Pension Accounting and Managerial Incentives in the UK

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Abstract

The introduction of the FRS 17 accounting standard in the UK has significantly increased the disclosure required for company sponsored defined benefit pension schemes. Nevertheless, the subjective nature of pension accounting means that there is still discretion afforded to management, and significant scope to window dress the company's financial accounts. We analyse the pension accounting assumptions made by UK FTSE 350 companies over the period 2001 to 2005. We find that the assumptions made vary across companies and our results suggest that companies with higher levels of pension scheme funding are concerned with the balance sheet impact of the pension liability, while those companies with lower funding are more concerned about the profit and loss account and the financial income that can be derived from the pension scheme assets.

JEL Classifications: G23, M41, G11, G30

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1. Introduction

Defined benefit pension promises represent substantial liabilities for many UK companies. Most companies currently face deficits, where the pension assets held in the scheme are not sufficient to meet the pension liability faced by companies. As a broad illustration as to the extent of the problem, Lane Clark and Peacock (2005) estimate that as of July 2005, the aggregate deficit of the FTSE 100 companies amounted to £37bn. This is approximately 3% of market capitalisation or almost the total amount of dividends paid by these companies' in the same year.[1]

The adoption of the FRS 17 accounting standard requires companies to provide greater disclosure about their pension obligations than under previous accounting standards, including disclosure of any pension deficit on the company balance sheet. In addition companies must disclose the asset allocation of the scheme as well as key variables and assumptions used in the valuation of the liabilities. One consequence of this is that the magnitude of the liability faced by some companies is now apparent. British Airways for example, in 2004 had a pension liability which was 380% of the company's market value.[2] Under previous disclosures this would not have been clear as SSAP 24 provided little explanation of the company's pension costs and liabilities. (ASB 2000)

We analyse the choice of assumptions made by management in accounting for their pension assets and liabilities. As Bergstresser et al. (2006) note, pension accounting assumptions are readily observable and reflect conscious choices made by management.

Our analysis shows that assumptions for key pension accounting variables vary significantly across companies. Our results suggest that companies with higher levels of pension scheme funding are concerned with the balance sheet impact of the pension liability, while those companies with lower funding are more concerned about the profit

[1] Dividends declared by these companies in 2004 totalled £39bn. Lane Clark and Peacock (2005)
[2] Accounting for Pensions UK and Europe, Annual Survey, Lane Clark and Peacock (2005)

and loss account and the financial income that can be derived from the pension scheme assets.

This paper adds a number of contributions to the existing research in this area. First, we consider both the balance sheet and the profit and loss impacts the pension scheme has upon the company which extends the work of Bergstresser et al., that focus only on the profit impact. Second, we apply improved metrics in our analysis through utilising 'spread' variables that directly impact the profit and loss account and balance sheet, e.g. the equity return assumption minus the discount rate, rather than the raw variables, which in themselves do not determine the impact of the pension scheme on the financial statements. Third we consider the impact of liability driven investment and the changes to the pension portfolio structure that have occurred in response to pressure to address pension deficits. We also consider the role of the auditor and the actuary in the assumption setting process.[3]

The UK experience is important in this context as it is the first accounting regime to apply this type of market based standard. FRS 17 has subsequently been followed by the world-wide introduction of IAS 19, which in important respects is similar to FRS 17, and in the US the introduction of FAS 158, which will place similar requirements on US companies. The findings of this paper are therefore relevant to a wider international audience.

The remainder of the paper is organised as follows. Section 2 discusses previous literature on earnings manipulation and pension accounting and motivates the current study. Section 3 outlines the FRS 17 accounting standard, section 4 describes the data, and section 5 explains the method used. Section 6 presents the results, while section 7 concludes.

[3] It is also worth noting that over this time period the Pension Protection Fund (PPF), which is the US Pension Benefit Guaranty Corporation (PBGC), was not in operation and so the sample that we analyse does not have a moral hazard problem as managers are fully exposed to the decisions that they make.

2. Pension Accounting and Disclosure under FRS 17

The Accounting Standards Board published FRS 17 in 2000 and it applies to all UK companies with financial year ends after 22 June 2001. The basic provisions of the standard in relation to defined benefit pension schemes are:

- Pension scheme assets are measured at fair (market) value
- Pension scheme liabilities are measured using the projected unit method[4]
- Liabilities are discounted using the current yield on a high quality (AA-rated) corporate bond of equivalent term and currency to the liability
- The DB (net) asset or liability is shown on the balance sheet
- Full actuarial valuations are required every three years, with annual updates

The change in the asset or liability from period to period can be broken down into:

- Current service costs (i.e. cost of pensions earned that year)
- Interest cost (unwinding one year of discounting)
- Expected return on the assets
- Actuarial gains and losses (including the difference between the actual and expected return on scheme assets)
- Any historical adjustments to pension costs as a result of changes in the level of benefit provision

Actuarial gains and losses are recognised immediately in the statement of total recognised gains and losses, but do not appear on the profit and loss account. The net of the expected return on pension assets minus the interest cost appears on the profit and loss account as other financial income.

[4]The projected unit method is an accrued benefits valuation method, which takes account of rights to benefits earned by scheme members up to the valuation point, allowing for future increases in the level of pensionable salaries and the value of pensions in payment.

The standard also requires that the company disclose the main assumptions underlying the valuation of the scheme liabilities. Key assumptions which are disclosed include the discount rate, expected rate of price inflation, expected rate of wage growth and expected rate of growth of pensions in payment. Companies are also required to give a categorization of the assets in the scheme into broad groups, namely, equity, bonds, property and other[5] and to state the expected rate of return on each asset class.

FRS17 disclosures were required in the notes to the accounts for year ends from 22 June 2001 to 31 December 2004. Thereafter, full adoption of the standard was required. However, many companies, particularly the largest UK companies undertook early adoption over the transitional period.

It is worth noting that many of the provisions of the FRS 17 standard are similar to the US standard FAS 87 and the international standard IAS 19. All three use the projected unit method for calculating the liability and require the discount rate to reflect the yield on a high quality corporate bond of appropriate maturity. However, the UK standard is different in that actuarial gains and losses – including differences between actual and expected investment returns - are recognised in reserves immediately. Under FAS 87 and IAS 19 these can be smoothed over a period of years and gains or losses less than 10% of the liabilities can be ignored. (Cooper et al. 2001)

For accounting periods starting on or after 1 January 2005 all listed UK companies must report under IAS 19, although options exist such that disclosure can, in many respects, continue largely as on the FRS 17 basis. (Lane Clark and Peacock, 2005)

[5] Other assets are generally just the cash held in the scheme. However, some companies also hold insurance contracts and other diverse assets.

3. Literature and Theoretical Background

In this section we motivate our study and put forward a theoretical framework for our analysis. We consider how companies account for their pension scheme in terms of its impact upon the balance sheet and on the profit and loss, as well as the determinants of the decisions management make. We then look at the portfolio asset allocation and the impact of the trend towards liability driven investment. Last we consider the role of professional advisors such as the company auditor and pension scheme actuary in the process of accounting for pensions.

3.1 Accounting Manipulations

There is a wide literature on the incentives and ability of managers to manipulate corporate earnings. Healy and Whalen (1999) define earnings management as when managers use judgement in financial reporting to mislead stakeholders as to the underlying economic performance of the company. They note that there are many ways for managers to do this, including manipulating the assumptions that are required to account for pensions. Furthermore, evidence suggests this manipulation can be successful as the market fails to see through the manipulation and values misreported earnings as if they were true earnings. For example, Sloan (1996) finds that stock prices appear to act as if investors focus on reported earnings and fail to take account of the additional information contained in accounting accruals.

3.2 Balance Sheet Effects

US-focused pension accounting research has tended not to focus on balance sheet issues because of the smoothing effects allowed under US accounting standards. However, the mark-to-market nature of FRS 17 means that the impact of the pension scheme on the balance sheet becomes more important. Company management have an incentive to minimise the impact of the pension liability on the balance sheet by choosing a ‘favourable’ discount rate. FRS 17 states that the discount rate should be equivalent to the yield on an AA-rated corporate bond of appropriate maturity**.** While this prescription

sounds quite clear, the fragmented nature of the UK corporate bond yield curve and the thin trading of many corporate bonds, means some discretion needs to be exercised in choosing the yield level to be used.

3.3 Earnings Effects

In terms of pension accounting, Bergstresser et al. (2006) argue that managers of US companies manipulate earnings through their choice of pension accounting assumptions. Companies whose earnings have the greatest sensitivity to pension income, i.e. where the pension fund is large in relation to operating earnings or assets, then managers tend to use a high expected return on pension plan assets. High return assumptions are also likely where management have an incentive to boost earnings, for example prior to mergers, seasoned equity offerings and exercise of options by management.

Amir and Benartzi (1998) however, find that the expected return on scheme assets, which in the US is a combined rate reflecting the weighted average of all assets held in the plan, is only weakly correlated with the percentage of equity held in the plan. They also find that the expected return variable is a poor predictor of future returns on the pension portfolio.

Coronado and Sharpe (2003) argue that in valuing companies that sponsor pension schemes, the market focuses on the smoothed pension-related income that is reported on the income statement, rather than on the actual values of assets and liabilities of the plan. Furthermore, they find that the market assigns a multiple to these pension earnings similar to that applied to core, non-financial earnings. The authors argue that this factor contributed to the overvaluation of some companies' shares in the late 1990's stock market boom and the subsequent correction.

3.4 Portfolio Restructuring

There is a strong rational for pension schemes to invest in bonds. First pension funds have special tax status and the benefit of this status is maximised when the pension portfolio is almost wholly invested in bonds (Black, 1980). Second, a low risk approach in the pension scheme will allow the sponsoring company to take more risk in its underlying business, a source of risk that is more likely to be valuable to shareholders. However, most pension scheme are heavily invested in equities, presumably on the basis that the higher expected return makes the pension commitment seem 'cheaper'.

Under current accounting standards company earnings are also boosted by investing the pension scheme assets in equities. Gold (2003) argues that standard pension accounting approaches (e.g. FAS 87) include a "financial bias" that is likely to lead to systematic overvaluation of companies with pension plans invested in equities. This "opaque" accounting has the effect of enabling managers to invest pension assets in equities, despite the tax disadvantages of doing so noted by Black (1980) and Tepper (1981).

3.5 The Role of the Auditor and the Actuary

Professional advisers have an important role to play in pension accounting. The pension scheme's actuary will provide a valuation of the pension scheme liabilities for funding purposes and may advise company management on assumptions to use in the valuation and in the company financial statements. Once management have chosen the assumptions, the company auditor will have sign off the assumptions as being fair and reasonable. Hence it is important to consider incentives that exist in the relationship between company management and these key advisers.

The independence of the audit and the size of the auditor are important factors in looking at the range of disclosures which are presented in the annual report and the issue of audit quality. Given the opaque nature of pensions accounting and in considering the level of discretion afforded to management, the identity of the auditor and the level of fees paid to

the auditor are interesting factors to consider in the assumption setting process. Prior research, however, shows for large auditors that have essentially the same technology, that they have more to lose from performing a low quality audit (DeAngelo, 1981). Furthermore DeFond et al (2002) and Craswell et al (2002) both find that there is no relationship between audit quality and the level of non-audit fees received. Both of these arguments are consistent with loss of reputation and potential litigation.

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4. Data

The sample of companies used in this study is drawn from the UK FTSE 350 index, an index of the largest 350 companies listed on the London Stock Exchange. The index is rebalanced quarterly and we include all companies that appeared in the index between June 2001 and June 2004. This universe comprises 392 companies. We exclude 44 investment trusts (listed closed end investment funds). We also exclude 62 companies with only Defined Contribution (DC) schemes and 2 companies without UK pension schemes. For DC schemes, there is no balance sheet effect and the pension expense is simply the cash cost of the contributions. (Cooper et al. 2001) This leaves 284 eligible companies on which we attempt to collect the FRS17 data from published accounts. Some do not have four years of data, for example because they are new issues, or because they merge, or otherwise die. In our analysis we use an unbalanced panel that ranges from 206 to 232 companies each year, giving a total of 876 company-years.

In the analysis, we define “Year 1” as the first year in which a company makes FRS17 disclosures, which means all financial year ends from 22 June 2001 to 21 June 2002. Accordingly, “Year 2” is financial year ends from 22 June 2002 to 21 June 2003; “Year 3” is from 22 June 2003 to 21 June 2004; and “Year 4” from 22 June 2004 to 21 June 2005.

For each company in the sample, we collect the value of pension assets and liabilities, the asset allocation of the pension assets, the discount rate, expected wage growth, and the

expected return assumptions for the various asset classes in which the pension assets are invested. The market capitalisation of the company, book value of equity, book value of total debt and net profit figures are collected from *Datastream*.

5. Methodology

First, we present descriptive statistics on the companies in the sample and the pension liabilities and assets they disclose under FRS 17. We also show the range of assumptions used by companies in terms of discount rate, wage growth and expected return on equity. We do not report expected return on bonds given that companies vary in whether they disclose rates of return for government and corporate bonds separately, or as one combined figure. Thus there are concerns about how comparable the figures are. Equally, disclosure on property returns and "other" assets is variable in nature. More importantly however, the majority of assets for most companies are invested in equities.

To examine the choices that are made by management we derive a number of proxies for the size and the risk of the scheme as well as the portfolio composition. Our variables relate to the size of the pension scheme relative to the size of the company, measured by market value, and hence the schemes potential impact on the financial statements of the company. We construct two variables of this nature the first is the pension liability divided by equity market capitalisation and the second is the pension surplus (deficit) divided by equity market capitalisation. We also include funding as an additional proxy of pension risk/exposure. This measure is commonly reported in the financial press and is defined as the ratio of pension assets relative to liabilities.

The accounting assumption variables we test are taken from the FRS 17 disclosures. The first is the nominal discount rate, while the second is the spread between the discount rate and assumed wage growth. These two assumptions are our balance sheet measures.

In simple terms, the company has an incentive to use a high discount rate in order to reduce the value of the liabilities and flatter the balance sheet. More specifically, Lane

Clark and Peacock (2005) note that a key determinant of the calculation of pension liabilities is the 'real' discount rate – measured as the excess of the discount rate over the assumed rate of growth in employee salaries. These balance sheet variables are important because it is possible for a large deficit to wipe out the company's distributable reserves and prevent it making dividend payments to shareholders. British Airways for example in their 2004/05 financial report show that they would have negative distributable reserves under FRS 17.

The disadvantage of using a high discount rate is that the periodic interest cost, shown as a cost in net financial income, will be relatively high. This can be compensated by using a high return on scheme assets, which counts positively in net financial income.

We also therefore consider the assumptions applied for the expected return on equity. To analyse this we consider the nominal equity return assumption but again the more important factor is not the level of the expected return on equity variable, but the spread between this assumption and the discount rate. Cooper et al (2001) note that corporate earnings may be flattered where there is a positive spread between the expected return on pension assets and the discount rate being used to value the liabilities. Hence we test this spread variable too.

Further, given that the equity return assumption is arguably the most subjective assumption with regards to managerial discretion we test whether companies wishing to utilise this discretion hold higher levels of equity in their pension scheme assets.[6]

Lastly we look at the relationship between the auditor and the actuary and the key accounting variables used by companies. We consider not only the identity of the auditor but also the level of non-audit fees as a percentage of total fees. For the actuary we can only examine the identity because the level of fees is not disclosed. Both of these factors

[6] It is possible to argue the corporate management do not control asset allocation, which formally is the responsibility of the pension scheme trustees. However, corporate management often comprise a significant proportion of the trustee board and can exert significant influence. See Cocco and Volpin (2007) for a discussion of this.

are important however, as both the auditor and the actuary play important roles in the setting of the pension assumptions.

6. Results

6.1 Descriptive Statistics of Sample Companies

Table 1 presents descriptive statistics for the companies in the sample in Year 1 and shows how the mean values change between Year 1 and Year 4. In Year 1, the median company in the sample has, in approximate terms, market capitalisation of £0.9bn and profits of £37m. The corresponding statistics on the pension scheme assets and liabilities show that the median UK pension liability in Year 1 is £302m. Again the distribution is positively skewed and companies in the top quartile have liabilities exceeding £1bn. Over the period from Year 1 to Year 4 the mean pension liability increases by £238.37m. In terms of pension liabilities relative to market capitalisation, the median value in Year 1 is 23.26%. The mean value increases by 5.3% over the four years. A wide range and positive skew is evident in the data with between 12 and 25 companies, depending on which year, having liabilities equal to more than 100% of their market capitalisation.

In most cases, the assets held to back the pension promises amount to less than the value of the liabilities, i.e. there is a deficit. The median value of assets in Year 1 is £273m. The mean value of assets rises from Year 1 to Year 4, but not by as much as the increase in liabilities. The median gross surplus of assets over liabilities is -£5.75m in Year 1. The mean surplus falls significantly by £235m from Year 1 to Year 4. The corresponding median funding figure, i.e. assets divided by pension liabilities, for year 1 is 94%. The mean funding figure in Year 1 is 96%, falling significantly to 80% by Year 4. The median ratio of pension scheme surpluses to company market capitalisation is -0.5% in Year 1. The mean value for Year 1 is -0.5% and this falls to -7.08% by Year 4. In the later years, the bottom quartile for surplus relative to market value is -9.8% through -15.0%. It is clear that for many companies the pension obligation is significant in relation to their market value.

In terms of asset allocation, the most notable feature is the high level of investment in equities, with a median allocation of 73.5% of assets in Year 1. This is consistent with the US experience (Amir and Benartzi, 1998; Bergstresser et al., 2006; Gold, 2003) but contrary to theoretical considerations that suggest company value is maximised by investing plan assets mainly in bonds. (Black, 1980; Bodie, 1990; Tepper, 1981) The mean percentage of equities held falls significantly from 69% in Year 1 to 62% in Year 4. The initial decline in equity share can be explained in part by the relative performance of equities and bonds in the latter part of the 2000 to 2003 bear market. However, the subsequent declines in equity share come at a time when equity markets were performing well, meaning the decline must reflect active switching by pension schemes. In tandem with this there is a significant increase in the percentage of debt held which increases from 23% in Year 1 to about 29% in Year 4. This is consistent with the growing use of liability matching investment strategies.

In considering the potential for financial statement manipulation through pension accounting assumptions, the first question is to what extent assumptions vary across companies. Some variables, such as employee wage growth, could legitimately vary across companies reflecting circumstances such as industry or the nature of the workforce. However, it is less obvious why the discount rate and expected return on equity should vary significantly.

Discount rates could vary reflecting the duration of the plan liabilities if there is variation in the term structure of AA-rated corporate bond yields. However, few companies disclose details of the duration of liabilities to enable this to be tested. In any case, most corporate bonds have duration that is shorter than the duration of typical corporate pension liabilities and as a result most companies must simply choose the longest-dated yield available.

In considering the expected return on equity, the return assumption could vary depending on the beta of the underlying portfolio and, possibly, the level of investment management

charges. However, most pension schemes are likely to be invested in broadly diversified equity portfolios which would be similar to the market and it is reasonable to assume most schemes would be paying similar levels of charges.

From the table it is clear that there is variation across companies in terms of their pension valuation assumptions. For wage growth the median assumption in Year 1 is 4.0%, while the range is from 0.0% to 5.8%. As noted above, no direct conclusion can be drawn from the variation across companies without knowing more about the profile of the workforce in each case.

The median discount rate fluctuates from year to year, as would be expected given the requirement to use a market bond yield. In Year 1 the median is 6.0%. The mean in year 1 is 5.9% and falls to 5.4% by Year 4. This is consistent with market experience over the period where gilt yields have fallen and corporate bond spreads have narrowed. The range for the discount rate in Year 1 is from 5.5% to 7.25%. However, the inter-quartile range (not reported) for the discount rates is relatively narrow, of the order of 10 to 20 basis points, suggesting most companies produce their assumptions in similar ways. It is unclear whether the variation that is present reflects differing maturity profiles in the pension schemes and variation in the term structure of corporate bond yields.

While the discount rate is an important variable, a more direct driver of the valuation of the pension liabilities is the spread between the discount rate and assumed wage growth. The wider this spread, the more powerfully future pension obligations will be discounted. From Table 1 it can be seen that there is more variation in this ‘real’ variable than in the nominal discount rate. The median spread in Year 1 is 1.8%, while the range is from 0.2% to 7.3%. The inter-quartile range (not reported) is of the order of 50 basis points. The implication is that different companies assign different present value figures to the pension obligation to an employee of equivalent current salary and tenure.

The investment return assumption is arguably the most subjective variable in the accounting requirements. As argued above, the equity holdings of most pension funds can

be expected to be relatively similar and characterised as the market portfolio. However, there is scope for companies to differ in their expectation of market returns.[7] Table 2 shows that the median assumption for the expected return on equity in Year 1 is 7.8%, while the mean is 7.5%. The mean changes little between Year 1 and Year 4. There is a large range in Year 1 from 6.1% to 9.0% and the inter-quartile range is 0.7%.

As with the discount rate, the key variable that impacts the financial statements is not the equity return in isolation, but the spread between the expected return on equity and the discount rate. This spread is reflected in net financial income on the profit and loss account. Any difference between the expectation and the actual return is shown on the statement of total recognised and unrecognised gains and losses and taken directly to reserves. The median value of this spread in Year 1 is 1.75% in year 1, while the mean is also 1.75%. One interpretation of this figure is as the equity risk premium, although measured relative to corporate bonds rather than, as traditionally, gilts or T-bills. The range in Year 1 is from 0.25% to 3.0%. The inter-quartile range at 70 basis points is broadly similar to the corresponding range for the nominal equity return assumption.

We now turn to our analysis of the relationship between the pension accounting assumptions and the incentives management face in terms of the impact of those assumptions on the company financial statements. Panel A in table 2a shows data for each of the four years sorted by the discount rate. Companies are ranked into quintiles using their discount rate assumption and we then calculate average values for the incentive variables for the first and fifth quintiles. Our incentive variables essentially measure the extent to which the company's financial statements will be materially affected by the pension accounting assumptions. In looking at the difference between the fifth and first quintiles, we see that companies that are applying the highest discount rates have the smallest Liability/MV and those companies with the highest Liability/MV are applying the lowest discount rate although the difference is not significant. For

[7] It is worth pointing out that companies do have sources of common assumptions in terms of their use of a limited number of accounting and actuarial companies as advisers. To the extent that advisory companies have 'house views' on these variables and their client companies are prepared to accept them, we should find companies using a limited number of 'packages' of assumptions. Why assumptions should vary by advisory company is a matter for speculation.

Surplus/MV there is no discernable relationship. Companies with high (i.e. less conservative) discount rate assumptions do not tend to have higher levels of liabilities and larger deficits relative to their market capitalisation. For funding in Year 1 – Year 3 those companies that are applying a higher discount rate are better funded, however, in Year 4 this reverses.

Panel B presents the same analysis but this time for the discount rate spread variable that measures the extent to which the discount rate exceeds the assumed future wage growth. If we compare the first quintile with the fifth quintile, we find that companies that use wide spreads (Q5), which will, all other things being equal, reduce the liability, have larger ratios of pension liabilities to market capitalisation, larger pension deficits relative to market capitalisation, and lower pension scheme funding ratios compared to companies that use narrower spreads (Q1). The differences in means and medians for Liability/MV are significant at the 95% level for Years 1 to 4[8], while the differences in means for Surplus/MV are significant at the 95% level for all four years. The sign on the difference in funding is consistently negative, but the coefficients are not statistically significant in all years.

Table 2b shows quintiles ranked by the Equity Return assumption. One of our hypotheses was that companies with high assumed return on equity would have higher equity allocations. If anything, the reverse is true and this is a puzzling result. The negative sign implies that companies with high forecasts for the equity risk premium allocate less to equities than companies with low forecasts, although the relationship is not significant at conventional levels.[9] In terms of the other incentive variables, the results are similar to the discount rate spread analysis in the previous tables. There appears to be some relationship between the extent of the company's liabilities relative to market capitalisation, and the deficit relative to market capitalisation, and the level of assumed return on equity. Again, the relationship is evident when comparing quintiles 1 and 5. The

[8] In year 1 the difference between Q5 and Q1 is significant at 90%

[9] However, when we carry out our panel regression analyses this relationship that high expected return on equity is related to higher equity allocations is significantly positive.

sign is correct in all four years for both variables and significant at the 95% level in three years for liability to market value and in two years for surplus to market value. There appears to be no relationship between the equity return assumption and the level of funding.

Panel B shows quintiles ranked by the equity spread variable, the excess of the expected return on equity relative to the discount rate. The results are similar to the results using the nominal equity return assumption. High spreads are associated with high ratios of liabilities to market cap and high ratios of deficit relative to market cap. The results are statistically significant for the latter three years in each case. There is no discernable relationship between the equity spread and scheme funding.

6.2 Balance Sheet Effects

Tables 3 and 4 present the results for the analysis of the balance sheet effects of pension accounting. In table 3 the dependent variable is the discount rate. The results show that the discount rate is negatively related to the liability/market value. Those companies with the highest liability to market value are therefore applying the lowest discount rates. There is a positive relationship between the discount rate and the level of scheme funding, which is measured as total pension assets/pension liability. Companies with the highest levels of funding choose to use the highest discount rates. These findings are also robust when we control for Fama-French factors[10] and proxies for corporate governance.

We apply a number of different control variables as it is possible that the results that we observe are driven by other factors such as the size of the company or governance effects. We also control for year effects in our analysis as the period that we consider is relatively turbulent for pensions, with the fall in the stock market and falling bond yields. We are, in essence, only concerned with the cross-sectional relationships.[11]

[10] We control for both size (log market value of the company) and market-to-book

[11] For governance proxies we control for the board size and the percentage of non-executive directors on the board

Table 4 examines the discount rate spread variable. Although there is not a significant relation between the discount rate spread and the liability to market value, there is still a significant positive relationship between the discount rate spread and the funding level. If anything this result is more important than the discount rate findings as the size of the spread has a more direct impact on the balance sheet than the discount rate alone.

The implication is that those companies in the strongest position are applying lower levels of discounting to their pension liability. As mentioned above the implication is that different companies discount liabilities of employees with the same tenure and salary differently.

This result is consistent with the findings of Rauh (2006). He showed that for those companies in the worst position there is very little scope for risk-shifting.[12] Essentially, the impact of British Airways applying the highest discount rate in a given year will not change the fact that they are a risky prospect due to the funding level in their pension scheme and the magnitude of their pension liability. There is therefore less incentive for management in such a situation to apply higher rates as the impact upon the balance sheet will be marginal, and the company will subsequently incur a high interest cost in the future. However, for those companies with well funded schemes, there is a greater incentive to smooth fluctuations in the funding level as any large changes in the solvency of the pension scheme will be apparent and will be a cause for concern to both management and investors as the company will appear to be riskier.

6.3 Profit and Loss Effects

Tables 5 and 6 present the results of the fixed panel regressions on the profit and loss variables. For the expected return on equity in table 5 we can see that there is a significant positive relationship across companies between the expected return on equity and the amount of equity held in the pension portfolio. This is consistent with prior

[12] Risk-shifting occurs where management undertake risky strategies as they either explicitly know that they will not bear the risks if the strategy fails or implicitly believe that they will not bear such risks

research such as Gold (2003) and Bergstresser et al. (2006). We also see that there is a positive relationship between funding levels and the expected return on equity. This result holds when we control for Fama-French factors, but not when we control for corporate governance.

In table 6 it is clear that there is a positive relationship between the percentage of equity held and the equity spread. Again as with the discount rate spread and balance sheet impacts, this relationship is more important, as the spread between the variables represents the 'real' impact on the profit and loss. Once we control for governance there is a significant negative relationship between the spread and the funding levels. Although the relationship is negative in all cases only the regression with corporate governance has any significance. The result however, shows that companies with the worst funding levels have the largest spreads between the expected return and the discount rate. These companies are therefore maximising the financial income which can be derived from the pension assets.

Given that the discount rate and the expected return on equity are significant in our estimation, it is important to test the relationship between these variables as there is potential for an endogenous relationship to exist. The reason we test for endogeniety is to check the order of the decision making process. If the objective function of managers is the expected return on equity whether to offset interest costs or increase financial income, then it is possible that the order of the decision making process may have different causality from expectations.

Table 7 shows the results of the two-stage-least-squares analysis for the discount rate, expected return on equity and the equity spread. From the results for the expected return on equity we find that the discount rate is significantly and positively related to the expected return on equity, showing that for those companies that choose a high discount rate they commensurately choose a higher expected return. Further, the result for the equity spread shows those companies that elect to apply a higher discount rate have a smaller spread as there is a significantly negative relationship between the discount rate

and the equity spread. The expected return on equity that is applied is therefore a function of the choice of discount rate that companies use.

Implicitly those companies that are electing to manage their funding levels by electing to apply higher discount rates do not derive as much income from the assets they hold in the pension portfolio. They do however select a higher expected return on equity which may be in part to offset the high interest cost of applying the higher discount rate. However, those companies with lower funding levels derive a higher level of income from the assets in the pension portfolio as the choice of a smaller discount rate increases the spread between the expected return on equity and the discount rate.

6.4 Lagged Analysis of Balance Sheet and Profit and Loss Effects

Table 8 presents the results of analysing lags in certain incentive variables and proxy variables. For the discount rate spread we find further evidence of smoothing as there is a significant positive relationship between the discount rate spread at t_0 and liability/market value at t_{-1}, those companies that have larger liability to market value therefore choose to increase the spread in the proceeding year, that is to discount the liability more heavily. Further to this there is a significantly negative relationship between the level of funding in the previous year and the spread in the current year, again this implies that the choice of balance sheet variables is a result of the desire to smooth the balance sheet impact of the pension.

Although we do not find that there are other significant relationships between the other assumptions and the lagged variables. Given the result of the two-stage-least squares analysis, it is reasonable to assume that the choice of the balance sheet variables would be affected by prior changes in the pension scheme and that the other variables are then set with reference to these decisions.

6.5 Portfolio Restructuring

Over the sample period we observe that there is a restructuring of the pension portfolio as there is a movement away from equities into bonds. This is consistent with the liability driven investment strategies which companies are undertaking, and also with the theoretical works of Black (1980) and Tepper (1981). We therefore analyse how the expected return on pension portfolios changes in response to this.

Table 9 shows that there is a significant fall in the weighted average return on the pension portfolio between 2001 and 2004. The mean return on the pension portfolio falls by just over 30 basis points. When we analyse the weighted average on all assets other than equity we also find that there is a significant fall in the weighted average return on all of the other assets held from 5.28% in 2001 to 4.98% in 2004. This suggests that management have not sought to cushion the impact on expected return of shifting to bonds by inflating the return assumption.

6.6 The Role of the Auditor and the Actuary

As a result of the variability we observe across all companies in all years, it is reasonable to analyse the role of the auditor and the actuary in the setting of the pension assumptions. We identify the top four auditors and actuaries by market share and assign dummy variables to them. From Table 10 we can see that for all of the assumptions the choice of auditor and the level of non-audit fees relative to total fees have no relationship to the assumptions of the companies. This is broadly consistent with expectations as the companies in the sample predominantly use one of the 'Big Four' auditors, the result therefore conforms to previous findings as neither size nor the level of other fees received impact upon the quality of the audit.

For the different actuaries however, there are a number of significant findings. The first is that in relation to the 'Big Four' actuaries in the market place, other smaller actuaries set significantly higher discount rates. For the discount rate assumption the bigger

actuaries generally set a smaller spread, although only one of the results is significant. What is more interesting is that three of the four biggest actuaries set significantly higher expected return on equity assumptions, with the other actuary applying significantly lower expectations about the return on equity. This result also holds for the spread with the same big three actuaries applying much larger equity spreads.

7. Conclusions

From our analysis we find that key pension accounting assumptions vary significantly across companies and the companies with the most optimistic assumptions are those where the pension liabilities and deficits are large in relation to the size of the company. This is broadly consistent with opportunism by management in choice of the assumptions.

Our results show that, for those companies with best funded schemes management are more interested in the changes of the balance sheet impact of the pension scheme. However, for those companies where there is lower funding in the scheme then managers opportunistically choose to maximise the financial income that can be derived from the pension assets.

The restructuring of the pension portfolios is also clear from our analysis. This is consistent with the current move towards liability driven investment strategies. However, there is no evidence that management have adjusted return expectations on the various asset classes to cushion the effect of this on aggregate expected return.

We also show that although the auditor does not impact upon the range of assumptions, the choice of actuary does. This is an interesting finding as we see a large variation in the choice of assumption across both companies and actuaries. The range of views across individual companies is also startling, where one would expect house views and clustering there is significant variation within actuaries as well as across them.

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Table 1 - Descriptive Statistics of Sample Companies and Company Pension Schemes in 2001

Table 1 presents descriptive statistics for the sample companies in 2001. The table presents the number of companies 2001 for which the data item is available (N) the mean, median, standard deviation, minimum, and the change in the means from 2001 to 2004 (μ_{2004}- μ_{2001}), where * indicates significant at 95% and ** indicates significance at 90% based on t-test for the difference in means. The data items in the table are company market value, the book value of equity, total debt, net profit, pension assets, pension liability, gross surplus, funding level (pension assets/pension liability), liability/market value surplus/market value equity percentage, debt percentage, discount rate, wage growth, expected equity return, discount rate spread (discount rate – wage growth) and the equity spread (expected equity return – discount rate). All figures not shown as £m are percentages.

	N	Mean	Median	St. Deviation	Min	Max	μ_{2004}- μ_{2001}
Market Value (£m)	206	4070.75	943.40	12601.19	5.29	119787.20	*-1852.20**
Book Value (£m)	206	27040.73	1048.94	88240.64	-114.00	644275.38	1043.03
Total Debt (£m)	206	4080.02	417.90	15531.68	0.00	117507.00	235.12
Net Profit (£m)	206	39.68	37.05	1311.09	-15679.00	5134.10	132.44
Pension Liability (£m)	206	-1281.36	-302.25	3053.39	-28930.00	-2.10	-238.37
Pension Assets (£m)	206	1303.99	273.20	3097.30	1.90	27100.00	3.30
Gross Surplus (£m)	206	22.63	-5.75	374.39	-1830.00	4134.00	*-235.07**
Funding	206	96.50	93.87	16.39	61.05	171.43	*-16.69**
Liability/Market Value	206	42.04	23.26	67.79	0.28	541.95	5.30
Surplus/Market Value	206	-0.47	-0.54	9.41	-64.68	75.74	*-7.08**
Equity Percentage	206	70.08	73.56	14.90	5.56	100.00	*-7.32**
Debt Percentage	206	22.77	20.01	13.71	0.00	73.33	*6.05**
Discount Rate	206	5.95	6.00	0.20	5.50	7.25	*-0.55**
Wage Growth	206	4.13	4.00	0.53	0.00	5.80	-0.04
Equity Return	206	7.70	7.75	0.54	6.12	9.00	-0.03
Discount Rate Spread	206	1.82	1.80	0.59	0.20	7.25	*-0.47**
Equity Spread	206	1.75	1.75	0.53	0.25	3.00	*0.52**

Table 2a – Pension Scheme Exposures Ranked by Discount Rate and Discount Rate Spread

Table 2a presents the difference in the mean value and median value for the pension liability divided by balance sheet market capitalisation, pension surplus/deficit divided by balance sheet market capitalisation and the level of funding in the pension scheme when sorted into quintiles by discount rate in panel A, and discount rate spread in panel B, The mean value presented in italics is the difference between quintile 5 and quintile 1. * indicates significant at 95% and ** indicates significance at 90%.

	Discount Rate		**Liability/Market Value**		**Surplus/Market Value**		**Funding**	
Panel A	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
Year 1 Q1	5.70	5.75	32.66	18.24	0.30	-0.28	96.76	96.43
Year 1 Q5	6.30	6.25	26.95	17.86	-0.48	-0.59	97.19	95.69
Q5-Q1	*0.60*	*0.50*	*-5.71*	*-0.38*	*-0.78*	*-0.31*	*0.43*	*-0.74*
Year 2 Q1	5.35	5.40	41.72	29.54	-11.85	-4.72	70.59	70.21
Year 2 Q5	5.96	5.95	38.54	13.82	-7.98	-3.53	76.27	73.40
Q5-Q1	0.61	0.55	-3.19	-15.72	3.87	1.19	5.67	3.18*
Year 3 Q1	5.27	5.30	56.92	21.48	-16.72	-4.70	66.14	69.59
Year 3 Q5	5.73	5.70	54.30	22.05	-10.83	-4.76	76.30	76.84
Q5-Q1	*0.46*	*0.40*	*-2.62*	*0.57*	*5.88*	*-0.07*	*10.16**	*7.25*
Year 4 Q1	5.21	5.25	46.12	18.73	-2.87	-2.49	84.33	78.18
Year 4 Q5	5.62	5.50	42.89	24.45	-8.11	-6.03	78.39	77.34
Q5-Q1	*0.41*	*0.25*	*-3.24*	*5.72*	*-5.24*	*-3.54**	*-5.94***	*-0.85*

Panel B	**Discount Rate Spread**		**Liability/Market Value**		**Surplus/Market Value**		**Funding**	
Year 1 Q1	1.05	1.25	21.07	11.88	1.17	-0.14	100.51	97.62
Year 1 Q5	2.53	2.40	50.34	22.87	-3.33	-1.01	95.08	90.31
Q5-Q1	*1.48*	*1.15*	*29.26***	*10.99**	*-4.50**	*-0.88**	*-5.42*	*-7.31**
Year 2 Q1	1.03	1.20	23.18	8.66	-4.11	-2.02	76.00	71.61
Year 2 Q5	2.61	2.33	71.54	33.13	-18.45	-10.02	72.83	71.84
Q5-Q1	*1.58*	*1.13*	*48.36**	*24.48**	*-14.34**	*-8.00**	*-3.18*	*0.24*
Year 3 Q1	0.66	0.75	22.65	9.61	-3.64	-1.81	81.05	80.51
Year 3 Q5	2.45	2.05	51.91	23.27	-10.55	-4.98	77.57	76.67
Q5-Q1	*1.79*	*1.30*	*29.26**	*13.66**	*-6.91**	*-3.18**	*-3.48*	*-3.84*
Year 4 Q1	0.55	0.60	17.67	10.08	-2.37	-1.74	82.95	84.62
Year 4 Q5	2.46	2.10	58.93	30.50	-8.35	-5.82	78.30	77.39
Q5-Q1	*1.91*	*1.50*	*41.26**	*20.43**	*-5.98**	*-4.07**	*-4.64***	*-7.24**

Table 2b – Pension Scheme Exposures Ranked by Equity Return and Equity Spread

Table 2b presents the difference in the mean value and median value for the pension liability divided by balance sheet market capitalisation, pension surplus divided by balance sheet market capitalisation and the level of funding in the pension scheme when sorted into quintiles by equity return in panel A, and equity spread in B. The mean value presented is the difference between quintile 5 and quintile 1. * indicates significant at 95% and ** indicates significance at 90%.

	Equity Return		**Liability/Market Value**		**Surplus/Market Value**		**Funding**		**Equity Percentage**	
Panel A	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
Year 1 Q1	6.91	7.00	31.28	15.30	0.57	-0.53	97.51	91.76	69.26	75.83
Year 1 Q5	8.52	8.50	46.32	27.47	-2.14	-0.38	95.90	95.55	68.24	70.19
Q5-Q1	*1.61*	*1.50*	*15.05*	*12.18**	*-2.70*	*0.14*	*-1.61*	*3.79*	*-1.02*	*-5.64*
Year 1 Q1	6.78	7.00	32.46	17.40	-7.54	-3.29	71.26	71.53	66.20	66.86
Year 1 Q5	8.58	8.50	79.52	34.27	-14.46	-6.25	75.97	74.48	63.98	67.04
Q5-Q1	*1.80*	*1.50*	*47.06**	*16.87**	*-6.93***	*-2.95**	*4.71*	*2.94*	*-2.22*	*0.18*
Year 1 Q1	6.90	7.00	33.54	12.99	-6.48	-3.33	76.21	75.80	65.17	67.24
Year 1 Q5	8.51	8.50	71.95	37.63	-12.70	-9.71	78.41	78.66	61.90	64.23
Q5-Q1	*1.61*	*1.50*	*38.42**	*24.64**	*-6.22**	*-6.38**	*2.19*	*2.86*	*-3.27*	*-3.01*
Year 1 Q1	6.82	7.00	28.68	12.67	-4.62	-2.60	78.10	77.50	65.30	63.96
Year 1 Q5	8.37	8.30	61.33	32.21	-10.73	-6.30	78.57	77.71	60.82	65.79
Q5-Q1	*1.54*	*1.30*	*32.65**	*19.54**	*-6.11**	*-3.70**	*0.47*	*0.22*	*-4.48*	*1.83*
Panel B	**Equity Spread**		**Liability/Market Value**		**Surplus/Market Value**		**Funding**		**Equity Percentage**	
Year 1 Q1	0.98	1.00	30.38	13.20	0.51	-0.38	96.95	93.84	70.65	76.34
Year 1 Q5	2.44	2.40	45.43	27.32	-1.23	-0.22	96.83	97.26	69.66	70.93
Q5-Q1	*1.47*	*1.40*	*15.05*	*14.12**	*-1.74*	*0.15*	*-0.12*	*3.42*	*-0.98*	*-5.41**
Year 1 Q1	1.22	1.33	32.07	18.68	-7.39	-3.38	72.22	72.68	65.40	67.71
Year 1 Q5	2.94	2.95	80.08	40.98	-14.96	-8.42	75.05	73.16	63.67	66.31
Q5-Q1	*1.72*	*1.63*	*48.01**	*22.30**	*-7.57**	*-5.04**	*2.83*	*0.48*	*-1.73*	*-1.40*
Year 1 Q1	1.36	1.40	26.79	11.53	-6.38	-2.90	75.32	75.23	66.61	68.69
Year 1 Q5	2.98	2.90	73.70	37.15	-12.09	-8.67	79.78	80.11	60.30	63.12
Q5-Q1	*1.62*	*1.50*	*46.91**	*25.63**	*-5.71**	*-5.77**	*4.46*	*4.88**	*-6.31***	*-5.57**
Year 1 Q1	1.43	1.60	24.46	12.40	-4.38	-2.60	77.02	77.34	64.77	63.96
Year 1 Q5	2.95	2.93	58.46	27.52	-10.84	-5.76	78.73	77.45	59.30	64.09
Q5-Q1	*1.52*	*1.33*	*34.01**	*15.12**	*-6.46**	*-3.16**	*1.71*	*0.11*	*-5.47*	*0.13*

Table 3 - Regression Analysis of Balance Sheet Effects for Choice of Discount Rate

Table 3 presents the results for two-way fixed effects regressions for the determinants of the discount rate. The table presents the regression coefficient and immediately below is the corresponding t-statistic. * indicates significant at 95% and ** indicates significance at 90%. The dependent variable, (discount rate) for each model is presented at the head of each column and the independent variables are presented in the far left column. The Fama-French control variables are the log market value for size and the market-to-book ratio is the market value of equity/book value of equity. The corporate governance control variables are the board size and the percentage of non-executive directors on the company's board. The standardised discount rate is calculated by $(Discount\ Rate_{it} - \mu_t)/Standard\ Error\mu_t$.

	Discount Rate	**Discount Rate**	**Discount Rate**
Intercept	-38.318	-36.432	-42.750
	-3.86*	-3.60*	-2.82*
Liability/Market Value	-0.020	-0.020	-0.021
	-1.91*	-1.95*	-1.78*
Funding	0.484	0.481	0.407
	7.63*	7.57*	5.11*
Equity Percentage	0.029	0.018	0.017
	0.36	0.22	0.14
Size	-	-0.442	-
		-0.46	
Market-to-book	-	0.001	-
		0.42	
Board Size	-	-	0.625
			1.11
Non-Executive Ratio	-	-	7.806
			0.84
2001	-6.931	-6.591	-4.162
	-4.06	-3.84	-1.79
2002	3.266	3.347	4.910
	2.64	2.69	2.91
2003	0.918	1.075	1.428
	0.78	0.91	0.89

Table 4 - Regression Analysis of Balance Sheet Effects for Discount Rate Spread

Table 4 presents the results for two-way fixed effects regressions for the discount rate spread. The table presents the regression coefficient and immediately below is the corresponding t-statistic. * indicates significant at 95% and ** indicates significance at 90%. The dependent variable, (discount rate spread) for each model is presented at the head of each column and the independent variables are presented in the far left column. The Fama-French control variables are the log market value for size and the market-to-book ratio is the market value of equity/book value of equity. The corporate governance control variables are the board size and the percentage of non-executive directors on the company's board. The standardised discount rate is calculated by $(Discount\ Rate\ Spread_{it} - \mu_t)/Standard\ Error\mu_t$.

	Discount Rate Spread	**Discount Rate Spread**	**Discount Rate Spread**
Intercept	-12.990	-11.959	-28.590
	-2.06	-1.85	-3.14
Liability/Market Value	-0.007	-0.007	-0.012
	-1.06	-1.11	-1.60
Funding	0.257	0.257	0.180
	6.40	6.33	3.75
Equity Percentage	0.005	0.004	0.045
	0.10	0.07	0.61
Size	-	-0.413	-
		-0.71	
Market-to-book	-	0.000	-
		-0.06	
Board Size	-	-	1.084
			3.20
Non-Executive Ratio	-	-	-2.635
			-0.47
2001	-3.408	-3.287	-2.793
	-3.15	-3.00	-1.99
2002	1.546	1.503	2.148
	1.97	1.89	2.11
2003	0.366	0.376	0.628
	0.49	0.50	0.65

Table 5 - Regression Analysis of Profit and Loss Effects and the Determinants of Expected Return on Equity

Table 5 presents the results for two-way fixed effects regressions for the choice of expected return on equity. The table presents the regression coefficient and immediately below is the corresponding t-statistic. * indicates significant at 95% and ** indicates significance at 90%.The dependent variable, (expected return on equity) for each model is presented at the head of each column and the independent variables are presented in the far left column. The Fama-French control variables are the log market value for size and the market-to-book ratio is the market value of equity/book value of equity. The corporate governance control variables are the board size and the percentage of non-executive directors on the company's board. The standardised discount rate is calculated by *(Expected Return on Equity$_{it}$ - μ_t)/Standard Errorμ_t.*

	Equity Return	**Equity Return**	**Equity Return**
Intercept	-10.966	-10.397	-12.835
	-1.60	-1.50	-1.36
Liability/Market Value	0.004	0.004	0.104
	0.59	0.61	1.43
Funding	0.088	0.085	-0.025
	2.01*	1.97*	-0.51
Equity Percentage	0.121	0.121	0.229
	2.16*	2.18*	2.97*
Size	-	-0.173	-
		-0.27	
Market-to-book	-	-0.001	-
		-1.05	
Board Size	-	-	0.183
			0.52
Non-Executive Ratio	-	-	1.001
			0.17
2001	-2.811	-2.567	-1.085
	-2.39	-2.19	-0.75
2002	-0.124	-0.301	-1.248
	-0.15	-0.35	-1.18
2003	-0.715	-0.657	-1.357
	0.38	-0.81	-1.35

Table 6 - Regression Analysis of Profit and Loss Effects for the Expected Return on Equity Spread

Table 6 presents the results for two-way fixed effects regressions for the equity spread. The table presents the regression coefficient and immediately below is the corresponding t-statistic * indicates significant at 95% and ** indicates significance at 90%. The dependent variable, equity spread, (expected return on equity – discount rate) for each model is presented at the head of each column and the independent variables are presented in the far left column. The Fama-French control variables are the log market value for size and the market-to-book ratio is the market value of equity/book value of equity. The corporate governance control variables are the board size and the percentage of non-executive directors on the company's board. The standardised discount rate is calculated by $(Equity\ Spread_{it} - \mu_t)/Standard\ Error\mu_t$.

	Equity Return Spread	**Equity Return Spread**	**Equity Return Spread**
Intercept	0.469	0.457	0.281
	0.07	0.06	0.03
Liability/Market Value	0.010	0.010	0.017
	1.34	1.37	2.16*
Funding	-0.059	-0.059	-0.152
	-1.29	-1.30	-2.90*
Equity Percentage	0.117	0.121	0.226
	2.00*	2.07*	2.78*
Size	-	-0.065	-
		-0.09	
Market-to-book	-	-0.001	-
		-1.32	
Board Size	-	-	0.010
			0.03
Non-Executive Ratio	-	-	-1.817
			-0.30
2001	-0.751	-0.612	0.175
	-0.61	-0.50	0.11
2002	-1.115	-1.322	-2.766
	-1.25	-1.48	-2.49*
2003	-1.012	-0.999	-1.846
	-1.20	-1.18	-1.75

Table 7 – 2 Stage Least Squares Analysis of the Discount Rate and the Expected Return on Equity

Table 7 presents the results for a Two Stage Least Squares Analysis for the relationship between the discount rate, expected return on equity and the equity spread variables. The table presents the dependent variable for each model at the head of the column. The endogenous variable in each case is the discount rate. The instrumental variables are the company size, market-to-book ratio, funding level, equity percentage, debt percentage and the expected return on equity. The table presents the regression coefficient and immediately below is the corresponding t statistic.* indicates significant at 95% and ** indicates significance at 90%.

	Discount Rate	**Expected Return on Equity**	**Discount Rate**	**Equity Spread**
Intercept	0.307682	-23.1095	0.307682	-23.4918
	0.11	-3.92*	0.11	-3.93*
Size	-1.18804	3.45362	-1.18804	3.48884
	-1.66**	5.06*	-1.66**	5.04*
Market to Book	0.00322	-0.00094	0.00322	-0.00103
	3.52*	-1.07	3.52*	-1.16
Liability/Market Value	-0.00338	0.017541	-0.00338	0.01772
	-0.62	3.28*	-0.62	3.27*
Funding	0.033294	-0.01619	0.033294	-0.01545
	1.14	-0.56	1.14	-0.52
Equity Percentage	-	0.130013	-	0.13245
		2.5*		2.51*
Debt Percentage	-	0.199666	-	0.2022
		3.75*		3.74*
Discount Rate	-	0.202007	-	-0.10458
		6.23*		-3.18*

Table 8 - Pooled Regression Analyses for Determinants of Assumptions

Table 8 presents the results for pooled regression analysis on lagged explanatory variables. The table presents the regression coefficient and immediately below is the corresponding t-statistic. * indicates significant at 95% and ** indicates significance at 90%. The dependent variables for each model are presented at the head of each column and the independent variables are presented in the far left column.

	Discount Rate	**Discount Rate Spread**	**Equity Return**	**Equity Return Spread**
Intercept	-0.990	6.244	0.820	-0.809
	-0.25	1.55	0.33	-0.32
lag Liability/Market Value	-0.003	0.014	-	-
	-0.58	2.44*	-	-
lag Funding	-0.002	-0.064	-	-
	-0.01	-2.11	-	-
lag Equity Percentage	-0.019	-0.029	-	-
	-0.53	0.78	-	-
lag Discount Rate	-	-	-0.001	-0.005
	-	-	-0.11	-0.12
lag Discount Rate Spread	-	-	0.001	0.002
	-	-	0.03	0.05
Funding	-	-	-	-
	-	-	-	-

Table 9 - Changes in the Weighted Average Return Assumptions for the Pension Portfolio 2001 – 2004

Table 9 presents the changes in the weighted average return on the assets in the pension portfolio. Panel A presents the mean, median, standard deviation, minimum and maximum for the weighted average return on all assets in the pension portfolio in year 1 and year 4. Panel B presents the mean, median, standard deviation, minimum and maximum for the weighted average return on all assets in the pension portfolio excluding equity in year 1 and year 4. * indicates significant at 95% and ** indicates significance at 90% for both t-tests and Wilcoxen Sign Test.

	Weighted Average Return on Pension Portfolio				
Panel A	**Mean**	**Median**	**Standard Deviation**	**Min**	**Max**
Year 1	6.98	6.99	0.52	5.31	8.21
Year 4	6.65	6.65	0.59	3.6	8.42

	Weighted Average Return on Pension Portfolio Assets Excluding Equity				
Panel B	**Mean**	**Median**	**Standard Deviation**	**Min**	**Max**
Year 1	5.28	5.29	0.60	0.00	7.22
Year 4	4.98	4.95	0.43	2.22	6.63

Table 10 - Pooled Regression Analyses of Auditor, Audit Fees and Actuary

Table 7 presents the results for a pooled regression of the different pension accounting assumptions against a dummy variable for each of the big four accountancy companies and the percentage of non-audit fees to total audit fees received and the actuary. The table presents the dependent variable at the head of each column and the independent variables in the far left column. Below the dependent variable the left hand column presents the result for the auditor and the right hand column presents the actuary. The table presents the regression coefficient and immediately below is the corresponding t statistic.* indicates significant at 95% and ** indicates significance at 90%.

	Discount rate		**Discount Rate Spread**		**Equity Return**		**Equity Return Spread**	
Intercept	2.039	1.7405	-2.638	1.2933	2.635	-2.88716	2.160	-3.45077
	0.54	2.26*	-0.67	1.69*	0.65	-4.08*	0.54	-4.92*
Non-Audit Fee	0.636	-	-0.453	-	-1.734	-	-2.096	-
	0.22		-0.15		-0.55		-0.67	
Auditor 1	-4.389	-	1.600	-	-1.210	-	0.042	-
	-1.16		0.40		-0.30		0.01	
Auditor 2	-2.442	-	2.583	-	-2.154	-	-1.497	-
	-0.67		0.67		-0.55		-0.38	
Auditor 3	-0.993	-	2.615	-	-3.204	-	-3.017	-
	-0.26		0.64		-0.77		-0.73	
Auditor 4	-1.750	-	1.419	-	-1.428	-	-0.910	-
	-0.48		0.37		-0.36		-0.23	
Actuary 1	-	-2.961	-	-1.91588	-	12.0517	-	13.1537
		-2.15*		-1.4		9.55*		10.51*
Actuary 2	-	-3.482	-	-4.1988	-	-4.4515	-	-3.52722
		-2.6*		-3.15*		-3.62*		-2.89*
Actuary 3	-	-3.041	-	1.873	-	8.788	-	9.73613
		-1.18		0.73		3.71*		4.15*
Actuary 4	-	-2.2415	-	-1.5242	-	7.82505	-	8.664
		-1.44		-0.99		5.49*		6.13*