a half years earlier. In particular, the US standard allowed much less flexibility and, more significantly, proposed a market value approach for pension asset valuation rather than the actuarial method, which was based primarily on the present value of expected cash flows.

A similar view was expressed by Lane, Clarke and Peacock (1994) in their annual survey of the pension reporting practices of FTSE100 companies: 'It is barely possible for an informed pensions specialist to interpret the information currently provided with any confidence. The investment analyst or shareholder stands little chance.'

3.3 THE BEGINNINGS OF CHANGE

It became obvious that an early review of the lessons learnt from the implementation of SSAP24 was required. Two discussion papers were subsequently published, 'Pension Costs in the Employers Financial Statements' in 1995 and 'Aspects of Accounting for Pension Costs' in 1998. The earlier paper set out two contrasting approaches to accounting for pension costs. The first was an actuarial approach, similar to that upon which SSAP24 was based, but which removed many of the options offered by SSAP24 and improved the disclosure requirements. The second approach was a market-based approach, as adopted by FAS87, based on measuring the scheme assets at market value. The ASB, at that time, still preferred the actuarial approach but was aware that the IASC was likely to propose the market-based alternative. This supposition was proved correct when the IASC issued IAS19 'Employee Benefits' in February 1998.

Consequently, by the time of the publication of the second discussion paper in July 1998, the ASB found itself increasingly isolated from a global trend towards the use of market values. In light of such developments, and the increasing use of market values by the actuarial profession, the ASB concluded that the UK and Ireland should move into line with international practice. Some of the options available for the development of a standard based upon market values were taken forward by FRED20, published in November 1999.

FRED20 appears very similar to the US Standard, FAS87, and the International Standard, IAS19, with the exception of its treatment of actuarial gains and losses. IAS19, like SSAP24, specifies that changes should be recognised over the service lives of the employees. In contrast, FRED20 intends that actuarial gains and losses should be recognised immediately and disclosed in the statement of recognised gains and losses rather than in the profit and loss account. Pension assets would be taken at market value and liabilities assessed using a 'market rate of interest', interpreted as the yield on long-term corporate bonds.

The scheme surplus or deficit would be shown on the balance sheet, and this, it was suggested, could become an issue for many companies. The principle of including large and volatile assets on the balance sheet, when the company does not fully control such assets, is likely to cause contention. In addition, the full cost of benefit improvements would normally be shown in the profit and loss account in the financial year in which they are introduced. This may have the effect of militating against the introduction of further benefit improvements in the future.

3.4 CONTROVERSY DELAYS PROGRESS

It had been expected that FRED20 would evolve into a financial reporting standard during the year 2000 without undergoing any major alterations. In the event, its controversial nature prompted a delay in implementation, which had originally been intended for June 2003, and a transitional period was allowed in which disclosures concerning pension surpluses or deficits could be incorporated into the notes to the accounts rather than entered directly on the balance sheet. In addition, the IASB was reconsidering IAS19 and was thought likely to issue an amended version of that standard in late 2004. The ASB deemed it inappropriate to subject disclosure requirements to two potentially significant revisions within a relatively short time. Eventually FRS17 emerged phoenix-like from the ashes and became a requirement for financial years commencing on or after 1 January 2005.

It is perhaps not an understatement to suggest that FRS17 has been one of the most controversial and maligned reporting standards of recent years. Aside from the possible introduction of significant volatility into the balance sheet, it has also shouldered at least part of the blame for the continuing decline of DB pension schemes. Admittedly other factors, such as the decline of the stock market, accompanied by historically low interest rates and the increased contributions required following the implementation of the Minimum Funding Requirement (MFR), also contributed, but many also viewed the implementation of FRS17 as significant.

In brief, FRS17 attempted to introduce an accountant's, as opposed to an actuary's, perspective into the assessment of pension costs. A 'balance sheet' approach is adopted which measures the assets and liabilities of the fund at current market values, thereby introducing a degree of volatility into pension fund accounting, which many found unacceptable. The measurement of the fund liabilities is intrinsically more difficult owing to the absence of market values and is typically solved by discounting the expected future cash flows. SSAP24 allowed the choice of discount rate to be made by the actuary and a rate based upon the expected return of the assets was usually selected. This choice implicitly assumes that the risk profiles of the assets and liabilities are comparable.

FRS17 took a stricter view of the discount rate, by adopting the perspective that the rate should be independent of the way that the liability was funded. The eventual rate selected was the rate of return on a good-quality corporate bond (AA rated). This was a lower rate than many pension managers expected to earn on equities and some alleged it would lead to excessive deficits. The response to this argument was that a higher risk premium is more appropriate for equities than for liabilities.

At that time, the three existing standards, FRS17, IAS19 and FAS87 (although FAS132 had, to a large extent, updated the latter standard), were broadly comparable although IAS19 was arguably closer to FAS87 than it was to FRS17. The most significant difference between FRS17 and IAS19/FAS87 was in the reporting of actuarial gains and losses. Whereas FRS17 reported these immediately in the STRGL (statement of recognised gains and losses), IAS19 adopted a smoothing approach known as the 'corridor', which applied to actuarial gains and losses amounting to less than 10% of total pension assets or liabilities. Items falling within the corridor do not have to be reported in either the profit and loss account or the balance sheet pension obligation, and do not have to be revealed in the notes to the accounts. Items outside the corridor are reported in the profit and loss account and balance sheet but their recognition can be spread over the expected service lives of the current scheme members. Not surprisingly, many entities choose to spread the gains and losses.

3.5 MOVING AHEAD TOGETHER

The ASB was convinced that its approach was preferable and the IASB project to revise IAS19 identified the corridor method as the main issue under consideration. Furthermore, international accounting standards were to be adopted by EU companies from 2005 onwards, so IAS19 would become applicable to UK companies, in place of FRS17, from that date. Other significant issues to be addressed by the IASB were the definition of the asset ceiling and the estimation of the expected return on plan assets.

The amendment to IAS19 was issued by the IASB in December 2004 and allowed the option of recognising actuarial gains and losses in full in the period in which they occur, outside the profit and loss account, in a statement of recognised income and expense. This option is similar to the requirements of FRS17. In announcing the

amendment, Sir David Tweedie, IASB chairman, stated:

> *Pension costs are one of the most complex and obscure areas of accounting. The amendment issued today allows entities to choose a simpler, more transparent method of accounting than is currently adopted at present. I hope that many entities will take the opportunity of improving their financial reporting in this way.*

FRS17 itself was also amended by the ASB in January 2007 to align more closely with IAS19. The amendments, effective for accounting periods commencing on or after 6 April 2007, were largely disclosure-related, except for requiring that quoted securities be valued at bid, rather than mid-market, value. The disclosure changes introduced the requirement for a number of additional disclosures while removing that for a number of redundant disclosures. One of the most significant additions was that of the 'principal actuarial assumptions', rather than the 'main financial assumptions', as previously required. In particular, this would include the mortality assumptions that have become regarded as one of the most significant variables in the valuation of pension liabilities. Among other changes was the required disclosure to show separately any movements in scheme assets and liabilities, rather than simply showing a reconciliation of the surplus or deficit.

3.6 INTERESTING TIMES AHEAD

The most recent accounting standard development concerns the treatment of scheme surpluses. As of August 2009, a significant proportion of schemes are in surplus, albeit perhaps temporarily, so the issuance of IFRIC14 may be timely. Currently, under IAS19, a limit is placed on the amount of pension surplus that can be included as an asset on the company's balance sheet. This limit equates to what can be returned to the company by way of refunds or reductions in future contributions. IFRIC14 makes it clear that, for a refund to be included on the balance sheet, companies must have either an 'unconditional right' to the refund or have 'sufficient scope to reduce future contributions'. This means that the company must be entitled to the refund with the necessary consent of a third party, for example trustees. For companies accounting under FRS17, different rules apply, such that the surplus recognised is restricted to the amounts of refunds or reductions in future contributions that have already been agreed between the company and trustees. The implementation of IFRIC14 is effective for financial periods beginning on or after 1 January 2008.

The pace of change in the measurement, and particularly the disclosure, of DB pension schemes is unlikely to relent in the foreseeable future. In July 2006 the IASB, in response to requests from investors and other financial reporting constituents, decided to add two projects concerned with post-employment benefits to its technical agenda. The first project would aim at a targeted series of improvements to IAS19, to be completed by 2010. It would focus on removing the 'add-ons' to the basic model, in particular the smoothing and deferral mechanisms, such as the corridor, the assumed rate of return on plan assets, and the recognition of gains and losses. It would also reconsider the definition of defined-benefit and defined-contribution plans, with special attention directed towards cash balance plans. The second project would be a comprehensive review and revision of the existing pension accounting model, to be undertaken in conjunction with the FASB. The FASB is also undertaking a two-phase post-retirement-benefits project. Although the timing and scope of the first phases may differ, the two boards are committed to arriving at a common approach by the end of the second phase.

Finally, the ASB began a research project into accounting for pensions in October 2005, which is reconsidering the basic principles of pensions accounting. The project is considering, inter alia, the actuarial method to be adopted in valuing liabilities, the expected rate of return, the impact of the PPF on financial reporting, and the adequacy of current disclosure requirements.

Discussion papers were circulated for both the ASB and IASB projects. The former project, carried out on behalf of EFRAG as part of its Proactive Accounting Activities in Europe initiative (PAAinE 2008), closed for comment with 90 responses being received, while the IASB discussion paper remained open for comment until September 2008. One of the main proposals of the ASB project was the valuation of scheme liabilities at a risk-free (gilt) rate rather than a corporate bond rate. Concerns have been expressed that this would significantly affect scheme liabilities and hence deficits and thereby further jeopardise the already uncertain future of remaining defined-benefit schemes.

3.7 COMMENTS FROM KEY STAKEHOLDERS

A key component of the research project was semi-structured interviews with industry experts, including scheme actuaries, finance directors, academics and independent pension trustees.

There was a broad consensus among the interviewees on the current position of accounting disclosure requirements, as reflected in the following extracts from the interviews. The general view is that a consistency now exists across companies and the situation has dramatically improved during recent years but some argue there is still a degree of 'opaqueness' in certain areas. There were a few controversial opinions regarding the impact of accounting disclosures on the decline in DB schemes and the volatility that they have introduced to company balance sheets.

Box 3.1: Comments on accounting disclosure

One of the major strengths is that disclosure is pretty consistent across all companies. (Scheme actuary)

I think, in terms of IFRS, the weakness used to lie in terms of not disclosing the split of investments and that has now been changed. (Academic)

One of the main weaknesses is that cash flow requirements are not disclosed…they just detail the funding position at a set date, they don't show what the business is paying towards the trustees' deficit, there is no reference in there to say the accounting deficit may be X but the trustee funding deficit is Y and this what the cash flow is being paid against. (Accountant)

In terms of weakness, accounting disclosure isn't completely transparent as you don't get all assumptions disclosed, only partially, so a little bit opaque. (Academic)

We're miles ahead of where we were 10 years ago [but] *it is sometimes hard to distinguish between the accounting standards and the accounting disclosures.* (Finance director)

SSAP24 was pretty rubbish really and far too easily manipulated or ignored but obviously that started the ball rolling, it started people at least thinking about pensions in a more sensible way, from a company point of view. (Accountant)

The actuarial profession didn't challenge David Tweedie and the ASB strongly enough, didn't challenge the government strongly enough in terms of attacks on pension schemes…the short-term measures, the focus on market-based valuations, the focus on accounting standards when the results were not very nice in 2002/3 encouraged employers to do away with the benefits. (Scheme actuary)

4. Actuarial assumptions

4.1 INTRODUCTION

The accounting regulators have focused primarily upon the appropriate information to disclose concerning the DB pension scheme. Nonetheless, the task of valuing scheme assets and, particularly, scheme liabilities has largely been the responsibility of the actuarial profession. The latter, it has been suggested, was initiated by mathematicians who were challenged by the problems of providing the increasing risk of life assurance with increasing age, at a time when the moneyed classes were concerned with dying too soon. Later, and more particularly in the twentieth century, the weight of interest changed and the now much wider 'moneyed classes' realised that their problem was much more one of living too long than dying too soon. Hence the switch of interest to pensions.

Actuarial techniques of the 1950s valued scheme assets and liabilities with reference to the long-term performance of the asset classes in which the pension portfolio was invested, rather than the change in the value of actual securities held by the pension fund. In addition, the emergence of inflation in the 1950s resulted in a significantly equity-oriented investment policy. Inflation eroded the pensioners' retirement income and initiated claims for discretionary increases to protect real values. The role of the actuary consisted of assessing how much of the sponsor's capital needed to be committed to allow for the discretionary increases. In addition, the trend towards equity investment required actuarial valuation to be attentive to the investment logic used by the pension fund manager.

The actuarial profession remained largely self-regulatory and issued guidance notes (GNs) to members relating primarily to pensions and insurance advice. The complex, predominantly mathematical, activities undertaken by actuaries meant that few outside the profession itself understood the processes from which actuarial advice was derived. The predictable universe of the actuarial profession was, however, eventually unsettled by the uncertainties of the real world.

The role of the actuary came under closer scrutiny following the near collapse of the UK's oldest life insurer, Equitable Life. In 1999 the company found itself unable to pay promised bonuses to some of its policyholders and gained court approval for the cuts. Upon appeal the Court of Appeal reversed the decision, however, and the House of Lords turned down a counter-appeal from Equitable Life. The company found itself unable to pay the bonuses and put itself up for sale; eventually Halifax bought part of the business and injected some funds. Equitable Life still exists today but policyholders suffered severe cuts in bonuses and high exit charges.

A government enquiry led by Lord Penrose singled out the actuarial profession for severe criticism and this led to the Morris Review of the actuarial profession in 2004. The Morris Review recommended (Morris 2005) the introduction of a new regime of independent oversight of the profession to be exercised by the Financial Reporting Council. This was to include the formation of a new actuarial standards board, oversight of compliance with technical and ethical standards and clearer lines of accountability from actuaries to regulators, to the profession and to clients and employers.

4.2 GUIDANCE NOTES

The basis for guidance for the actuarial profession was provided by a series of guidance notes, which established recommended practice for various aspects of pensions and insurance advice. To some extent, these paralleled the developments in the disclosure requirements then being implemented by the accounting profession, for example GN17 (Accounting for Pension Costs under SSAP24) and GN36 (Accounting for Retirement Benefits under FRS17). Other guidance notes were issued relating to other aspects of pensions advice that were more specific to the actuary, such as scheme funding (GN9 and GN49), transfer values (GN11) and scheme winding-up (GN19).

SSAP24 required that actuarial calculations of pension cost and other figures disclosed should be made in accordance with the stated accounting principles. The role of the actuary was to consult with the company, taking into account its circumstances and workforce, to settle the principles and assumptions to be followed and to calculate the required figures. The client in this respect is the company, not the trustee of the pension scheme. SSAP24 requires disclosure of the pension cost charge for the period, which should normally be equated to the standard contribution rate as defined in GN26 (Pension Fund Terminology), and this would be subject to recalculation at every actuarial valuation. GN17 discusses a number of actuarial methods developed in response to the varying circumstances of individual schemes. These included the projected unit credit method (PUC) and the attained age method. The former calculates the contribution rate as the rate appropriate for current active members over the year following the date of the valuation. The attained age method, in contrast, allows for the ageing of the workforce by settling the contribution rate at the average level appropriate over the future working life of the active membership.

The selection of the actuarial assumptions to be used in assessing pension cost for SSAP24 purposes is a matter of judgement for the actuary in consultation with the client. The actuarial methods and assumptions taken together should be compatible and lead to the actuary's best estimate of the cost of providing the benefits promised. SSAP24 does not, however, require the actuary to make best estimates of the financial and demographic factors taken separately.

GN36 concentrates on accounting for a funded DB pension scheme whereas FRS17 encapsulates a wider range of employee benefits (GN21 refers to post-retirement medical plans). The assumptions used for the valuation of the liabilities are ultimately the responsibility

of the employer's directors, who should have regard to the advice provided by the actuary. The assumptions underlying the valuation should be mutually compatible and reflect a best estimate of likely future experience. A full actuarial valuation is normally carried out on a triennial basis and would not normally be available when the FRS17 estimates are required. The actuary should therefore advise the employer on those aspects of the valuation that may mean that the FRS17 figures differ materially from those produced by a full actuarial valuation.

4.3 THE ACTUARIAL ASSUMPTIONS

The valuation basis is the term given to the assumptions that underlie the actuary's calculations. The basis of valuation can be considered in two main sections, namely the economic assumptions and the demographic assumptions.

4.3.1 Economic assumptions

For the purposes of valuation, assumptions will be required about:

- the rate of inflation
- the rate of wage inflation
- the rate of pension increase
- the return available on investments
- the discount rate.

Some of these assumptions will depend on the specific scheme while others will be determined by wider economic factors. The objective of making the assumptions is to prepare a framework for funding the scheme. It should be remembered that assumptions are not estimates and will almost always be incorrect, thereby resulting in scheme surpluses or deficits. Perhaps the key economic assumption is that of the rate of return on investments. It is standard practice for actuaries to assume a low risk : return ratio (based on bond/gilt yields) for liabilities in retirement but a higher rate prior to retirement.

A key component of the research project was semi-structured interviews with industry experts, including scheme actuaries, finance directors, academics and independent pension trustees. In Box 4.1 are a range of viewpoints regarding the economic assumptions, whereas in Box 4.2 mortality assumptions are the main focus.

Box 4.1: Economic assumptions

We are now called [on to be] *far more precise regarding our assumptions. There was a time 10 or 15 years ago whereby actuarial assumptions were the actuary's assumptions and nobody said boo to them. They were a bit finger in the air, they felt about right, they felt on the cautious side of things and that was OK. Whereas now we are far more* [often] *going through each of the assumptions and actually assessing 'are they best estimate?', 'are they prudent or not prudent?', and so on. So we are being asked in a way to be far more technical about the way we approach actuarial valuations.* (Scheme actuary)

I'm not a complete convert but I can see the financial economist's view that any valuation of liabilities should be based upon a risk-free discount rate. And therefore it makes schemes more easily comparable, it makes a clearer view about what you are trying to do and it means that you are not taking credit now for future investment returns that may or may not turn up. However, I am a pragmatist and I realise that this is completely unpalatable for the majority of companies and probably trustees out there. So I'll be honest that in the pension schemes that I'm doing valuations for now – and in the past that includes some very large pension schemes – there is only one case where I have used a risk-free gilt-based discount rate and in the others I'm making some allowance for future investment returns. (Scheme actuary)

My own preference is that when you are working out the technical provision,...when you are deciding whether there is a surplus or deficit on your balance sheet, that you should be on the prudent side and obviously that is what the regulator is saying as well, and I'm more relaxed about allowing for investment out-performance when you are working out the recovery plan, so the way in which that deficit is going to be paid off and that is my own preference, but I know that some actuaries don't hold with that at all. (Scheme actuary)

So I think the most crucial assumptions and the ones we are spending the most time talking about are the discount rates and the mortality assumptions. Things like rates of early retirement, withdrawal rates, some of the other demographics, frankly are all fiddling around the edges, for most schemes. (Finance director)

So your discount rate should reflect your investment strategy. Now of course there will be variation in the extent to which you allow for equity out-performance and that could probably be manipulated. Some people might assume 2% in excess of a gilt return whereas others might assume 4% so what you are going to get out of equity is an area for manipulation and difference of opinion. (Scheme actuary)

The equity out-performance assumption is the only judgemental one where the actuary has to hang his hat on something which will affect the results. (Scheme actuary)

4.3.2 Demographic assumptions

These assumptions relate to the membership of the scheme and include:

- mortality rates for both in-service and retired members
- the proportion of members who withdraw before retirement
- the proportion of members retiring at each age
- the proportion of members who will leave a partner who is entitled to a spouse's pension, and the age of that partner.

The demographic assumption that is currently receiving most publicity and scrutiny is the mortality assumption. Over recent years there has been a noticeable increase in longevity, which can have a significant impact on the magnitude of scheme liabilities. It has been estimated that life expectancy has recently been improving at the rate of two years per decade.

A further factor which may influence the scheme liabilities is the proportion of scheme members who opt for cash commutation at retirement, that is, who sacrifice future pension for a cash sum. The potential significance of this factor has recently increased following new legislation, implemented on A Day, which allows a higher tax-free cash sum to be taken at retirement. The terms of commutation are typically less generous than the income forgone so if significant numbers take up this option then the reduction in scheme liabilities could be material.

Box 4.2 Mortality assumption

Mortality is a bit like putting your finger in the air (Finance director)

One [assumption] *is mortality…not because it is the most important assumption…but the reality of it is that most pension schemes, all but the very biggest, have no scheme-specific evidence on which to base their own assumptions.* (Scheme actuary)

The changes in mortality that they are talking about now [are] *postcode type mortality – I think they are really only tweaks to the mortality that they have at the moment.* (Trustee)

A few years ago they had this enormous jump where they just came out with generational mortality tables instead of the previous ones, which were the 1992 series, and at that point everyone's liabilities jumped by 10 to 15% overnight but since then they are kind of there with the mortality tables. There is still a lot of research going on in mortality… mortality always changes…but they are almost there. (Independent trustee)

I think everybody now will be using generational mortality tables…there is still a bit of judgement in whether actuaries want to use medium cohort or long cohort or short cohort. The liabilities would change 1 to 2% in the short-to-medium [term] *and then again from medium-to-long* [term]. *Most actuaries* [take the] *medium* [term]. *I have only seen one case where actuaries have asked us to look at the short cohort and see what the impact is.* (Scheme actuary)

Mortality is the bit where you are most likely to end up with uniformity albeit you are required to make a judgement on mortality for your particular scheme population. (Scheme actuary)

There is scope for a lot of variation in current mortality to reflect occupation and socio-economic class. There is little argument against standardising the allowance for future improvements in mortality (or at least specifying a minimum rate of improvement (eg the long cohort projections). (Trustee)

Nobody knows, anybody's guess is as good as anybody else's in terms of future rates of improvement. (Finance director)

Because of the Regulator there is going to be a default towards long cohort, which ratchets up liability and discourages employers from continuing accruals. (Academic)

The mortality assumption is an important one but is a default to some sort of standard table…and all the other [demographic] *assumptions are third order and marginal.* (Finance director)

A situation we have come up against recently is that of a push back from the auditors of the mortality assumptions because what might be used for funding may not be appropriate for accountants as a best estimate. (Scheme actuary)

4.4 THE SIGNIFICANCE OF THE ASSUMPTIONS

Clearly, when an actuarial valuation is carried out, reliance is placed upon a specific set of economic and demographic assumptions. An obvious question arises concerning the sensitivity of the reported pension surplus or deficit to changes in the individual assumptions. It is, however, important to recognise that changing the valuation assumptions does not alter the actual position of the scheme itself. In decreasing order of significance, we shall consider the potential impact of a number of different variables, not all of which are currently prescribed under existing disclosure requirements.

4.4.1 Mortality/longevity

The choice of mortality table used to value the scheme liabilities can make a huge difference to the liabilities themselves and can also affect the profit and loss account through the service cost. Despite this obvious significance, FRS17 did not require a mortality assumption to be disclosed, although IAS19 requires all material assumptions, of which mortality is clearly one, to be shown. Indeed Lane, Clark and Peacock (2007) note a marked improvement in disclosure levels of expectations of future life expectancy. Of the 93 FTSE100 companies with defined-benefit schemes, 76 disclosed a meaningful mortality assumption for the year studied, in contrast with a small minority two years previously.

Although disclosure levels on mortality have clearly improved, there remains more concern about a widespread tendency to underestimate length of life as a result of medical, lifestyle and other improvements. Such concern is illustrated by the following observation by David Norgrove at the UK Pensions Summit: 'The effects of changing life expectancy are so substantial that they are worth revisiting. Each year of extra life adds 3% to 4% to pension liabilities so, with £800 billion of liabilities across all UK pension schemes, getting it wrong could mean nasty surprises in the future' (Norgrove 2006).

Surveys of mortality disclosures tend to reveal both a wide range of assumptions and a tendency not to account fully for future improvements in mortality and life expectancy. Punter Southall (2006) examine the range of mortality assumptions used by FTSE100 companies as at 31 December 2005 and show a difference of more than five years in life expectancy at age 65, which equates to a potential 20% difference in liabilities. In their annual survey of actuarial assumptions for 2006, PricewaterhouseCoopers (2007) suggest that longevity assumptions can increase or reduce liabilities by as much as 15%. They also report, however, that average assumptions regarding life expectancy had increased by one year since the previous survey, thereby adding approximately 7% to the calculated cost of pensions. This would suggest that companies are in the process of updating their longevity assumptions in line with recent trends. Hymans Robertson (2007) reveal that FTSE350 companies use life expectancies ranging from 82 to 88 years for males currently aged 65. This would again equate to a difference in pension liabilities of around 20% between the bottom and top of the range. Finally, Pension Capital Strategies (2008) quote a similar range of assumptions for FTSE100 companies but also suggest variations across different industries and, interestingly, by size of pension.

Current life expectancy is, however, only part of the equation. The other key factor is the rate at which life expectancy is improving and whether the current rate of improvement will continue in the future. The current rate of improvement is in the region of two years per decade but companies are anticipating, on average, that life expectancy will increase by only 1.3 years in the next two decades (Pension Capital Strategies 2008)). If current trends do continue then future pension shocks may be in the pipeline. Longevity is currently under further scrutiny from both the recently introduced Board of Actuarial Standards and the Pensions Regulator. The former published a consultation paper in March 2008 inviting comment by June 2008. Paul Seymour, Chairman of the BAS, commented:

> *One of the BAS's goals is that decisions should be based on sound and defensible assumptions. This Discussion Paper has set out to explore the complex issues involved in making mortality assumptions and to discuss the part that technical actuarial standards might play in achieving this goal.*

He went on to emphasise the importance of the consultation for pension schemes and insurance companies:

> *We need to hear from the pension scheme trustees and insurance company directors who necessarily make decisions based on assumptions about mortality. They need information which can assist them to understand risks. Actuaries providing advice must focus on how best to communicate the choices to be made, the uncertainty surrounding them and their implications.* (BAS 2008)

The Pensions Regulator issued a consultation document in February 2008 seeking views on how it expects pension schemes to take account of future improvements in longevity. This had suggested introducing changes applying to valuations due from March 2007. Commenting on the change, David Norgrove, chairman of the Regulator, said:

> *The consultation has proved to be extremely useful. In order to ensure that we have the time to fully consider all of the responses, and to clarify that the original proposed date of introduction did not mean that schemes needed to restart valuation processes that had already begun, we have decided that any changes will be introduced from the start of the next valuation cycle. This will impact valuation dates from September 2008, with any necessary recovery plans due up to 15 months later in December 2009.*

More than 80 responses were received as part of the consultation, which the Regulator is considering carefully before reaching a conclusion on the best way forward. The Regulator expects to publish a full response to the consultation and the final version of its new approach later in the summer.

4.4.2 Rate of inflation and volatility of inflation

The theoretical market expectations of inflation at each duration can be derived by comparing the yield on fixed interest gilts with that for index-linked gilts. It has been suggested that the rate on index-linked gilts may be artificially low owing to excessive demand from pension schemes, and consequently an adjustment to the theoretical rate may be justified. On surveying FTSE100 and FT250 companies, Punter Southall (2006) find a range between 2.5% and 3% in disclosures. They also estimate that a reduction of 0.5% in the assumed inflation rate could reduce liabilities by approximately 15%.

The impact of inflation volatility is not as significant as inflation itself but nevertheless can exert an impact upon the magnitude of liabilities. When the rate of inflation is comparatively low, as currently, then a high assumption regarding the volatility of inflation can lead to reduced pension increase assumptions. More specifically, if pensions increase at inflation rate up to a maximum of 5% per annum then higher volatility would suggest that the increase is capped more often. In turn this would lead to a lower assumption regarding pension increases. In contrast to the sensitivity of liabilities to inflation itself, the impact of volatility is likely to be of the magnitude of 10% of liabilities.

4.4.3 Discount rate

The accounting rules prescribed by FRS17 and IAS19 result in the calculation of accounting disclosures on the basis that future investment returns on scheme assets will equate to those of AA-rated corporate bonds of appropriate duration. PricewaterhouseCoopers (2007) suggest that in the calculation of liabilities, pension schemes assume much higher investment returns for the period up to retirement, closer to the return on BBB-rated bonds. For the period after retirement, the investment rates assumed tend to be lower, and in most cases close to AA- or AAA-rated bonds. Punter Southall (2006) report a range of assumptions for FTSE100 companies of 4.7–4.9%, with more flexibility shown by FT250 companies, which have a range of 4.6–5.3%. They also suggest that an increase in the discount rate of 0.2% could reduce liabilities by as much as 5%.

4.4.4 Salary increases

The impact of salary increases depends to a significant degree upon the maturity of the individual scheme under consideration, since it applies only to active members. The salary increase assumption tends to be expressed in real terms and Punter Southall (2006) reveal assumptions ranging from inflation plus 0.05% to inflation plus 2.5%. In addition, their estimates suggest that a decrease in salary inflation of 0.5% would lower liabilities by a corresponding 4%.

4.4.5 Return on assets

The assumed return on equities does not affect the liabilities of the scheme but instead affects the profit and loss entry through its impact upon the net interest charge. More specifically, a higher assumption will lead to a reduction in the net interest charge. If the assumed returns do not materialise then the impact will flow through the statement of recognised gains and losses in the following year. Punter Southall (2006) report a range of disclosures by FTSE100 companies from 6.95% to 8.3%, and again FTSE250 companies exhibit more flexibility, with a range of 6.0% to 8.8%.

4.4.6 Other assumptions

Other variables that can affect the liabilities estimate include early retirement, cash commutation and scheme expenses. Of these, early retirement is suggested as having the most significance, with Punter Southall (2006) suggesting that allowing for a reasonable level of early retirement could reduce total liabilities by around 5%.

The impact of cash commutation is forecast to increase following legislative changes after A day, which permit higher cash lump sums to be taken. The terms of commutation vary enormously and PricewaterhouseCoopers (2007) report that, to date, only 36% of schemes actually reflect commutation in their funding assumptions. The potential impact of commutation has been estimated (Punter Southall 2006) at 1.5% of liabilities for a scheme with a commutation basis that is 10% less generous than the accounting basis.

Scheme expenses can currently be accounted for in a variety of different ways under FRS17 or IAS19. Perhaps the most significant expense is that of the PPF (Pension Protection Fund) Levy. Punter Southall (2007) suggest that a trend towards capitalising such expenses is likely in future, and this will further worsen any deficit arising.

4.5 SCHEME TERMS

Finally, the Association of British Insurers (2007) has researched the potential impact of the continuing alterations in scheme terms implemented by companies. These include increases in the contribution rates for both employers and employees, changes in the retirement age, accrual rates and date of indexation, and moving from a final salary basis to some alternative such as average salary. They simulate the impact upon a representative defined-benefit pension scheme (see Table 4.1 below).

Table 4.1: Defined-benefit scheme simulation

	Base case	Parameter being changed in the alternative case					
		Age	Accruals	Index.	Contrib.	Contrib.	Salary
Parameters							
Retirement age	60 years	**65 years**	60 years	60 years	60 years	60 years	60 years
Accrual rate	1/80th	1/80th	**1/90th**	1/80th	1/80th	1/80th	1/80th
Indexation from	1988	1988	1988	**2000**	1988	1988	1988
Employer's contribution	6%	6%	6%	6%	**3%**	6%	6%
Employee's contribution	6%	6%	6%	6%	6%	**9%**	6%
Pensionable salary	Final	Final	Final	Final	Final	Final	**Last 10 years**
Outcomes							
FRS 17 deficit	£23m	£8m	£22m	£4m	£23m	£23m	£9m
Pension liability	£74m	£59m	£73m	£55m	£74m	£74m	£60m
PV contributions	£10m	£10m	£10m	£10m	£8m	£13m	£10m
Funding ratio	80%	106%	81%	114%	77%	83%	102%
Maturity	2.2%	1.7%	2.2%	2.6%	2.2%	2.2%	2.7%
Duration	21	22	20	20	21	21	19
Funding gap vanishes in	2025	2006	2023	2006	2029	2021	2006

Source: ABI 2007.

5. Pension risk and equity markets

5.1 INTRODUCTION

Black (1980) emphasises that a firm's pension fund is legally separate from the firm but, because pension benefits are normally independent of fund performance, pension assets affect the firm as though they were firm assets. Accepting this viewpoint, we explore, from an econometric perspective, whether pension plan risk is reflected in equity risk. If it is, this implies that equity markets are informationally efficient. On the other hand, if pension risk is not accurately reflected, markets may be viewed as informationally inefficient resulting in the underestimation of risk and the consequent overvaluation of firms.

A priori, a number of arguments can be put forward as to why UK markets may not be informationally efficient. First (as detailed in Chapter 3). pension accounting has, at least in the past, been somewhat opaque. Secondly, there is a lack of consistency in the actuarial assumptions used in the calculation of pension plan funding (see Chapter 4). Thirdly, the role of the Pension Protection Fund, as a guarantor of pension benefits, may cloud the relationship between the risk of the pension plan and equity risk.

The analysis is undertaken for FTSE100 companies that have in place DB pension plans (in 2006, 92 FTSE100 companies operated such schemes) and is carried out within a panel framework for the years 2002 to 2006. This period was one in which many DB schemes were in deficit,[1] the Pension Protection Fund was introduced and there was a drive for greater clarity and harmonisation in accounting rules and actuarial assumptions in pension reporting and calculation.

5.2 PENSION PLAN FUNDING AND CORPORATE EQUITY

Feldstein and Seligman's study (1981) was one of the first to explore the effect of a firm's pension deficit on its share price. Using a sample of 200 US firms, this study shows that a deficit is rapidly incorporated into the share price. This suggests that the unfunded pension liability is being recognised by shareholders as equivalent to corporate debt. Feldstein and Morck (1983) also explore how unfunded pension obligations affect the market values of firms. Firms appear to choose the interest rate they use in discounting future benefit obligations so as to balance the tax advantages of a low rate against the more healthy looking annual reports a high rate allows. Investors seem to penetrate this ruse and value firms as if obligations were figured at a standard rate. The authors therefore conclude that pension liabilities are overemphasised by the market, and that there is also some evidence that pension assets are undervalued. Bulow et al. (1987), using a variable-effect event study methodology, conclude that unfunded pension liabilities are accurately reflected in lower share prices. Aldersen and Chen (1987) find that companies that recover a pension plan surplus generally experience an abnormal rise in the share price. The authors argue that this is consistent with what they term the 'separation hypothesis', that is, pension assets and liabilities are separate from those of the company. Jin et al. (2006) examine whether the systematic equity risk of 4,500 US firms over the years 1993 to 1998 reflected the risk of their pension plan. The authors find that equity betas of firms do appear to reflect the betas of their pension assets and liabilities accurately, which would support the hypothesis of market efficiency. In addition, they find that cost-of-capital calculations, used widely in corporate finance, do not distinguish between the operating-asset risk and pension plan risk. Franzoni and Marin (2006), considering 36,651 company-years between 1980 and 2002, find that the market significantly overvalues firms with severely underfunded pension plans. These companies earn lower raw and risk-adjusted stock returns than firms with healthier pension plans for at least five years after the first emergence of the underfunding. The authors reason that the lower returns arise because investors are systematically surprised by the negative impact of the pension underfunding on earnings and cash flows. In addition, Franzoni and Marin find that underfunded firms tend to have poor operating performance, although they are 'value' companies.

5.3 DATA OVERVIEW

The data are drawn from a number of sources – Worldscope Database, annual reports of FTSE companies and London Business School (LBS) Risk Management Service. The analysis is carried out for those FTSE100 companies that operate a DB pension plan, and within a panel framework covering the period 2002 to 2006. Before 2002 few companies provided details of their DB schemes in their annual accounts. (Although FRS17 was introduced in November 2000 it was not until year-end 2002 that its impact reached most balance sheets.)

The hypothesis to be tested is that a higher pension plan risk translates into higher overall firm-equity risk. The initial issue to be considered is the measurement of the dependent variable.

1. Lane, Clark and Peacock (2007), calculate the following mid-year pension funding deficits for FTSE100 companies: 2006, £36bn; 2005, £37bn; 2004, £42bn; 2003, £55bn; 2002, £25bn.

Three alternative measures are considered. The first, and theoretically most appropriate, is that of capital structure risk and is defined as:

Equation 5.1

Capital structure risk =

$$\beta_{E+D} = \beta_E \frac{Equity[E]}{E + Debt[D]} + \beta_D \frac{D}{E + D}$$

The equity beta β_E is taken from the LBS Risk Management Service. For a small number of companies β_E was not available from this source and consequently we estimated β_E using five years of daily data and employing the Dimson (1979) adjustment with one lag and no lead to control for nonsynchronous trading.[2] Following Jin et al. (2006) a value of 0.175 was taken as the beta value for debt β_D.

To test the robustness of our empirical results we also consider findings based on two alternative measures of the dependent variable – systematic risk and the variance of returns:

Equation 5.2

Systematic risk = β_E

Equation 5.3

Variance of total return = σ_R^2

In Table 5.1 a profile is presented of the equity risk characteristics of the companies in the sample. The data reveal a relatively tight equity-risk spread.

Table 5.1: Measures of equity risk

Variable		Mean	Std Dev.	Q1	Median	Q3
Equity beta	β_E	0.9663	0.3972	0.6575	0.9400	1.2625
Capital structure risk	$\beta_E\,(E/E+D) + \beta_D\,(D/E+D)$	0.7086	0.3189	0.4477	0.6849	0.9230
Return variability (%)	σ_R^2	29.61	8.62	23.00	29.00	35.00

The key independent variable is pension plan risk. We use three alternative measures. These are:

Equation 5.4

Pension Risk (PR_1) =

$$\frac{Pension\ Liabilities\ [PL]}{E+D}$$

Equation 5.5

Pension Risk (PR_2) =

$$\frac{Pension\ Assets\ [PA] - PL}{E+D}$$

Equation 5.6

Pension Risk (PR_3) =

$$\frac{\beta_{PA} PA}{E + D} - \frac{\beta_{PL} PL}{E + D}$$

2. Using this procedure we estimated for some firms for which data were already provided by the LBS Risk Management Service. Both sets of estimates were very similar.

The first measure is guided by the work of Cardinale (2007), who suggests that UK bond market prices reflect corporate pension liabilities and that what is important is the absolute size of liabilities and not pension deficits. The second is a version of that used by Franzoni and Marin (2006), with the emphasis in this instance on whether the pension fund is in deficit or surplus. The third measure is that used by Jin et al. (2006) and links directly to our key measure of equity risk, capital structure risk (equation 5.1). Pension liabilities are taken as reported in terms of FRS17/IAS19 and are the projected benefit obligation, which represents the actuarial present value of vested and non-vested benefits earned by an employee for service rendered to date, plus projected benefits attributable to salary increase. The pension assets are represented by the contributions made by the sponsoring firm over the life of the defined-benefit scheme. These contributions tend to be invested in traded assets and are valued at their market prices. In the Jin at al. (2006) measure of pension risk, the pension assets and liabilities are weighted by average systematic risk exposure. The systematic risk exposure from pension plan assets average β_{PA} is measured by making certain assumptions about the beta risk of the various categories of assets (equity, bonds, property, cash and other).

In Table 5.2 we provide summary data for the pension plan asset[3] allocations for the sample companies plus the assumed β for the various classes.[4] It is clear from the asset allocations in Table 5.2 that there has been a rebalancing of pension plan assets away from equity and towards debt. This may be explained by the fact that recent legislative changes have clarified that pension liabilities are a form of corporate debt and that available evidence suggests that mismatched investment strategies in pension schemes reduce shareholder value.[5] With regard to the systematic risk of pension liabilities β_{PL} we adopt a similar approach to that followed by Jin et al. (2006), although in this instance UK bond data are used. Monthly closing prices for a 30-year UK treasury bond and the FTSE All-share index were employed in a market model regression to estimate a value for β_{PL}. Using the in-sample estimate of 60 months' data (ie the 60 months from 2002 to 2006), the pension liability is β_{PL} = 0.38. Also calculated were five yearly estimates using 60 months' rolling data up until the end of the prior years. The average of these yearly estimates from 2002 to 2006 is β_{PL} = 0.28. In the empirical analysis we report findings on the basis of these two values and it will be noted that our findings are quite sensitive to the chosen value of pension liability systematic risk.

Although findings for univariate specifications between the various measures of pension and firm risk are presented, it is important to assess whether the pension risk variable is merely a surrogate for other variables that might affect firm risk. There are a plethora of studies exploring the equity risk of firms and consequently an equally large number of control variables that are viewed as important. Young et al. (1991) suggest that liquidity and capital intensiveness are of importance. Chan et al. (2001) argue that research and development and advertising expenditure have a systematic impact upon stock returns. Rosett (2001) highlights the importance of leverage, while a majority of studies point to the importance of firm size, profitability and growth (see, for example, Gombola and Ketz 1983). Data for a small number of these variables were not available, notably research and development and advertising expenditure, while others, such as liquidity and capital intensiveness, did not prove significant.

In Table 5.3 we present a profile of all the explanatory variables that have proved to be of importance. A correlation matrix is also detailed. A key feature of this correlation matrix is that it highlights that the various measures of pension risk are strongly correlated.

3. The Jin et al. (2006) measure of pension risk, which takes account of the structure of the firm's pension assets, may be viewed as particularly appropriate because firms have recently changed their pension asset allocation in an attempt to alter the pension plan risk profile (see Table 5.2).

4. The various values of β draw from work undertaken by the Harvard Management Company (see Light 2001).

5. The move from equity to bonds might have been expected to have reversed after 2004 and the establishment of the Pension Protection Fund, with companies shifting to equity because they would benefit from the upside potential and would be able to pass downside risk to the protection fund. (The Pension Protection Fund essentially provides the sponsoring firm with a put option that can be exercised in the event of sponsoring plan failure.) That this has not occurred may reflect the design of the scheme, where premiums levied are a function of pension deficit level and the insolvency risk of the sponsoring company.

Table 5.2: Asset allocation

Variable	2002	2003	2004	2005	2006	Assumed asset-class beta
No. of firms	52	89	91	92	92	–
Equities (%)	59.83	59.50	56.94	57.60	54.73	1.000
Bonds (%)	30.52	30.63	32.44	32.82	35.32	0.175
Property (%)	3.36	2.39	2.48	3.07	3.74	0.150
Other (%)	6.30	7.48	8.14	6.51	6.20	0.006
Total pension fund assets (£bn)	195.44	294.13	326.71	381.07	419.96	–
Pension assets / market cap	21.88	24.33	24.26	23.95	24.51	–

Table 5.3: Explanatory variables

Variable	Calculation	Mean	Std Dev	Q1	Median	Q3
Pension Risk (1) PR_1	$\frac{Pension\ Liabilities\ [PL]}{E+D}$	0.4308	0.7622	0.0860	0.2121	0.4412
Pension Risk (2) PR_2	$\frac{Pension\ Assets\ [PA]-PL}{E+D}$	–0.0382	0.0715	–0.0402	–0.0172	–0.0045
Pension Risk (3) PR_3 (β_{PL}= 0.28)	$\frac{\beta_{PA}PA}{E+D}-\frac{\beta_{PL}PL}{E+D}$	0.0589	0.0836	0.0097	0.0299	0.0767
Pension Risk (3) PR_3 (β_{PL}= 0.38)	$\frac{\beta_{PA}PA}{E+D}-\frac{\beta_{PL}PL}{E+D}$	0.0336	0.0637	0.0045	0.0180	0.0471
Financial Leverage (FL)	$\frac{Delta}{Total\ Assets}$	26.4425	15.3687	15.7560	25.9807	36.8275
Growth Rate (GR)	$Log\left(\frac{Delta}{Total\ Assets}\right)$	0.0358	0.1345	–0.0111	0.0289	0.0612
Return on Investment (ROI)	$\frac{Net\ Income}{Total\ Assets}$	0.0515	0.0563	0.0082	0.0403	0.0749
Firm Size (FS)	$Log\ (Total\ Assets)$	4.1281	0.6806	3.6823	3.9557	4.4057

Correlation matrix

	PR_1	PR_2	PR_3 β_{PL}=0.28	PR_3 β_{PL}=0.38	FL	GR	ROI	FS	Beta	FR	Var
PR_1	1.0000										
PR_2	–0.8141	1.0000									
PR_3 β_{PL}=0.28	0.7473	–0.7179	1.0000								
PR_3 β_{PL}=0.38	0.4485	–0.4565	0.8699	1.0000							
FL	0.0896	0.0087	–0.0149	–0.0034	1.0000						
GR	–0.2180	0.1784	–0.2052	–0.0915	0.0319	1.0000					
ROI	–0.2043	0.1680	–0.1423	–0.0629	–0.0705	0.0026	1.0000				
FS	–0.0257	0.0963	–0.0434	0.0164	–0.1833	0.1484	–0.3459	1.0000			
FR	0.1195	–0.1594	0.1683	0.0830	–0.5000	–0.1278	–0.0274	–0.0567	0.7995	1.000	
Var	0.3635	–0.3724	0.2127	0.0121	–0.1774	-0.1857	-0.2139	-0.0710	0.5926	0.544	1.000

For illustrative purposes, consider a specification involving our primary measure of equity risk, capital structure risk (equation 5.1), and the linked measure of pension risk denoted PR_3 (equation 5.6). Following Jin et al. (2006) we define the 'integrated' company's balance sheet as:

Equation 5.7

$$OA + PA = E + D + PL$$

OA is operating assets and the other terms are as before. The company's financial capital (E + D) can then be found by rearranging (5.7), that is:

$$E + D = OA + PA - PL.$$

Therefore, the company's capital structure risk can be reworked in the following form:

Equation 5.8

$$\beta_{E+D} = \frac{\beta_{PA} PA}{E+D} - \frac{\beta_{PL} PL}{E+D} + \frac{\beta_{OA} OA}{E+D}$$

or

Equation 5.9

$$\beta_{E+D} = PR_3 + \frac{\beta_{OA} OA}{E+D}$$

and the estimating equation can then be specified as:

Equation 5.10

$$\beta_{E+D} = \alpha + \beta\, PR_3 + \varepsilon$$

β represents the sensitivity of firm risk to firm pension risk and α represents the part of the expected firm risk that cannot be picked up by the pension risk. The expectation is that β is positive and close to 1.

Equation 5.10 is estimated in panel data form, with fixed effects at industry level controlled for by incorporating a dummy variable for each one-digit Standard Industrial Classification (SIC). Petersen (2006) notes that in corporate finance and asset-pricing empirical studies, researchers are often confronted with panel data where the residuals may be correlated across firms or across time,[6] and OLS standard errors can be biased. Historically, the two literatures have used different solutions to this problem. Corporate finance has relied on clustered standard errors, while asset pricing has used the Fama and MacBeth (1973) procedure. Petersen (2006) shows that in the presence of an unobserved firm effect both OLS and the Fama-MacBeth standard errors are biased downward and only clustered standard errors are unbiased, as they account for the residual dependence created by the firm effect. In this study, our results are reported with Rogers' clustered standard errors.

Earlier, it was emphasised that it is important to assess, through the introduction of explanatory variables (see Table 5.3), whether pension risk is merely a surrogate of other variables that might affect firm risk. This point is reinforced through examination of equation (5.9) and the estimating relationship, as given by (5.10). The regression specification gives an unbiased estimate of the impact of pension risk on capital structure risk only if operating asset risk is uncorrelated with pension risk. This is unlikely to hold because as Jin et al. (2006) note: 'Much of the risk in the pension fund comes from its equity holdings and firm human resource policy, and these are potentially highly correlated with the firm's own operating asset risk'.

5.4 EMPIRICAL FINDINGS AND INTERPRETATION

In Table 5.4 empirical findings of various univariate specifications are detailed. The coefficient estimates on PR_1 (pension risk metric derived from Cardinale 2007) and PR_3 (based on Jin et al. 2006) are generally positive and significant, indicating that higher levels of pension risk feed into higher levels of capital structure risk, systematic risk and return variability. The exception to this uniform picture is when PR_3 is based on the pension liability upper limit β_{PL}= 0.38 and where it can be seen from Table 5.4 that the specification does not pass the F-test of joint significance of regressors at acceptable levels of significance. With respect to PR_2 (risk measure derived from Franzoni and Marin 2006) the coefficient estimates are negative as expected, although one of the three estimates is not significant at normal levels.

6. There are two general forms of dependence that are most common in finance applications. The residuals of a given firm may be correlated across years (time-series dependence) for a given firm. This is called an unobserved firm effect. Alternatively, the residuals of a given year may be correlated across different firms (cross-sectional dependence). This is called an unobserved time effect.

In Table 5.5 we explore whether the pension risk variable, variously measured, is merely a surrogate for other variables that may affect company equity risk. All specifications pass the F-test of joint significance of regressors at the 5% level of significance or better. Four control variables proved significant in this aspect of the analysis (financial leverage, firm size, firm growth, and the return on investment). The coefficient estimates on financial leverage, firm growth and the return on investment were consistently negative and mostly significant. Overall, these coefficient estimates suggest that FTSE100 companies that were more levered, more profitable and faster growing had reduced levels of capital structure risk, systematic risk and return variability. The other control variable, firm size, was also negative when the dependent variable was either capital structure risk or return variability, but positive when the dependent variable was systematic risk, although the firm size estimates were statistically significant at acceptable levels of significance only when the dependent variable was variability.

The pension risk estimates in Table 5.5, relative to those in Table 5.4, are similar in sign and slightly smaller in absolute magnitude, and a somewhat greater number of the pension risk estimates (6 out of 12) are not different from zero at acceptable levels of significance. It is also the case that three of the insignificant estimates relate to the PR_3 metric calculated using the pension liability upper limit β_{PL} = 0.38. This confirms that β_{PL} assumptions materially affect our findings with respect to this risk measure. When the pension liability lower limit, β_{PL} = 0.28, was used to calculate PR_3 the resultant estimate, detailed in Table 5.5, for the capital structure risk specification was 0.3777. This implies that one unit of pension risk increases capital structure risk by 0.3777 units. This is decidedly below the earlier hypothesised one-to-one relationship. That the coefficient is lower than expected may be due to the blurring of the relationship between pension and firm risk by differing and/or opaque actuarial assumptions. It may also in part be due to the quasi underwriting role provided by the Pension Protection Fund or it may centre on accounting practice that now recognises actuarial gains and losses direct in equity, and there is deferred taxation on the actuarial gain or loss, with this charged straight to reserves.

5.5 SUMMARY

This study has examined pension plan risk, variously measured, and its impact upon equity risk, also variously measured. In general terms, our analysis indicates that for FTSE100 companies, over the 2002 to 2006 period, pension plan risk does feed into firm equity risk. This suggests that the market views the assets and liabilities of the company pension scheme as part of the assets and liabilities of the firm itself. Notwithstanding this point, it is also the case that there is some sensitivity to model specification and the adjustment techniques used. More specifically, we note that the measure of pension risk proposed by Jin et al. (2006) can result in quite divergent findings influenced by relatively small variations in the assumed value of the systematic risk of pension liabilities. Where the correct sign was obtained, with respect to this measure, it was also apparent that the resultant estimate was significantly lower than 1, casting doubt on the hypothesised one-to-one relationship between pension risk and capital structure risk. This in turn raises the possibility that there may be a weakness in the informational efficiency of equity markets that may be caused by the plethora of accounting rules and actuarial assumptions.

Table 5.4: Univariate analysis* – Rogers' clustered standard errors

Dep Var	Firm risk				Equity beta				Variability			
	0.0465				0.1820				5.6066			
	(0.0289)				(0.0309)				(0.8659)			
	1.62				5.88				6.47			
PR_1	0.107				0.000				0.000			
		−0.3076				−1.2923				−48.8516		
		(0.3468)				(0.5597)				(14.0177)		
		−0.89				−2.31				−3.49		
PR_2		0.376				0.022				0.001		
			0.6384				1.1519				28.9572	
			(0.2239)				(0.3843)				(9.4346)	
PR_3			2.85				3.00				3.07	
$\beta_{PL} = 0.28$			0.005				0.003				0.002	
				0.3501				0.5848				−0.0985
				(0.4829)				(0.6472)				(19.0774)
PR_3				0.73				0.90				−0.01
$\beta_{PL} = 0.38$				0.469				0.367				0.996
	0.8989	0.8989	0.8917	0.8983	1.0001	1.0000	0.9941	1.0065	30.7905	30.8103	30.6025	31.1442
	(0.0776)	(0.0784)	(0.0768)	(0.0777)	(0.0890)	(0.0934)	(0.0877)	(0.0886)	(3.7517)	(3.8374)	(3.7389)	(3.7666)
	11.59	11.45	11.60	11.56	11.24	10.71	11.33	11.36	8.21	8.03	8.18	8.27
Constant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.1400	0.1331	0.1510	0.1332	0.2679	0.2022	0.2083	0.1708	0.1722	0.1665	0.0723	0.0159
F-Stat	29.07	27.28	30.29	29.79	21.45	19.90	19.85	17.53	18.66	6.66	3.56	0.75
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.6299

*Coefficient, Std Error (in parentheses), T-statistic, P-value

Table 5.5: Multivariate analysis* – Rogers' clustered standard errors

Dep Var	Firm risk				Equity beta				Variability			
	0.0460				0.1650				4.9939			
	(0.0240)				(0.0317)				(0.9286)			
	1.92				5.21				5.31			
PR_1	0.056				0.000				0.000			
		−0.1761				−0.9309				−41.2789		
		(0.3543)				(0.6358)				(14.5235)		
		−0.50				−1.46				−2.84		
PR_2		0.619				0.144				0.005		
			0.3777				0.7642				22.3843	
			(0.2495)				(0.4358)				(7.0716)	
			1.51				1.75				2.90	
PR_3 $\beta_{PL} = 0.28$			0.131				0.080				0.004	
				0.1997				0.2598				−0.3670
				(0.3590)				(0.2885)				(15.6428)
				0.56				0.44				−0.02
PR_3 $\beta_{PL} = 0.38$				0.578				0.659				0.981
	−0.0108	−0.0107	−0.0105	−0.0107	−0.0064	−0.0061	−0.0058	−0.0061	−0.1255	−0.1083	−0.1106	−0.1178
	(0.0011)	(0.0012)	(0.0012)	(0.0012)	(0.0014)	(0.0015)	(0.0015)	(0.0015)	(0.0521)	(0.0507)	(0.0498)	(0.0516)
Financial	−9.58	−9.24	−9.05	−9.09	−4.74	−4.18	−3.83	−3.96	−2.41	−2.14	−2.22	−2.28
leverage	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.033	0.027	0.023
	−0.0394	−0.0638	−0.0405	−0.0644	−0.1249	−0.0199	−0.1769	−0.2300	−9.8128	−12.2278	−13.3116	−16.8806
	(0.0705)	(0.0811)	(0.0739)	(0.0844)	(0.0708)	(0.0716)	(0.0608)	(0.0777)	(6.3422)	(6.8178)	(6.5153)	(7.4913)
Growth	−0.56	−0.79	−0.55	−0.76	−1.76	−2.78	−2.91	−2.96	−1.55	−1.79	−2.04	−2.25
rate	0.576	0.432	0.584	0.446	0.078	0.006	0.004	0.003	0.123	0.074	0.042	0.025
	−0.0612	−0.0607	−0.0646	−0.0629	0.0780	0.0774	0.0739	0.0798	−2.8756	−2.7923	−3.3042	−2.6436
	(0.0479)	(0.0485)	(0.0473)	(0.0474)	(0.0534)	(0.0548)	(0.0539)	(0.0540)	(1.2535)	(1.2500)	(1.3238)	(1.3000)
	−1.28	−1.25	−1.36	−1.33	1.46	1.41	1.37	1.48	−2.29	−2.24	−2.30	−2.03
Firm size	0.202	0.212	0.173	0.170	0.145	0.159	0.171	0.140	0.022	0.026	0.022	0.043
	−0.8023	−0.8717	−0.8414	−0.9121	−1.4216	−1.6003	−1.6639	−1.8009	−36.7627	−36.4597	−43.9300	−47.6381
	(0.4874)	(0.5066)	(0.4894)	(0.4996)	(0.5456)	(0.6078)	(0.5809)	(0.6183)	(4.8166)	(6.7825)	(6.3762)	(7.5719)
Return on	−1.65	−1.72	−1.72	−1.83	−2.61	−2.63	−2.86	−2.91	−7.63	−5.38	−6.89	−6.29
investment	0.101	0.086	0.086	0.069	0.010	0.009	0.004	0.004	0.000	0.000	0.000	0.000
	1.4065	1.4138	1.4153	1.4252	0.9837	1.0063	1.0144	1.0267	49.4516	49.0328	50.7889	50.4476
	(0.2085)	(0.2102)	(0.2104)	(0.2098)	(0.2282)	(0.2328)	(0.2368)	(0.2326)	(6.7876)	(6.9620)	(7.1687)	(7.1061)
	6.75	6.73	6.73	6.79	4.31	4.32	4.28	4.41	7.17	7.04	7.08	7.10
Constant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R2	0.3787	0.3698	0.3757	0.3698	0.3705	0.3078	0.3071	0.2900	0.2689	0.2579	0.1886	0.1575
F-Stat	28.01	28.86	29.66	27.88	21.27	19.74	19.54	18.06	18.25	8.35	6.98	5.34
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

*Coefficient, Std Error (in parentheses), T-statistic, P-value

6. Pension risk and debt markets

6.1 INTRODUCTION

This part of the report parallels the analysis in the previous chapter. The investigation is again undertaken for FTSE100 companies that have in place DB pension plans, and is carried out within a panel framework for the years 2002 to 2006. In this instance, however, we consider the impact of pension plan risk on corporate debt rating. The analysis is again based on the premise that markets are informationally efficient, which should imply that individual company ratings are correct and respond in a timely fashion to market events. As before, because of a degree of opacity in pension accounting, differing actuarial assumptions and the underwriting role, since 2004, of the Pension Protection Fund, markets may not be as informationally efficient as expected. This point can perhaps be reinforced by reference to recent market turbulence, which has led to questions about whether agencies respond to changing market conditions with sufficient speed,[7] with Charlie McCreevy, the EU Internal Market Commissioner, also questioning whether the rating agencies suffer from a conflict of interest.[8]

6.2 PENSION PLAN FUNDING AND CORPORATE DEBT

Bodie et al.'s study (1985) is one of the earliest to show a negative relationship between pension plan funding and corporate debt ratings. Carroll and Niehaus (1998) implement an ordered probit model of debt ratings controlling for non-pension-plan-related risk variables. The evidence presented indicates that excess pension assets and unfunded pension liabilities influence debt ratings. Moreover, the authors find that unfunded pension liabilities decrease debt ratings more than an equivalent amount of excess pension assets increases debt ratings, all things being equal. This asymmetric relationship is consistent with the view that unfunded pension liabilities are corporate liabilities that compete with debt claims, but that there are costs associated with quickly accessing excess pension assets, owing to the mandated sharing of reverted excess assets. Watson Wyatt Worldwide's Insider Report (2005) examines the relationship between pension deficits and the credit ratings of sponsoring firms. Using data from Fortune 1000 pension sponsors, the Report shows a notable positive relationship between higher pension deficits and lower credit ratings. For example, for 2004, AA -rated firms had a funding ratio of 94% in comparison with BBB-rated firms, which had a funding ratio of 82%. Cardinale (2007) claims that market bond prices reflect corporate pension liabilities in the UK and US. In particular, DB plan liabilities appear to be recognised by the US bond market, the more so if they are unfunded. The US bond market considers deficits to be three times riskier than ordinary leverage and the effect is stronger in more recent years. In the UK, the bond market assesses pension information differently and, in particular, the absolute size of liabilities, and not deficits, matters.

6.3 DATA OVERVIEW AND ESTIMATING RELATIONSHIP

Many of the variables used in this section were also used and described in section 5.3 (the data overview of pension risk measures and the control variables in the multivariate specification). In this analysis of pension plan funding and debt ratings, additional information is also required on credit ratings. In the debt risk specification, the dependent variable was that provided by Moody's Rating Agency, and where a Moody's rating was not available but a corresponding Standard & Poor's rating existed, the latter rating was converted to its Moody's equivalent. The sample of FTSE companies was allocated to 10 debt-rating categories. In Table 6.1 a profile is presented of the debt-risk characteristics of the companies in the sample. The data reveal that no companies in the sample have a Moody's credit rating below Baa3. Debt obligations designated below this benchmark are considered more speculative and are subject to higher levels of credit risk.

Table 6.1: Measures of debt risk

Moody's debt categories	Frequency	%
Aaa	2	0.63
Aa1	16	5.05
Aa2	29	9.15
Aa3	17	5.36
A1	36	11.36
A2	35	11.04
A3	42	13.25
Baa1	58	18.30
Baa2	43	13.56
Baa3*	39	12.30

* None of the companies in our sample had a debt rating below Baa3 over the period analysed

7. K. Corbet, the president of Standard & Poor's, resigned her post at the end of August 2007, with immediate effect, after investor hostility to the agency's perceived failure to incorporate the sub-prime mortgage crisis in company debt ratings.

8. The Committee of European Securities Regulators commissioned a report on rating agencies published in early 2008 (CESR 2008). The report's remit is far reaching and among other issues addresses whether a conflict of interest exists between rating agencies and those firms whose debt they assess. The EU Regulation on credit rating agencies was issued in 2009 (European Parliament 2009).

Given the ordinal nature of the dependent variable (debt ratings) a random-effects-ordered probit model was employed in the estimation. Underlying the estimating process is the assumption that the rating agency calculates an index which measures expected default loss, with higher expected default loss corresponding to lower values for the index, and the index itself is divided into intervals with the lowest interval receiving the lowest debt rating and so on. Each rating, as detailed in Table 6.1, is given an ordinal assignment ranging from 0 (which equates to the highest risk rating, Baa3) to 9 (which equates to the lowest risk category, Aaa). Assuming that the unobservable index is a linear function of observable firm characteristics (including pension risk) and the error term is normally distributed, the following specification results.

Equation 6.1

$$CR = \beta PR_{*} + \varepsilon$$

In this instance, β represents the sensitivity of the credit rating, CR, to pension risk, PR, variously measured. The model is parameterised in such a way that the intercept is already implicitly contained by the estimation cut-off points. Given the categorisation of credit risk, a negative relationship is expected. Random-effects-ordered probit panel models are estimated, controlling for fixed effects at the industry level using one-digit SIC. Two-dimensional clustering of the random-effects-ordered probit model is not possible, therefore in this instance results are reported solely for one-dimensional clustering based upon firm identity.

Findings are reported for univariate and multivariate (which include control variables) specifications. In earlier studies of corporate-debt ratings factors, a variety of control variables are deemed to be of importance. Asset size, systematic risk, profitability and leverage have all proved statistically significant control variables. See, for example, Kaplan and Urwitz (1979), Iskandar and Emery (1994) and Carroll and Neihaus (1998). In general, these studies suggest that larger, more profitable firms with lower levels of systematic risk and leverage have superior credit ratings.

6.4 EMPIRICAL FINDINGS AND INTERPRETATION

In Table 6.2 we present both univariate and multivariate results for the random-effects-ordered probit specifications. According to the integrated balance sheet perspective, the company's pension plan funding, in that it affects the expected payoff to debtholders, can be expected to influence credit rating.

In the univariate specification, the coefficient estimates on all pension risk metrics are significant. For the most part, the results are as expected: that is, the greater the pension risk the greater the probability of obtaining a lower credit rating. This situation is consistent with a negative coefficient estimate for PR_1 and PR_3 and a positive coefficient for PR_2. The exception to this uniform profile, as in the equity risk analysis (Chapter 5), is when PR_3 is estimated using β_{PL} = 0.38 and confirms the sensitivity of results based on this metric to the choice of β_{PL}. Also evident from Table 6.2 is that two of the univarate specifications fail the likelihood ratio test of joint significance of regressors, indicating that the output lacks explanatory value.

In the multivariate models the likelihood ratio test raises no concerns regarding joint significance of regressors. The coefficient estimates on the pension risk variables are all significant and have the expected signs, highlighting that the greater the pension risk, the greater the probability of obtaining a lower credit rating. Three of the control variables are negative and significant at either the 1% or 5% level. These variables are financial leverage, asset growth and systematic risk as measured by beta, and imply that firms that are more levered, have faster asset growth and have higher equity risk can be expected to obtain lower credit ratings. The performance variable, return on investment, does not prove significant while the firm-size estimates are positive and significant at the 1% level, showing that larger firms have a greater probability of obtaining superior credit ratings.

6.5 SUMMARY

This study has examined pension plan risk, variously measured, and its impact upon debt ratings for FTSE100 companies over the period 2002 to 2006. Pension risk has been demonstrated to be factored into credit ratings, and the analysis shows that the greater the pension risk the greater the probability of obtaining a lower debt rating. From a rating agency viewpoint, this is positive news, particularly at present, when agencies are being criticised for a perceived failure to reflect sub-prime mortgage problems in firm-specific ratings. Notwithstanding this point, our analysis offers only a relative perspective and provides little insight into whether ratings agencies systematically underestimate or overestimate pension risk in their debt ratings.

Table 6.2: Random-effects-ordered probit analysis

Dep Var = credit rating	Univariate				Multivariate			
	–0.5447				–0.6615			
	(0.1484)				(0.1697)			
	–3.67				–3.90			
PR_1	0.000				0.000			
		6.0657				0.3622		
		(1.0696)				(1.1325)		
		5.67				0.32		
PR_2		0.000				0.749		
			–16.1545				–6.0111	
			(1.4672)				(1.1962)	
			–11.01				–5.03	
PR_3 $\beta_{PL} = 0.28$			0.000				0.000	
				8.5406				–9.0545
				(1.6404)				(1.6067)
				5.21				–5.64
PR_3 $\beta_{PL} = 0.38$				0.000				0.000
					–0.0205	–0.0116	–0.0177	–0.0247
					(0.0069)	(0.0059)	(0.0064)	(0.0061)
					–2.99	–1.96	–2.76	–4.04
Financial leverage					0.003	0.050	0.006	0.000
					–2.6409	–3.8426	–2.3030	–3.3864
					(1.0143)	(0.9832)	(1.0118)	(1.0015)
					–2.60	–3.91	–2.28	–3.38
Growth rate					0.009	0.000	0.023	0.001
					2.9083	3.8667	3.3056	2.5994
					(0.2530)	(0.2680)	(0.2542)	(0.2268)
					11.50	14.43	13.01	11.46
Firm size					0.000	0.000	0.000	0.000
					–1.4922	2.4129	–1.6291	–1.0054
					(1.8037)	(1.6584)	(1.7181)	(1.6812)
					–0.83	1.45	–0.95	–0.60
Return on investment					0.408	0.146	0.343	0.550
					–2.6166	–1.0726	–2.8558	–1.7013
					(0.3039)	(0.2466)	(0.3093)	(0.2715)
					–8.61	–4.35	–9.23	–6.27
Beta					0.000	0.000	0.000	0.000
LR Chi^2	1.55	25.85	–2.63	53.81	130.33	131.93	133.90	118.12
Prob > Chi^2	0.9804	0.0005	1.000	0.000	0.0000	0.0000	0.0000	0.0000

7. Concluding remarks and policy recommendations

In this concluding chapter we summarise some of the key findings emanating from this study and offer a selection of policy recommendations and potential avenues for future research. Also, as in earlier chapters, we illustrate that our policy recommendations have currency and resonance by the inclusion of selected quotes from the key stakeholders.

7.1 PROSPECTS FOR DEFINED-BENEFIT SCHEMES

Our own analysis coupled with discussions with scheme and consulting actuaries, finance directors and trustees (see Box 7.1 for a range of representative comments) suggests that DB schemes have a limited long-term future. Nonetheless, if the pensions environment could be turned around we think the defined-benefit scheme would still be seen by people as a big bar of gold among their benefits and it is clear that companies who continue to offer such a scheme would have a competitive advantage in the labour market.

Box 7.1: Comments about prospects for defined-benefit schemes

DB pensions outside the public sector have become largely a legacy issue. In many newer high-growth industries they have been absent for 15 to 20 years and the current wave of closure to accrual is now unstoppable. There are some signs of a move towards innovative risk-sharing designs but we believe that these are too late in the day and would in any case have only slowed the inexorable trend rather than stopped it. (Consulting actuary)

I honestly don't know whether there are going to be significant defined-benefit schemes around and still thriving in 30, 40 years, I just don't know. It is hard to see things surviving as they are at the moment. I suppose the other thing is, longevity is a real worry for people and the Regulator has just put out a consultation saying that everybody has to be more cautious on their mortality assumptions and again that is going to push up costs and make things come to the finance director's mind more so than it has in the past. (Consulting actuary)

For the large corporate out there, if they have not already ceased accruals in their pension schemes they probably more than likely have closed their schemes to new entrants. (Finance director)

For smaller clients the majority have ceased accruals, those that haven't are trying to be paternalistic towards their employees; that tends to be more family oriented firms or those that have been established as a partnership, John Lewis for example. (Scheme actuary)

Given the current onerous burden of DB schemes this is unlikely to occur unless the government provides some incentives. The most effective incentives are likely to be financial and could take the form of a taxation break for operators of DB schemes. If such financial incentives are not forthcoming then government could alleviate the burden on employers by removing some of the guarantees that are currently in place, for example allowing pension increases to be made on a discretionary basis, taking into account funding levels.

7.2 ACCOUNTING DISCLOSURE

Our survey reveals competing views about the impact of accounting disclosure on DB schemes. One view suggests that the introduction of a volatile, uncontrollable number on the balance sheet had a role in the downfall of DB schemes by encouraging their closure. An alternative view suggests that the demise of DB schemes has largely been due to economic circumstances rather than accounting disclosure. Clearly, the transparency of disclosure for DB schemes has improved dramatically but has still some way to go, as evidenced by current projects initiated by the bodies that set accounting standards. Our evidence suggests that the pension buyout cost would be a welcome addition to accounting disclosure and without it the scope for inappropriate managerial and investment decisions remains.

Box 7.2: Comments about accounting disclosure

FRS17 and IAS19 obviously raised the bar and make things more comparable, and along with that disclosures became more comprehensive (Academic)

My feeling is that there is a lot of disclosure around pension schemes…I feel that the level of disclosure is about right (Trustees)

I come from a position where I think that FRS17/IAS19 was one of the big problems, one of the nails in the coffin of defined-benefit schemes, so I would sooner see the whole thing scrapped…but I think the problem is that the accounting standards that we have now got and any future tweaks focus people on the short term…finance directors are only interested in their annual or quarterly accounting disclosures. (Consulting actuary)

7.3 THE FUTURE ROLE OF THE ACTUARY

From our interviews with consulting actuaries the growing significance of deficit management became apparent. Where scheme managers are thinking about deficit management exercises, the schemes are generally underfunded and a GN11 report would have been done by the actuary, which may, for example, say that if anyone takes the transfer they will get 75% of their transfer value. The objective of this is to protect people who are staying in the scheme. This implies that the liability on a transfer valuation is lower than the liability on an FRS17/IAS19 basis. The result is that the scheme pays out of its assets an amount that is equivalent to a transfer value liability and it saves on an FRS17 basis an amount that is equivalent to an FRS17 liability, thereby reducing the deficit.

This raises issues regarding asymmetric information and the establishment of transfer values. Advice from the scheme actuary regarding the implications of accepting a transfer value should be made transparent to the scheme member. In addition there may well be a case for more standardisation in the establishment of transfer values.

In addition, actuaries appear to be actively involved in assisting companies in striving to improve their Dun & Bradstreet credit rating thereby, in turn, reducing the burden of the PPF levy, which is largely based on the credit rating.

Box 7.3: Issues in deficit management

Nearly every pension scheme is interested in deficit management now. (Consulting actuary)

Deficit management works because of the difference between the strength of an s179 basis or an expensing basis, when you are calculating FRS17 numbers say, and the strength of your transfer value basis for the scheme. There is a guidance note GN11 for transfer value but it does not really set in stone the assumptions you must use and generally the assumptions for transfer value are quite weak. (Academic)

The cash incentive is not set in stone; I've worked on a few cases where it could be anything from an extra £1,000 on top of your transfer value, 20% of your transfer value on top, 20% of the difference between the buyout figure and your transfer value figure. There really is nothing set in stone; it's really up to consultation between the actuary and the company. (Scheme actuary)

7.4 PENSION BUYOUTS

The number of firms offering to tackle pension schemes' investment or mortality risks through a partial or full buyout has rapidly increased, with general opinion being that it is only a matter of time before the first £1 billion buyout. Such competition is both driving down prices and swelling the number of products offered to schemes. A number of smaller companies are now entering the market to compete against the big players, ie primarily Legal & General and Paternoster. In addition, if proposals by the Accounting Standards Board to use a risk-free rate to value future pensions liabilities proceed, then the buyout option will become increasingly attractive to sponsoring companies. Various opinions suggest that such a move would increase liabilities by 25–40%, thereby reducing the gap between the ASB risk-free valuation and the buyout valuation.

Box 7.4: Pension buyouts

Competition in the buyout market is heating up after last year's carve-up between Paternoster and Legal & General. (Consulting actuary)

Prices are falling, and new players are happy to take on additional issues like data and benefit risk, or guaranteeing firms against guaranteed minimum pension (GMP) requirements. (Consulting actuary)

Longevity-hedging products are now more accessible, and I predict they will take off over the next 12 months. (Consulting actuary)

Buyouts are the obvious way for employers to escape the projected 25% in liabilities brought on by the ASB proposals. (Academic accountant)

7.5 PENSION DEFICITS AND EQUITY RISK

The econometric component of this study examined pension plan risk, variously measured, and its impact upon equity risk, variously measured, for FTSE100 companies over the period 2002 to 2006. This period has coincided with the introduction of the Pension Protection Fund, greater transparency and standardisation in pension accounting and increased efforts to disclose and harmonise actuarial assumptions. Over the period under investigation the majority of DB pension schemes of FTSE100 companies have been categorised as in deficit. In addition, it was noted that a trend has been for pension plan assets to shift away, marginally, from equities and towards bonds. In general terms, our analysis indicates that for FTSE100 companies over the 2002 to 2006 period, pension plan risk does feed into firm equity risk. This suggests that the market views the assets and liabilities of the company pension scheme as part of the assets and liabilities of the firm itself. Notwithstanding this point, it is also the case that there is some sensitivity to model specification and the adjustment techniques used. This raises the possibility that there may be a weakness in the informational efficiency of equity markets, which may be caused by the plethora of accounting rules and actuarial assumptions. This evidence of a weakness in informational efficiency suggests the need for enhanced transparency in the actuarial and accounting frameworks within which DB pensions are cast.

7.6 PENSION DEFICITS AND CREDIT RISK

Our results show that pension risk is factored into credit ratings, and the analysis indicates that the greater the pension risk the greater the probability of obtaining a lower debt rating. From a rating agency viewpoint this is positive news, particularly at present when agencies are being criticised for a perceived failure to reflect sub-prime mortgage problems in firm-specific ratings. Notwithstanding this point, our analysis offers only a relative perspective and provides little insight into whether ratings agencies systematically underestimate or overestimate pension risk in their debt ratings. If we draw parallels with the sub-prime market the more likely scenario is that pension risk has been underestimated in debt-rating estimates.

7.7 DIRECTIONS FOR FUTURE RESEARCH

DB pensions schemes are likely to feature prominently on the research agenda for some time to come. The current credit crunch is likely to focus increased attention on corporate credit ratings in general and credit rating agencies in particular. The impact of the crunch upon pension deficits is more difficult to predict, leading, on one hand, to increased volatility on the equity markets, but on the other to higher interest rates and enhanced corporate bond yields. The continuing trend in asset allocation away from equities and into bonds may, in fact, improve the overall general picture. The current project has suggested that pension risks, variously defined, do indeed affect both equity betas and credit ratings, and that the market is informationally efficient in recognising pension deficits. This then has implications for the cost of capital and, subsequently, for corporate investment decisions. More directly, additional contributions to pension funds, in an attempt to reduce deficits and meet PPF recovery plans, will diminish the funds available for investment and/or dividend decisions. This interaction between pension contributions, investment decisions and dividend payouts would appear to warrant further investigation on the future research agenda.

References

ACA (2009), <http://www.aca.org.uk/files/ACA_Pension_trends_report_No.1__-1_September_2009-20090828155500.pdf>, accessed 13 September 2009.

Aldersen, M. and Chen, K. (1987), 'The Stockholder Consequences of Terminating the Pension Plan', *Midland Corporate Finance Journal*, 4 (Winter): 55–61.

ABI (Association of British Insurers) (2007), *Understanding Companies' Pension Deficits*, ABI Research Paper 3.

Black, F. (1980), 'The Tax Consequences of Long-run Pension Policy', *Financial Analysts Journal*, July–August, 36: 3–10.

BAS (Board for Actuarial Standards) (2008), *Actuarial Mortality Assumptions: Discussion Paper* <http://www.frc.org.uk/bas/publications/pub1557.html>, accessed 23 May 2008.

Bodie, Z., Light, J., Morck, R. and Taggart, R. (1985), 'Corporate Pension Policy: An Empirical Investigation', *Financial Analysts Journal*, 41 (5): 10–6.

Bulow, J., Morck, R. and Summers, L. (1987), 'How Does the Market Value Unfunded Pension Liabilities?' in Bodie, Z., Shoven, J., Wise, D. (eds), *Issues in Pension Economics*, National Bureau of Economic Research Project Report Series (Chicago, Illinois and London, UK: University of Chicago Press), 81–104.

Cardinale, M. (2007), *Financial Analysts Journal*, 63 (5).

Carroll, T.J. and Niehaus, G. (1998), 'Pension Plan Funding and Corporate Debt Ratings', *Journal of Risk & Insurance*, 65 (3): 427.

CESR (Committee of European Securities Regulators) (2008), *The Role of Credit Rating Agencies in Structured Finance*, [online PDF document], <http://www.cesr-eu.org/popup2.php?id=4951>, accessed 13 November 2008.

Chan, L., Lakonishok, J. and Sougiannis, T. (2001), 'The Stock Market Valuation of Research and Development Expenditures', *Journal of Finance*, 56 (6): 2431–56.

Cocco, J.F. and Volpin, P.F. (2007), 'Corporate Governance of Pension Plans: The UK Evidence', *Financial Analysts Journal*, 63 (1): 70–83.

Dimson, E. (1979), 'Risk Measurement When Shares are Subject to Infrequent Trading', *Journal of Financial Economics*, 7 (2): 197–226.

European Parliament (2003), 'Directive 2003/41/EC of the European Parliament and of the Council of 3 June 2003 on the Activities and Supervision of Institutions for Occupational Retirement Provision', *Official Journal of the European Union,* 23.09.2003, L 235: 0010–0021.

European Parliament (2009), 'Regulation (Ec) No 1060/2009 of the European Parliament and of the Council of 16 September 2009 on Credit Rating Agencies', *Official Journal of the European Union,* 17.11.2009, L 302: 1–31. Available at <http://www.cesr-eu.org/popup2.php?id=6195>.

Fama, E. and MacBeth, J. (1973), 'Risk, Return, and Equilibrium: Empirical Tests', *Journal of Political Economy*, 81 (3): 607–36.

Feldstein, M. and Morck, R. (1983), 'Pension Funding Interest Rate Assumptions, and Share Prices', in Bodie, Z., Shoven, J. (eds), *Financial Aspects of the United States Pension System* (Chicago, Illinois and London: University of Chicago Press), 177–207.

Feldstein, M. and Seligman, S. (1981), 'Pension Funding, Share Prices, and National Savings', *Journal of Finance*, 36 (4): 801–24.

Franzoni, F. and Marin, J.M. (2006), 'Pension Plan Funding and Stock Market Efficiency', *Journal of Finance*, 61: 921–56.

Gombola, M. and Ketz, E. (1983), 'A Note on Cash Flow and Classification Patterns of Financial Ratios', *Accounting Review*, 58 (1): 105–14.

Greenwood, P.M. and Reynolds, M. (1989), 'SSAP24 – Eighteen Months On', presented to the Staple Inn Actuarial Society 14 November, <http://www.actuaries.org.uk/__data/assets/pdf_file/0004/26275/ssap.pdf>, accessed 13 November 2008.

Iskandar, M.E. and Emery, E.R. (1994), 'An Empirical Investigation of the Role of Indenture Provisions in Determining Debt Ratings', *Journal of Banking and Finance*, 18 (January): 93–112.

Hymans Robertson (2007), *Survey of Mortality Assumptions* (London).

Jin, L., Merton, R. and Bodie, Z. (2006), 'Do a Firm's Equity Returns Reflect the Risk of its Pension Plan?' *Journal of Financial Economics*, 81: 1–26.

Kaplan, R. and Urwitz, G. (1979), 'Statistical Models of Bond Ratings: A Methodological Inquiry', *Journal of Business,* 52 (April): 231–61.

Lane, Clark and Peacock LLP (1994), *Annual Accounting for Pensions Survey* (London).

Lane, Clark and Peacock LLP (2006), *Annual Accounting for Pensions Survey* (London).

Lane, Clark and Peacock LLP (2007), *Annual Accounting for Pensions Survey* (London).

Light, J. (2001), *Harvard Business School Case No. 9-201-129* (Boston, MA: Harvard Business School Publishing and Harvard Management Company).

Mercer (2008), *Common Themes, Cultural Differences: Defined Contribution Plans in Europe,* <http://www.mercer.com/referencecontent.htm?idContent=1310575>, accessed 13 November 2008.

Morris, Sir Derek (2005), *Morris Review of the Actuarial Profession: Final Report* (Norwich: HMSO). Also available in PDF from <http://www.hm-treasury.gov.uk/morris_review_actuarial_profession.htm>.

NAPF (National Association of Pension Funds) (2008), <http://www.napf.co.uk/DocumentArchive/Press%20Releases/02_2008/20081111_11-11-2008%20-%20Pension%20Funds%20Continue%20to%20Diversify%20Asset%20Investments.pdf>, accessed 13 November 2008.

Norgrove, D. (2006), 'Extract from a speech by David Norgrove, Chairman of the Pensions Regulator, to be made at the UK Pensions and Investment Summit in Brighton on Monday 25 September' [online PDF] <http://www.thepensionsregulator.gov.uk/pdf/DavidNorgroveUKPensionsInvestmentSummit.pdf>, accessed 9 October 2009.

PAAinE (2008), *The Financial Reporting of Pensions: A PAAinE Discussion Paper* <http://www.frc.org.uk/asb/technical/projects/project0065.html>, accessed 9 October 2009.

Pension Capital Strategies Limited (2008), 'The FTSE 100 and Their Pension Disclosures', *Quarterly Report*, October.

Pension Protection Fund (2009), <http://www.pensionprotectionfund.org.uk/.../PPF7800Index.aspx>, accessed 12 May 2009.

Pensions Regulator (2006), *Scheme Governance* (Brighton).

Pensions Regulator (2007), *The Purple Book* (Brighton).

Pensions Regulator (2007), *Occupational Pension Scheme Governance* (Brighton).

Pensions Regulator (2007), *Recovery Plans: An Initial Analysis* (Brighton).

Pensions Regulator (2008), *Good Practice When Choosing Assumptions for Defined Benefit Pension Schemes with a Special Focus on Mortality*, <http://www.thepensionsregulator.gov.uk/pdf/LongevityConsultationDocument.pdf>, accessed 9 October 2009.

Pensions Regulator (2008), *Conflicts of Interest: Consultation Document* (Brighton).

Pensions Management (2009), <http://www.pensions-management.co.uk/news/fullstory.php/aid/4926/PPF_7800_shortfall_reaches__A3242bn.html>, accessed 12 May 2009.

Petersen, M.A. (2006), 'Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches', NBER Working Papers 11280 (US: National Bureau of Economic Research, Inc.).

PricewaterhouseCoopers LLP (PWC) (2006), *Survey of UK Pension Scheme Governance* (London).

PricewaterhouseCoopers LLP (PWC) (2007), *Annual Survey of Actuarial Assumptions: UK Pension Scheme Funding* (London).

PricewaterhouseCoopers LLP (PWC) (2008), *Survey of UK Pension Scheme Governance* (London).

Punter Southall Consulting Actuaries (2006), *Punter Southall FRS17/IAS19 Annual Survey* (London).

Rosett, J. (2001), 'Equity Risk and the Labor Stock: The Case of Union Contracts', *Journal of Accounting Research*, 39 (2): 337–64.

Watson Wyatt Worldwide (2005), 'Cashing In: Do Aggressive Funding Policies Lead to Higher Credit Ratings?', *Watson Wyatt Insider Report*, October.

Young, S.D., Berry, M., Harvey, D. and Page, J. (1991), 'Macroeconomic Forces, Systematic Risk, and Financial Variables: An Empirical Investigation', *Journal of Financial and Quantitative Analysis*, 26 (4): 559–64.

Appendix

The enhanced disclosure of pensions information that has occurred during recent years can be shown by comparing the final accounts of Diageo Plc for 2000 and 2007. The first extract, below, shows the entire disclosure for 2000.

Diageo Annual Report 2000

Pension plans The group operates a number of pension plans throughout the world, devised in accordance with local conditions and practices. The plans are generally of the defined benefit type and are funded by payments to separately administered funds or insurance companies. The principal plans are in the United Kingdom, the United States and Ireland.

Valuations were carried out in 1999 of the UK, US and Irish plans. All valuations were done by independent actuaries using the projected unit method to determine pension costs. The principal assumptions were: real rate of return on assets 4% (1999 – 4.25% to 4.8%); real annual increase in wages and salaries 2% to 2.5% (1999 – 1.9% to 2.4%); real rate of future dividend growth for UK equities 1% (1999 – 0.75% to 1.25%); and pension increases to be approximately in line with inflation. Surpluses or deficits on the pension plans arising from the actuarial valuations are spread over the expected average service lives of the members (12 to 14 years) of the relevant fund on a straight-line basis using the single variation method. The market values of the assets of the principal funds at the dates of the latest actuarial valuations totalled approximately: UK fund – £3,068 million; US funds – £1,174 million; and Irish funds – £931 million. The actuarial value of the assets of those plans was sufficient to cover approximately 129% of the benefits that had accrued to members after allowing for expected future increases in wages and salaries.

Provision is made in the financial statements for the benefits accruing to members of unfunded pension schemes in accordance with the advice of independent actuaries.

The Diageo Pension Scheme is recharged with the cost of administration and professional fees by the company. The total amount recharged for the year was £13.8 million (1999 – £10.2 million).

Other post employment plans The group also operates a number of plans, primarily in the United States, which provide employees with other post employment benefits in respect of medical costs. The plans are generally unfunded and the liability in respect of these benefits is included in provisions. The liability is assessed by qualified independent actuaries under the projected unit method, assuming a liability discount rate of 7.5% (1999 – 8.4%) and medical inflation of 8% reducing by 1% per year to 5% (1999 – 9% reducing by 1% per year to 5%).

In contrast in 2007 pensions coverage extends to seven pages in the annual report. In particular, Diageo reveals both expected future pensions costs and a sensitivity analysis of the actuarial assumptions made (see below).

Diageo Annual Report 2007

(f) The future benefits expected to be paid by the post employment plans, up to 30 June 2017, are as follows:

	Payments due in the year ending 30 June					
	2008 £ million	2009 £ million	2010 £ million	2011 £ million	2012 £ million	2013-2017 £ million
United Kingdom – pension benefits	162	166	170	175	180	971
– other	2	2	2	2	2	7
Ireland – pension benefits	55	56	56	56	57	298
United States and Canada – pension benefits	32	32	31	31	30	125
– other	5	5	6	6	6	38
Other countries – pension benefits	8	8	8	8	8	39
– other	3	3	3	3	3	14
	267	272	276	281	286	1,492

(g) Changes in the assumptions used for determining post employment costs and liabilities may have a material impact on the income statement and balance sheet. For the significant assumptions, the following sensitivity analysis gives an estimate of these impacts for the year ended 30 June 2007:

	2007 £ million
A 0.5% decrease in the discount rate would have the following approximate effect:	
Increase in annual post employment cost	7
Increase in post employment deficit	407
A 1% decrease in the expected rates of return on plan assets would have the following approximate effect:	
Increase in annual post employment cost	45
A one year increase in life expectancy would have the following approximate effect:	
Increase in annual post employment cost	11
Increase in post employment deficit	173
A 0.5% increase in inflation would have the following approximate effect:	
Increase in annual post employment cost	31
Increase in post employment deficit	350
A 1% decrease in medical care inflation would have the following approximate effect:	
Decrease in annual post employment cost	(1)
Decrease in post employment deficit	(11)

RR/114/001

ISBN: 978-1-85908-457-1

ACCA 29 Lincoln's Inn Fields London WC2A 3EE United Kingdom / +44 (0)20 7059 5980 / www.accaglobal.com