PENSION ACCOUNTING: A STUDY OF VALUE RELEVANCE AND THE PERCEPTION OF DECISION USEFULNESS IN THE UK

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Copyright Statement

Abstract

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Pension accounting: a study of value relevance and the perception of decision usefulness in the UK

This study provides new evidence of the value relevance and the perception of decision usefulness of pension accounting information. The research contributes to the academic literature by using a mixed methodology approach (believed to be the first to do so in value relevance research) involving quantitative analysis of the relationship between the reported financial numbers and the market values of a sample of UK listed FTSE 100 companies over five accounting years from 2006 to 2010 and qualitative analysis in the form of semi-structured interviews with analysts and investors. The research focuses on pension accounting information which for the purposes of this study refers to the accounting for defined benefit (DB) pension schemes and other post-retirement benefits in accordance with the international accounting standard IAS 19.

The research provides evidence that pension accounting information is value relevant and it is perceived to be decision useful. The research also provides evidence that pension accounting information is less value relevant than other accounting information and it is also perceived to be less decision useful than other accounting information. This is a pioneering study in terms of its use of a mixed methodology in value relevance while it is also one of the first pension accounting value relevance studies applied to UK listed companies and believed to be the first study of the perception of decision usefulness of pension accounting information. There is significant convergence in the quantitative and qualitative findings. The mixed methodology process of triangulation reveals very few cases of contradictions or differences between the outcomes of the quantitative and qualitative analysis. Caution needs to be exercised however, as results for pension components are not as robust as they are for core balance sheet or income statement items, specifically book value of capital per share and earnings per share. There is evidence that value relevance revealed by regression is significantly lower in times of equity market and economic turbulence. One of the most significant conclusions arising from the qualitative research and supported to a significant extent by the quantitative research is the importance to analysts and investors of specific pension cash flow information. It is believed that this PhD research is a basis for future research efforts that may help to identify areas that have possible future accounting policy implications.

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List of Abbreviations

ASB	The Accounting Standards Board (United Kingdom)
ASC	The Accounting Standards Commission
CAI	The Institute of Chartered Accountants in Ireland
CICA	The Canadian Institute of Chartered Accountants
DB	Defined Benefit (pension scheme)
DC	Defined Contribution (pension scheme)
EAT	Extended Adapted Triangulation (Strategy)
ED	Exposure Draft (number)
EFRAG	European Financial Reporting Advisory Group
FASB	Financial Accounting Standards Board (United States of America)
FRS	Financial Reporting Standard (with number)
IAS	International Accounting Standard (combined with number)
IASB	The International Accounting Standards Board
ICAEW	The Institute of Chartered Accountants In England and Wales
ICAS	The Institute of Chartered Accountants of Scotland
IFRS	International Financial Reporting Standard(s) – (or with number)
PAAinE	Pro-active Accounting Activities in Europe
PPF	Pension Protection Fund (United Kingdom)
SFAS	Statement of Financial Accounting Standards (with number)
TPR	The Pensions Regulator (United Kingdom)

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Preface

This PhD thesis is presented in seven chapters. In the first chapter the project scope and the research questions are outlined. The literature review in Chapter 2 provides the background and development of value relevance literature including the main categories of relative association studies, incremental association studies and marginal information content studies. Also in Chapter 2 particular attention is given to pension accounting value relevance studies as well as the decision usefulness literature. After introducing the discussion and analysis of the research methodology literature in Chapter 3 there is an explanation of the approach to the design of the mixed methods using quantitative and qualitative analysis.

Chapter 4 presents the quantitative evidence and analysis and explains the development of the regression models that are based on certain earlier studies in the literature that are then considerably developed into the unique models for this current specific study. Chapter 5 considers analysts' perception of decision usefulness of pension accounting information by considering the qualitative evidence and analysis which is centred on semi-structured interviews with the key informants who bring very significant experience from their careers as analysts. Chapter 6 compares the findings from the value relevance research and the decision usefulness research. Chapter 6 also includes a critical analysis to determine the extent of convergence or differences in the findings by using the mixed methodology process of triangulation to reach a number of conclusions that may be generalised to wider matters in the way analysts and investors use information in financial reports to inform their decisions. Chapter 7 presents the summary, conclusions, limitations and scope for further research. Chapter 7 also summarises the relevance of the research to the practical and professional world. The contribution to academic literature forms the basis for further research and Chapter 7 also provides reflections and further thoughts about the practical aspects of building on the PhD research project so that further contributions may be made to the academic literature of pension accounting value relevance and the perception of decision usefulness. This academic research also has a strong professional relevance which is a key characteristic of output used to inform the ongoing accounting standard setting process.

Acknowledgement

I wish to record my thanks to the key informants (listed in Appendix 1) who gave freely of their time and in expressing their thoughts made an enormous contribution to the uniqueness and value of this research.

I also express my sincerest thanks to my PhD supervisors, Jonathan Edwards and Geoff Willcocks for their wisdom, loyalty, humour and excellent support throughout the lengthy and at times arduous expedition required in the undertaking of a PhD. I am grateful to a number of colleagues at Bournemouth University for their helpful comments and Venancio Tauringana deserves special mention for very valuable advice.

I thank my wife, Sharon for proof reading the thesis in its draft form and being extraordinarily tolerant of my necessary devotion to the PhD task over four years.

Any errors or omissions are of course mine alone.

The PhD is dedicated to my family.

Chapter 1

Introduction and overview of the research

1.1 Introduction

Value relevance refers to the relationship between published accounting data and the market value of the reporting business entity. Value relevance studies aim to test the extent of correlation between share prices and financial statement information over certain periods (Barth et al, 2001; Holthausen and Watts, 2001). The term 'value relevance' is believed to have been used first by Amir (1993) although the literature on the value relevance concept extends back over forty years with early contributions by Ball and Brown (1968) and Beaver and Dukes (1972). In this research a link between value relevance and decision usefulness or more precisely 'the perception of decision usefulness' is identified. Decision usefulness when applied to accounting information refers to how useful such information is to users in making investment, credit and similar resource allocation decisions (IASB, 2006 and 2008). Decision usefulness is recognised as "the central objective" in the provision of published financial statements in an early study by Staubus (1959: p.4) and remains central in the joint IASB-FASB conceptual framework as it concerns the provision of information that is useful to "present and potential investors" as well as creditors and others in making resource allocation decisions (IASB, 2006: p.18; IASB, 2008 and IASB, 2010).

The link between value relevance and the perception of decision usefulness may arise if investors either (a) consider accounting information to be decision useful or (b) recognise value relevance based on the likely reaction of other investors to accounting information. The perception of decision usefulness may also be thought of as a necessary part of the behavioural link between accounting information and share prices within value relevance. Value relevance concerns the association between numbers whereas the perception of decision usefulness is the basis for investment behaviour such as the activity of analysing accounting numbers leading to actual investment activity that in turn is expected to have an impact on share prices.

An important limitation of value relevance research is that it can provide only indirect evidence of decision usefulness or the manner of use of the financial statement information (Holthausen and Watts, 2001; Glaum, 2009). Decision usefulness is an aspect of the value relevance discussion although testing for decision usefulness is probably more difficult in that it needs to go beyond a purely quantitative study by incorporating qualitative methods. This also raises the question of whether it is better to try to assess the 'perception of decision usefulness' since this may be explored using methods such as interviewing users of accounting information.

The value relevance studies that have been undertaken over the four decades from the early studies of Ball and Brown (1968) and Beaver and Dukes (1972) have on the whole concluded that there is evidence of value relevance of accounting numbers. Decision usefulness or 'perception of decision usefulness' studies have been undertaken to try to explain the view of the usefulness of published audited accounting information. These studies such as McNally et al (1982) and Barker (1998) have mostly provided evidence that users perceive audited accounting information to be decision useful. Most of the studies neither recognise nor acknowledge that there is a failure to link the quantitative and qualitative aspects of value relevance and decision usefulness. An exception is Alford et al (1993) who attempt to apply their value relevance conclusions to 'usefulness' or 'decision usefulness' but their study may be criticised for its lack of testing of the viewpoints or analytical approach of investors. Another exception is Rippington and Taffler (1995) who suggest that evidence relating to the 'usefulness' of the annual report and accounts to investors is sparse and yet their approach is to use a purely quantitative approach or more particularly an event study that has considerable limitations.

Developing the analytical theme of decision usefulness Barker (1998) considers the market for financial accounting information in a study that makes direct contact with users in the form of analysts and fund managers. Barker (1998) finds that 'raw' data in the form of financial reporting information received directly from companies is considerably more important to fund managers than processed data provided by analysts. Again this analysis

doesn't go as far as providing a direct link to the effects of decisions on share prices. The apparent absence of research studies that test for a link between the perception of decision usefulness of accounting information and value relevance is the overall major shortcoming in the value relevance and decision usefulness research and remains a significant gap in the literature.

The apparent absence of studies that combine value relevance and the perception of decision usefulness is all the more important when there are conflicting results in research studies on either topics of value relevance or decision usefulness. There are significant examples of value relevance studies conflicting with each other even though they undertake research on very similar topics or use similar or the same data sources. One example is identified where the conclusions of Pope and Rees (1992) suggest far less value relevance than Harris and Muller (1999). Pope and Rees (1992) investigate differences in US GAAP and UK GAAP and returns based on movements in share prices of UK domiciled companies having ADRs listed in the US. Using regression analysis Pope and Rees (1992) conclude that GAAP earnings adjustments add only marginally to the ability of earnings to explain returns with the finding that the measure of incremental content results in an adjusted R^2 of well below 0.10 and coefficients that are not significant in most cases. The study by Harris and Muller (1999) considers the value relevance of accounting measures based on IAS versus US GAAP using Form 20-F reconciliations. Using a return regression model the inclusion of reconciliation amounts between IAS and US GAAP results in the adjusted R^2 rising from 0.0147 to 0.1728. Harris and Muller (1999) also use a market value regression model and find that the inclusion of reconciliation amounts between IAS and US-GAAP results in the adjusted R^2 increasing from 0.8796 to 0.9062 and the estimated coefficient on the US GAAP earnings reconciliation adjustment amount is significantly positive at the 1% level. In conclusion the Harris and Muller (1999) study suggests that reconciliations between US GAAP and IAS accounting are significantly value relevant in contrast to the conclusions of Pope and Rees (1992) about similar earnings reconciliation adjustments.

Another case of an inconsistency between value relevance studies occurs when two studies use very similar data on the topic of post retirement benefits other than pensions that are referred to as 'PRBs'. Amir (1996) uses US data drawn from sources including the Compustat files over the period 1990 to 1992 resulting in a sample providing 1,035 firm year observations. Amir (1996) finds that PRB disclosures are value relevant and not significantly less value relevant than pension disclosures. The conclusions of Amir (1996) are very different from those of Choi et al (1997) in a similar study using data for US firms drawn from sources including the Compustat files to run regressions with 336 firms in 1991 and 293 firms in 1992. Choi et al (1997) find that accumulated PRB obligations are marginally significant in explaining equity values but they are capitalised at a much lower rate than pension obligations. There are similar problems of inconsistent outcomes arising in decision usefulness studies with for example, studies by Arnold and Moizer (1984), Day (1986) and Barker (1998) finding that annual accounting information is decision useful but studies by Rippington and Taffler (1995) and Bartlett and Chandler (1997) questioning the perception of decision usefulness or evidence of actual use in practice.

The literature review reveals that value relevance studies are based on quantitative research methods whereas decision usefulness studies are based on qualitative research methods. There is considerable scope for using a mixed methods research approach to help to reduce the gap in the literature relating to value relevance and the perception of decision usefulness. Mixed methods research procedures have gained popularity as they utilise the strengths of both qualitative and quantitative research methods (Creswell, 2009). The mixed methods strategy employed in this thesis combines regression analysis similar to that used in most of the value relevance studies (particularly, Coronado and Sharpe, 2003) with qualitative methods such as interviews that are used in many decision usefulness studies (for example, Day 1986; Barker, 1998 and Glaum and Friedrich, 2006). Mixed methods research is now recognised as one of the three major 'research paradigms' adding to the quantitative and qualitative paradigms (Johnson et al, 2007). Once it is recognised that a mixed methodology approach is needed the advantage is that there is scope to borrow from the many research designs that have already been developed over recent years (Leech and Onwuegbuzie, 2009).

This research concentrates on pension accounting value relevance and decision usefulness. The reason for the particular interest in pension accounting value relevance is that for those companies that sponsor defined benefit (DB) pension schemes for their employees there can be major amounts relating to pensions that have a very significant impact on the results in the published financial statements. DB pension scheme liabilities are based on obligations to pay 'final salary' or 'average salary' pensions that are usually determined according to a formula based on each employee's final salary or average salary (for example, the average of last three years' salaries) and are dependent on the longevity of scheme members. DB schemes might be expected to have an impact on the market value of sponsoring companies – they have both assets and liabilities and even though the sponsoring company is separate from the 'ring fenced' pension fund, there is a contingent liability in relation to potential pension fund deficits. A DB scheme is therefore, very different from the other major type of pension scheme known as defined contribution scheme (or DC scheme) that as the name suggests features employer contributions to a pension fund but requires no further contributions by and hence no future liabilities for, the employing company. DB schemes can become a major burden on companies sponsoring them as large liabilities may arise from future pension obligations (and in some cases healthcare obligations) to DB scheme members. DB schemes have a fund of 'pension assets' that is dedicated to the payment of future scheme obligations but each employer company (as scheme 'sponsor') is liable to make a payment or series of payments, into the pension fund if there is a shortfall or 'pension fund deficit'.

A high proportion of pension scheme assets are represented by equities. Equity valuations may be subject to volatility including severe reductions. The crash in share prices after 2007 therefore, resulted in severe falls in the overall value of pension fund assets of the schemes sponsored by UK listed companies yet the pension liabilities have continued on a largely upward path. Large pension deficits became quite common in the 2008 accounting year among established UK listed companies. BT Plc had a net pension deficit of about £4 billion and total pension liabilities of £33 billion equivalent to about eight times the book value of total net assets excluding net pension assets in 2008. In the same year of 2008

British Aerospace Plc had a net pension deficit of £3.3 billion and total pension liabilities of £17 billion that were equivalent to 163 per cent of the book value of total core net assets excluding pensions. Glaxo Smith Kline Plc had a net pension deficit of about £3 billion and total pension liabilities of £12 billion that was equivalent to 112 per cent of the book value of core net assets. Also in the same year of 2008 National Grid Plc had a net pension deficit of £3 billion and total pension liabilities of £18 billion that were equivalent to 270 per cent of the book value of total net assets excluding net pension assets.

Companies have been closing DB schemes to new members or future accrual so that by 2011 only 16 per cent of DB schemes in the UK were still open (The Pensions Regulator/PPF, 2011: p.32). Even when DB schemes are closed they are still quite likely to have a significant presence in the sponsoring company's financial statements in the form of continuing liabilities to the 'legacy schemes' unless a sponsoring company takes the major step of paying perhaps a very considerable sum to transfer the scheme to an insurance company as part of a 'pension buy-out' (Kirkpatrick, 2007). If there are concerns about the extent of pension liabilities there is also considerable measurement uncertainty and one of the major reasons for this is that there are differing views over the appropriate discount rate for valuation purposes (PAAinE, 2008). Longevity estimates have increased over recent years based on research by actuaries and this has led to considerable expected liabilities even when pension deficits have reduced for example, between June 2010 and June 2011 (LCP, 2011). In the UK a male at retirement age at the accounts date for FTSE 100 companies could be expected to live to 86 years in 2008 but this had increased to longevity of 87 years only two years later in 2010 (LCP, 2011: p.67). DB pension liabilities have considerable sensitivity to increases in longevity and for example, BT reported that an increase of one year in life expectancy would add £1.3 billion to pension liabilities in 2008 while Glaxo SmithKline reported that one extra year of life expectancy would add £0.3 billion to its pension liabilities.

In view of the importance of the topic of pension accounting value relevance and decision usefulness it is surprising that the research literature is not more extensive particularly outside the USA. There are a number of pension accounting value relevance studies that

use US accounting data. These studies include earlier research such as Daley (1984), Landsman (1986) and Dhaliwal (1986) with later studies in the 1990s such as Barth et al (1992 and 1993) and Gopalakrishnan (1994) that all suggest value relevance but are also largely inconclusive due to a number of statistical shortcomings. Further studies use US data to extend the research to non-pension post retirement benefits such as Amir (1996) and Choi et al (1997) which are also inconclusive as they have conflicting results. More recent pension accounting value relevance studies have again used US data for example, Coronado and Sharpe (2003), Jin et al (2006), Hann et al (2007), Coronado et al (2008) and Werner (2011) and still suffer from the limitations of purely quantitative studies. The only significant study using UK data in relation to pension accounting value relevance is believed to be Klumpes and McMeeking (2007) that is an event study using purely quantitative methods. In none of the pension accounting value relevance studies is there a combination of value relevance analysis with research into the perception of decision usefulness. Furthermore, it appears that there are no separate studies about the decision usefulness or perception of decision usefulness of pension accounting information.

1.2 Research aims and objectives

The main aim of this research is to achieve a better understanding of the impact on the share prices of listed companies of accounting information about DB pension schemes recognised and disclosed in the audited financial statements. A further aim is to assess the perception of decision usefulness of pension accounting information as this is considered to be linked to the value relevance question. As part of this process of investigation it is intended to assess the relative value relevance and perception of decision usefulness of pension accounting information as compared to other accounting information.

The specific objectives of the research are to determine the value relevance and relative value relevance of pension accounting information and to assess the perception of decision usefulness of pension accounting information as well as how this information is perceived

relative to other accounting information. Specifically the following research questions are asked:

1. Is pension accounting information value relevant?

2. Is pension accounting information more or less value relevant than other accounting information?

3. Is pension accounting information perceived to be decision useful?

4. Is pension accounting information perceived to be more or less decision useful than other accounting information?

1.3 Research method and findings

1.3.1 Research Method

This research uses mixed methodology by analysing both quantitative and qualitative data. Quantitative data is obtained from published audited financial statements including the notes of UK listed companies and share price data obtained from Thomson Analytics over the period 2006 to 2010. A sample of 70 companies is selected from the FTSE 100. The Qualitative information is obtained from semi-structured interviews with a sample of 8 informed respondents.

On the one hand, the analysis of value relevance is quantitative – in that market value effects may be measured and compared to accounting information. On the other hand, the analysis of decision usefulness or 'perceived decision-usefulness' is a largely qualitative exercise as it requires an understanding of the viewpoints and insights of the decision takers. One of the ways in which this thesis contributes to the research literature is that it explores the drivers of decisions and their potential effect on market values. In this way the potential of the quantitative research using a multivariate regression analysis method is

enhanced. This is the basis of the choice of a mixed methodology approach, using both quantitative research using regression models and qualitative research in the form of semi structured interviews with users or more specifically financial analysts. For the value relevance analysis an Ohlson (1995) based market value regression model is used. Two main versions of the model described as the 'Transparent Model' and the 'Opaque Model' are developed in line with Coronado and Sharpe (2003).

The preferred model is the Opaque Model that is shown below:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti}}$$

It may be seen that the Opaque Model includes 'share price' (P) as the dependent variable and independent variables for 'core book equity value per share' (BVCS), the 'book value of net pension assets per share' (NPAS), 'earnings per share generated by core operations' (CoreEPS) as well as a separate independent variable for current period 'pension earnings per share' (PensionEPS). The Transparent Model has the same terms as the Opaque Model apart from the variable 'PensionEPS'. The reasons for the preference for the Opaque Model is that the qualitative research suggests that analysts use both balance sheet and income information and the quantitative results using the Opaque Model are also stronger than for the Transparent Model which is consistent with Coronado and Sharpe (2003).
The analysis is performed over the five years 2006 to 2010.

1.3.2 Results

The quantitative analysis using the model provides evidence that pension accounting information is value relevant but it appears that it is less value relevant than other accounting information. Looking at the results using data for the five year period it is found that the regression coefficients are significant at the 0.01 level for all independent variables except for the coefficient for PensionEPS which is significant at the 0.05 level and for the same period there is an adjusted R^2 of 0.44.

There is a noticeable decline in the significance of the pension accounting components, NPAS and PensionEPS in the years from 2008 onwards even though there is a higher adjusted R^2 of 0.542 and 0.593 in the years 2009 and 2010 respectively. There is a low adjusted R^2 of 0.238 that coincides with the period of particular equity market volatility and the overall significant decline in the UK stock market. The quantitative research findings suggest that the answer to Research Question 1 is that pension accounting information is value relevant. The quantitative research findings also suggest that the answer to Research Question 2 is that pension accounting information is less value relevant than other accounting information.

The results are summarised in Figure 1.1 below.

Figure 1.1

	Regressions Testing the Opaque Model					
	Regression Outcomes					
	5YR	2006	2007	2008	2009	2010
Independent Variable Coefficients						
BVCS (β_1)	**0.81***** (0.08)	**-0.04** (0.37)	**0.71***** (0.18)	**0.45**** (0.19)	**1.20***** (0.17)	**0.90***** (0.21)
CoreEPS (β_2)	**1.03***** (0.28)	**3.13**** (1.27)	**0.59** (0.48)	**0.82*** (0.45)	**2.46***** (0.86)	**1.89*** (1.01)
NPAS (β_3)	**-3.06***** (0.97)	**-6.77**** (3.23)	**-8.83***** (2.78)	**-4.03** (2.47)	**2.31** (2.04)	**-1.52** (1.74)
PensionEPS (β_4)	**4.82**** (1.96)	**0.32** (6.99)	**5.30** (7.27)	**3.46** (3.43)	**-2.40** (4.61)	**5.82** (7.51)
Intercept (β_0)	**4.73***** (0.50)	**5.85***** (1.24)	**5.14***** (1.13)	**5.03***** (1.10)	**3.40***** (1.14)	**4.31***** (1.17)
Durbin-Watson	**1.956**	**2.236**	**2.214**	**1.644**	**1.627**	**1.843**
Adjusted R^2	**0.440**	**0.301**	**0.486**	**0.238**	**0.542**	**0.593**

Notes: *Standard errors are shown in brackets*
*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

The qualitative analysis based on semi-structured interviews with analysts provides evidence that pension accounting information is perceived to be decision useful but that it is considered to be less decision useful than other accounting information. The overall view expressed by the informants in the semi-structured interviews also provides evidence that published financial reports are considered to be very important and in all probability the most important source of information. The findings in this PhD research therefore support some of the previous views (Hines, 1982) and research findings (Barker, 1998; Glaum and Friedrich, 2006) that financial reports are the most important source of information for investors. It goes further than previous literature by undertaking a study that gives pension accounting information specific attention. In summary the qualitative research findings suggest that the answer to Research Question 3 is that pension accounting information is perceived to be decision useful. The qualitative research findings also suggest that the answer to Research Question 4 is that pension accounting information is perceived to be less decision useful than other accounting information.

The mixed methodology research strategy that is adopted relies very much on the concept of triangulation which involves comparing the quantitative and qualitative databases to determine whether there is convergence or evidence of contradictions. There is considerably more evidence of convergence than contradictions or conflicts in the findings of the quantitative and qualitative analysis. There is consistency in the findings in relation to the research questions. The quantitative research findings that support the answer to Research Question 1 – with the conclusion that pension accounting information is value relevant – are consistent with the findings that support the answer to Research Question 3 – with the conclusion that pension accounting information is perceived to be decision useful. Similarly, the qualitative research findings that support the answer to Research Question 2 – with the conclusion that pension accounting information is less value relevant than other accounting information – are consistent with the findings that support the answer to Research Question 4 – with the conclusion that pension accounting information is perceived to be less decision useful than other accounting information.

1.4 Contribution of the research

Existing literature on pension value relevance suffers from its inconclusive nature arising largely from a heavy reliance on quantitative research methods. There is also a gap in research literature arising from the lack of studies that investigate a link between value relevance and the perception of decision usefulness. This PhD seeks to address both of these issues and in so doing make a number of contributions to research literature. By using a mixed methodology approach with both quantitative and qualitative methods this research addresses the link between value relevance and decision usefulness. There is considerable scope for using a mixed methods research approach that is recognised as one of the three major 'research paradigms' (Johnson et al, 2007). This research is able to adapt some of the many research designs that have been developed over recent years (Leech and Onwuegbuzie, 2009). This research responds to the potential to add to research using methodological triangulation that may overcome the inadequacy of a single method (Morse, 1991). A single method may indeed be insufficient to address the complexity of a social science based research question (Creswell, 2009). By investigating and finding evidence of a link between pension accounting information value relevance and the perception of decision usefulness of such information this research also helps to overcome some of the problems of the excessive reliance on quantitative methods.

This study finds evidence of the perception of decision usefulness of pension accounting information of UK listed companies. This is particularly important as the literature review reveals that literature on pension accounting decision usefulness is sparse or even not researched. The study also finds evidence of value relevance of pension accounting information based on the study of UK listed companies. Again this is an important contribution to the research literature as although this is not the first UK oriented pensions accounting research as there is an earlier study by Klumpes and McMeeking (2007), it nevertheless represents much more recent research and comes at a time of increasing awareness in the accounting profession and among users of accounting information of the risks of deficiencies in financial reporting of pensions (PAAinE, 2008). The timing of this research is significant for a number of reasons: there has been increasing disclosure of pension information in annual reports of companies sponsoring DB schemes; the difficult

financial market conditions in recent years, particularly in the period since 2007 have severely tested the efficacy of relevant accepted accounting practice in the area of DB pensions; and, the importance of pension accounting has been recognised in the UK and in other jurisdictions. It is also worth commenting on the last point as this study provides evidence of reduced value relevance in a period of financial crisis which is at this time of writing an under-researched period in the UK and other affected markets.

This research provides evidence that pension accounting information is value relevant and is also perceived to be decision useful. Nevertheless the semi structured interviews with analysts also suggest that pension accounting disclosures are not considered to be sufficiently comprehensive or comprehensible. This research provides ideas for future research into the use by analysts of pension accounting information as well as potential comparative studies of pension accounting in different international jurisdictions. It is believed that there is scope for using a mixed methodology approach in these future post doctoral studies with a view to increasing our knowledge of value relevance and the perception of decision usefulness.

1.5 Organisation of the research

The structure of this thesis will now be outlined. The next chapter, Chapter 2 provides the context of the research by reviewing related academic literature with an exploration of the contributions made in value relevance and decision usefulness. The literature review involves a consideration of the objectives, findings and limitations such as inconclusive outcomes and methodological constraints. Chapter 3 discusses the research methodology by considering a number of epistemologies before discussing the precise design choice for this project. The research design choice entails a discussion of mixed methods strategies including a consideration of the importance of behavioural studies in accounting and the benefits of triangulation. Chapter 3 concludes by setting out the research proposal with an outline of the mixed methods approach to be used.

Chapter 4 is concerned with the quantitative analysis and includes a detailed consideration of the regression model and the results. A number of variants of the model are used in the

analysis that builds on previous studies in the literature. This research is not restricted to quantitative methods alone and so Chapter 5 provides evidence and analysis from the qualitative research undertaken in accordance with the chosen mixed-methodology research strategy. There is a discussion of the background and themes of the semi-structured interviews including a focus on specific pension accounting matters. Chapter 5 also outlines the relevance of the triangulation process and provides an overall summary of the findings. Chapter 6 is a record of the conclusions reached on the basis of the research. The mixed methodology approach has been helpful in the research process and has provided evidence that is pertinent to the research questions. Chapter 6 considers the outcomes of the analysis and the conclusions as well as the possible limitations of the research. Chapter 6 also identifies a number of ways in which this research has contributed to academic literature. Finally, Chapter 7 contains the reflections from the research undertaken and considers post-doctoral research possibilities on the basis of specific matters and external academic and professional developments.

Chapter 2

Literature review

2.1 Introduction

This chapter is intended to provide the context of the research and a review of related academic literature. The literature review should help to illustrate major issues and refine the focus of the research in a way that can ultimately lead to one or more research questions (Gray, 2009, p.53). In the process of reviewing the literature it is important to consider the objectives, findings and limitations such as inconclusive outcomes and methodological constraints. The literature for value relevance and decision usefulness is reviewed with the intention of revealing how adequately it explains the value relevance and perception of decision usefulness of pension accounting information. The limitations of the current literature are highlighted in the last section of this chapter.

It has been suggested that value relevance tests are concerned with two attributes of an accounting amount namely, 'relevance' and 'reliability' that are difficult to test separately (Barth et al, 2001: p.5). One important limitation of value relevance research is that it can provide only indirect evidence of decision usefulness or the manner of use of the financial statement information (Holthausen and Watts, 2001; Glaum, 2009). The concept of decision usefulness that could perhaps be termed 'decision relevance' is different from the concept of 'value relevance' (Barth et al, 2001: p.5). Reliability is an important attribute in the study of decision usefulness and value relevance of an accounting amount. However, it is suspected that it is the 'perception of decision usefulness' that provides the link to value relevance since it is such perception that influences investment decisions.

Value relevance studies aim to test the extent of correlation between share prices and financial statement information over certain periods (Barth et al, 2001; Holthausen and Watts, 2001). Value relevance literature extends back over forty years with early contributions by Ball and Brown (1968) and Beaver and Dukes (1972). These early studies

focus on the impact of earnings on firm value and they are influenced by earlier research evidence that the earnings term is the most important explanatory variable in predicting the value of the firm or the share price (Miller and Modigliani, 1966).

The first study to use the term 'value relevance' is believed to be that carried out by Amir (1993). Value relevance studies cover a number of different items such as financial assets and liabilities; intangibles; oil and gas properties; as well as pensions and other post retirement benefits. Three main categories of value relevance studies may be identified: relative association studies, incremental association studies and marginal information content studies (see Holthausen and Watts, 2001). Relative association studies compare the association between stock market values or changes in values and alternative bottom-line measures – for example, earnings based on US GAAP or 'foreign GAAP' and extent of association with stock market values or returns. They usually test for the differences in the R^2 of regressions using the different bottom line numbers and the accounting number with the greater R^2 is described as being more value-relevant. Incremental association studies investigate whether particular accounting numbers help to explain value or returns (over 'long windows') given other specified variables. An accounting number is deemed to be value-relevant if its regression coefficient is significantly different from zero. Some of the incremental association studies assess the relationship between the accounting numbers and inputs to a market valuation model to predict coefficient values and/or assess differences in error with which different accounting numbers measure a valuation input variable. Differences between the estimated and predicted values are often interpreted as evidence of measurement error in the accounting number. Marginal information content studies investigate whether an accounting number adds to the information set available to investors. These studies usually use 'event studies' or 'short window return studies' (in contrast to the 'long window' incremental association studies) to determine how the release of an accounting number (adding to and conditional on other accounting information released) is associated with value changes. Therefore, price reactions are considered evidence for value relevance.

Value relevance studies are reviewed in the following sections before reviewing studies related to decision usefulness.

2.2 Relative association studies

One of the earliest relative association studies is that carried out by Beaver and Dukes (1972) to consider the relative merit of alternative income measurement rules under US GAAP based on the issue of interperiod tax allocation. In order to investigate the association between share prices and the alternative income numbers arising from tax deferral and 'non-deferral' Beaver and Dukes (1972) develop the earlier research of Ball and Brown (1968) by looking at the relationship between unexpected earnings changes and unexpected price changes employing an Abnormal Price Index or 'API'. Regression models are developed to provide estimates of the unexpected component of the returns. The sample that is used is based on 123 NYSE Compustat firms whose year end is 31 December and whose methods for depreciation for tax and reporting purposes may be identified for each of the years 1963 to 1967. The sampling process produces data from 576 firm years. Beaver and Dukes (1972) conclude that there is stronger evidence of an association between share prices (or share price returns) and accounting income numbers based on tax deferral than income that is not based on such interperiod tax allocation. There are some limitations in the research by Beaver and Dukes (1972) for the research is purely quantitative and relies on levels of statistical significance that are not conclusive – even though 48 out of 60 models are significant beyond the 0.01 level and another 5 of the 60 models are significant at the 0.05 level. Beaver and Dukes (1972) acknowledge that further research is likely to be needed for example, to investigate the value relevance of cash flow information in the financial reports.

Relative association studies are often employed in comparative studies of value relevance of accounting information in different countries. Alford et al (1993) use a relative association study to examine the 'relative informativeness' of accounting disclosures in different countries. The main objective is to investigate whether differences in accounting standards, disclosure practices and corporate governance leads to significant differences in

the usefulness of accounting earnings. At a practical level the research involves a comparison of the information content and timeliness of accounting disclosures in several countries using the United States as a benchmark. The research methods take the form of two approaches. The first form of analysis is based on the rank of unexpected earnings developed by Ball and Brown (1968); and the second approach estimates a regression model of 15 month returns on the contemporaneous level and change in earnings.

The sample in the Alford et al (1993) study is drawn from an extensive set of 17 countries including the US and the UK using the 'Global Vantage Industrial/Commercial and Issue Files' for the years 1983 to 1990. To control for differences in industry, market capitalisation and time Alford et al (1993) use matched US samples for each non-US sample and this results in a variety of non-US observations for example, the 2,878 observations in the UK make it the largest non-US sample compared to for example, 855 in Canada, 665 in France, 447 in Australia, 370 in Germany and 197 in Japan. The results of the analysis reveal significant differences in the timeliness and information content of accounting earnings across the sampled countries. The annual accounting earnings from Australia, France, the Netherlands and the UK are found to be more informative or more timely than US accounting earnings. The results for Belgium, Canada, Hong Kong, Ireland, Japan, Norway, South Africa and Switzerland are inconclusive. However, annual accounting earnings in certain countries are found to be less timely or less value relevant information than in the US – these countries are Denmark, Germany, Italy, Singapore and Sweden. The overall findings suggest that the income numbers have a significant association with share prices although this varies between countries. The analysis reveals that only in the UK and Ireland does the value relevant information in the form of earnings become more rapidly impounded into the share price than in the matched US sample. There are a number of limitations in the analysis and some aspects seem to be inadequately discussed for example, the very low adjusted R^2 of less than 0.20 in a number of cases. In spite of the important contribution made to value relevance research by Alford et al (1993) their attempt to apply their conclusions to 'usefulness' or 'decision usefulness' may be criticised for its lack of testing of the viewpoints or analytical approach of investors. Consequently the insight into decision usefulness from the users' perspective is limited.

Joos and Lang (1994) study the effects of differences in accounting measurement practice or 'accounting diversity' in different countries by taking samples of German, French and UK firms over the years 1982-90. The sample sizes are 172 in Germany, 228 firms in France and 675 firms in the UK. It is found that there are substantial accounting differences in the different jurisdictions and it is concluded that the EU directives have done little to reduce these accounting differences. The quantitative research involved regression analysis with results for returns on earnings levels and changes producing an adjusted R^2 of 0.28 for France, 0.24 for the UK and 0.19 for Germany post EU directive. The results for regressions of price on net income and shareholders' equity produced an adjusted R^2 of 0.48 for France, 0.20 for the UK and 0.24 for Germany post EU directive. The post EU directive results were better than the position before the EU directive yet the adjusted R^2 results are still quite low especially for the UK and Germany and the analysis is not very conclusive. It may also be pointed out that there are quite small samples for Germany and France although there is a bigger sample for the UK. It is purely a quantitative study and this limits the scope for understanding investor viewpoints.

Chan and Seow (1996) undertake a relative association study that considers the association between stock returns and 'foreign' GAAP earnings compared to earnings adjusted to US GAAP. The study examines the years 1987-92 for a sample of 45 firms from the Compustat files to provide data over 147 firm years. Regression models are developed to test the associations between stock returns and accounting earnings based on 'foreign' and US GAAP. It is found that earnings based on foreign GAAP are more closely associated with contemporaneous stock returns than earnings reconciled to US GAAP. Adjusted R^2 is quite low in the range of 0.16 to 0.35 for several cases. A criticism is that there is a fairly small sample size. Even though the regression analysis is extended by comparing competing sets of independent variables it is ultimately not very conclusive.

Relative association studies may also be used to compare the association between share prices and different measures of income. Dhaliwal et al (1999) undertake a study to compare comprehensive income and net income as a measure of firm performance. Their

sample is drawn from Compustat firms over the period 1994-95 resulting in data from 11,425 firm years. Using regression analysis for stock return models it is found that differences in the results for adjusted R^2 are statistically insignificant except in the case of financial sector firms. The overall conclusion is that the results do not support the claim that comprehensive income is a superior measure of firm performance than net income. Further quantitative analysis is undertaken by Dhaliwal et al (1999) but even this leaves a question mark over the true motives and responses of investors. The suggestion by Dhaliwal et al (1999) that the results of their study cast doubt on the appropriateness of the requirement for uniform comprehensive income disclosures for all industries leads to criticism from other researchers (Holthausen and Watts, 2001).

2.3 Combined relative and incremental association studies

A significant number of relative association studies are also incremental association studies. Harris and Ohlson (1987) investigate the 'explanatory power' or value relevance of reported valuations of oil and gas properties as included in the balance sheet and discussions in notes to the financial statements under the relevant US accounting standard, SFAS 19. The study uses a sample of oil and gas companies classified as 'independents' in a 1983 Arthur Andersen industry survey that also have data available on the Compustat file. The period of the research is the years 1979 to 1983 so that there is a total of 283 firm years in the study. A multivariate regression model is used to analyse the rich set of measures used in a valuation of a firm's oil and gas properties – these include the 'successful efforts' basis and the 'full costing' basis and also forms of valuation based on discounted future cash flow. The approach used by Harris and Ohlson (1987) involves an attempt to impute the market value of oil and gas properties by an adjustment to the overall market value of equity. It is found that the net book values of oil and gas properties are highly significant or value relevant for the market values of the oil and gas properties (and ultimately the market values of the companies). Variations of the regression model are tested with results showing an adjusted R^2 in the range of 0.48 to 0.80 for market values associated with book values determined on the successful efforts basis and considerably lower results for adjusted R^2 in the range of 0.26 to 0.54 for market value associations with book values

determined on the full costing basis. The regression results suggest a much weaker association between the market values and present value measures on both a successful efforts or full costing basis – the adjusted R^2 is in the range of around zero to 0.52 which may be considered to be inconclusive. This is a limitation of the analysis which in common with other purely quantitative studies provides no insight into behavioural aspects such as the use and interpretation of accounting information by investors.

Pope and Rees (1992) investigate differences in US GAAP and UK GAAP and returns based on movements in share prices of UK domiciled companies having ADRs listed in the US. The period examined is 1987-90 and there are 85 firm year observations drawn from a samples taken from the LBS database and Compustat. UK and US earnings are found to be strongly positively correlated and when the two sets of numbers are compared the variables for earnings levels and changes have correlation coefficients in excess of 0.70. It is found that the GAAP earnings adjustments add marginally to the ability of earnings to explain returns – it is suggested that the association is of a 'transitory' or 'short window' nature. The measure of incremental information content results in an adjusted R^2 that is well below 0.10 in most cases. The limitations include the small sample and some caution is required in interpreting the conclusions. It is emphasised that adjustments only 'add marginally' to the ability of earnings to explain returns.

Harris et al (1994) consider the value relevance of accounting measures for US and German firms. The approach is to match firms in the two countries on the basis of industry and firm size with the objective of determining the incremental 'informativeness' of earnings. In the discussion of methodology Harris et al (1994) express a preference for the 'long window' approach to analysing the association between stock returns and accounting earnings as compared to the 'short window' of assessing market reaction to unexpected earnings. A returns model is used as well as a model that is based on Ohlson (1991) to test the association between share prices and the accounting measures of earnings and shareholders' equity. A sample of 230 firms are selected for the year 1991 with data extracted from the Global Vantage Industrial / Commercial data base and directly from company annual reports. Harris et al (1994) conclude that accounting data for German

corporations are significantly associated with share price levels and returns – it is suggested that this conclusion is interesting particularly since it is contrary to the notion that accounting data are essentially meaningless for German corporations. Nevertheless, the conclusion may be a little strained in that the adjusted R^2 is often less than 0.25 for the sample of companies analysed – and the association between returns and reported earnings has an adjusted R^2 that is significantly less than 0.25 in certain cases, for example 'domestic-only' German groups and unconsolidated companies. A final matter of concern is that the results require considerable interpretation and the fact that they are purely based on a quantitative study reduces the insight given into investor use of the accounting information.

Biddle et al (1997) perform research to identify the evidence for associations between share prices and earnings as against the value relevance of a proprietary measure of shareholder value – this is the measure known as Economic Value Added or EVA ® by Stern Stewart and Company. It is a US study taking a sample of 219 companies in the Compustat files with fiscal years ending June 1983 to May 1994 to provide data from 2,271 firm years. EVA is tested against the earnings measures of 'residual income' (RI) and 'earnings before extraordinary items' (EBEI) and the cash flow measure, 'cash from operations' (CFO). The null hypothesis is that that CFO, EBEI, RI and EVA have equal relative information content. It is found that the earnings measure (or EBEI) generally outperforms the proprietary shareholder value measure in terms of value relevance (stock returns and firm values). Adjusted R^2 is in the range of 0.11 to 0.30 – so all quite low – and the study concentrates on marginal effects as well. A problem is that the research may be regarded as rather inconclusive. As a purely quantitative study there are gaps in the analysis – for example, no behavioural considerations are included and interviews might provide a very helpful extension to the analysis.

Bodnar and Weintrop (1997) use a combined relative association and incremental association study to investigate the valuation of the foreign income of US multinational firms. The sample is constructed using the Compustat Expanded Annual Industrial File for firms with domestic and foreign (to US) pre-tax annual income over the years 1985 to

1993. This provides data for 2,570 firm years. The research method is to calculate the cumulative abnormal returns (based on the earlier research methodology of Ball and Brown (1968) for the sample firms over a twelve month period and perform regression analysis to determine the extent of the association between annual excess returns and changes in earnings. The association coefficients suggest that the value relevance for foreign (non-US) income is significantly greater than it is for domestic (US) income. In common with many of the other purely quantitative studies there are limitations in the analysis when it is not possible to try to explain how investors actually undertake the financial analysis. For example it is very difficult to say what are the views or motivations of investors.

Balsam and Lipka (1998) perform a study of the association of share prices and alternative measures of EPS – primary earnings per share (PEPS), the measure that has replaced PEPS basic earnings per share, BEPS and fully diluted earnings per share (FDEPS). There are a number of research questions: first, Balsam and Lipka (1998) ask whether all three of the earnings measures are associated with and explain share prices; secondly, the closeness of the association of the three earnings measures and share prices or the 'relative usefulness' is examined; the third research question is whether each of the measures provides incrementally useful information; and the fourth research question seeks to determine whether the new reporting combination (BEPS and FDEPS) is more closely associated with share prices than the previous combination (with PEPS). The research study takes a sample of firms from the Compustat files over the years 1975 to 1993 to provide data for 3,646 firm years. The method employed is regression analysis using a valuation model based on the fundamental relationship assumed between the EPS and share prices. The different measures of EPS are found to be 'incrementally informative' – also the fully diluted EPS (FDEPS) is found to be even more informative than BEPS. The adjusted R^2 for PEPS exceeds that for BEPS in 13 out of the 19 years in the period of the study but only two of the differences are significant. The results are unfortunately not very conclusive with a wide range of results producing an adjusted R^2 in the range of 0.23 to 0.72 There is also a question mark over the applicability of this US study to other 'foreign' accounting jurisdictions. Furthermore this study might have benefitted from a qualitative approach yet no interviews or discussions with investors take place.

Fields et al (1998) undertake a study to try to assess the usefulness of Non-GAAP accounting measures in the real estate investment trust (REIT) industry. Fields et al (1998) use an Ohlson (1995) type price model for regression analysis to investigate the value relevance of funds from operations (FFO) compared to net income. The researchers use the Center for Research in Security Prices tapes and Moody's manuals to identify an initial sample of 198 real estate firms and after eliminating land development firms, real estate brokers, firms with only equity holdings in real estate companies and after excluding firm years in which a change in fiscal year occurred, they arrive at a final sample of 77 firms and 201 firm years. The period 1991 to 1995 is used to estimate the share price regressions. It is found that net income has a stronger association with share price than FFO – the adjusted R^2 is 0.613 for the 'net income model' and the adjusted R^2 is 0.578 for the 'FFO model' and this is sufficient to lead the researchers to conclude that any claim by the REIT industry that the FFO measure is superior is at least 'highly contextual' (Fields et al, 1998: p. 103). The analysis may be hindered by a relatively small sample size and the outcome needs to be treated with some caution in view of the presence of rather large intercept terms in the regression results. The very specific subject of the FFO comparison with net income might have been usefully extended by undertaking some qualitative analysis through surveys or interviews.

Vincent (1999) investigates the information content and value relevance of the FFO measure for REITs by looking at a slightly more recent period than Fields et al (1998). Vincent (1999) takes a sample of 138 out of the 166 publicly traded REITs from 1994-96 using annual reports and the Forms 10-K. Some of the REITs are removed from the initial sample of 166 publicly traded organisations for a number of reasons such as lack of share price data or due to comparability problems for example, where some organisations are in the year of an initial public offering. The share price data is obtained from CRSP. The analysis relies on return models used in regressions to test the relative and incremental information content of four accounting based performance measures: FFO, cash flow from operations, EPS and EBITDA. The incremental information content of the performance measures is tested using annual performance measures and quarterly performance

measures. Using annual performance measures only the coefficient for EPS is significant at the 1% level with an adjusted R^2 of 0.100. Using the quarterly performance measures however, the coefficients for EPS and FFO are significant at the 1% level with an adjusted R^2 of 0.112. Vincent (1999) concludes that the results indicate that all four performance measures provide some information content although the results depend to some extent on the model specification, but only EPS provides evidence of greater relative information content. Although both EPS and FFO display incremental information content it is EPS that is the most consistent measure. Criticisms of the Vincent (1999) study include the relatively small sample size and the problems of interpretation of the analysis which makes it difficult to make conclusions about the most value relevant performance measure. It is a purely quantitative study and leaves the question about how investors really undertake their financial analysis that may result in investment decisions.

Harris and Muller (1999) perform research to determine the value relevance of accounting measures based on IAS versus US-GAAP using Form 20-F reconciliations. The sample includes all non-US firms on the Lexis/Nexis database that have accounting policies that conform to IAS and reconcile to US-GAAP in Form 20-F filing over the period 1992 to 1996. This sampling process results in 104 observations relating to 31 firms from 13 countries. The research method involves testing three regression models: a market value model; a price per share model (to test the robustness of the market value model by using the number of shares outstanding as a deflator); and, a return model. For the market value regression model the adjusted R^2 is 0.8796 and the estimated coefficients on earnings and book value are both significantly positive at the 1% level suggesting that IAS book values and earnings are value relevant information. The next stage is to include reconciliation amounts between IAS and US-GAAP and this has the effect of increasing the adjusted R^2 to 0.9062 while the estimated coefficients on IAS earnings and book value remain significantly positive at the 1% level. The estimated coefficient on the US-GAAP earnings reconciliation adjustment amount is also significantly positive at the 1% level. This is consistent with the US-GAAP earnings reconciliation adjustment being incrementally associated with market values after controlling for IAS amounts – or 'value relevant'. The results using the return model also suggest that the US-GAAP reconciliation amounts are

value relevant, so that the inclusion of reconciliation amounts between IAS and US-GAAP results in the adjusted R^2 rising from 0.0147 to 0.1728.

There is a very different outcome using the Harris and Muller (1999) price-per-share estimation, however. At first glance the results may seem quite positive for the price-per-share regression model in that the adjusted R^2 is 0.3536 and the estimated coefficients on earnings and book value are both significantly positive at the 1% level suggesting that IAS book values and earnings are value relevant information. In contrast to the market value regression analysis however, when the reconciliation amounts between IAS and US-GAAP are included in the price-per-share model this has the effect of decreasing the adjusted R^2 to 0.3449 and the estimated coefficient on the US-GAAP earnings reconciliation amount is not significantly positive at the 1% level. The overall conclusion on the basis of the quantitative analysis using regression models is that there is evidence that the earnings reconciliation is value relevant although the results for the price-per-share regression cast some doubt on the conclusions. The quantitative results also suggest that there may be specification problems as there are large intercept terms. Some caution may be appropriate in interpreting the results in view of the relatively small sample size used for the analysis. In common with other quantitative studies there is no direct link with user behaviour. Inferences about user perception or the manner of use of the accounting information are therefore, somewhat conjectural.

Hann et al (2007) undertake a value relevance study in relation to pension accounting that is both a relative association and incremental association study. An important motivation for this research is debate in the USA at the time about the prospects of changing from a 'Smoothing Model' to a 'Fair Value Model'. Until it was amended in 2006 SFAS 87 gave companies preparing financial statements under US GAAP the option to delay actuarial gains and losses over long time horizons. The amendment requires full and immediate recognition of all actuarial gains and losses in the balance sheet. Hann et al (2007) are able to extract the fair value pension figures disclosed in the notes to the companies' financial statements of periods before application of the revised SFAS 87 accounting standard to provide a comparison with the alternative pension figures that are smoothed on the basis of

the earlier form of SFAS 87. The sampling period for the study is 1991 to 2002 and the sample of more than 2,000 firms is drawn from the Compustat files to provide 13,610 firm year observations.

The Hann et al (2007) regression model is a development of the standard Ohlson (1995) model format. Detailed model structure includes a net component representing the combination of pensions assets and liabilities ('NetPAL') and pension costs 'PC' disaggregated into a recurring component 'RecPC' (service cost plus interest cost less return on plan assets) and 'PGL' a gains / losses component. It is found that the PC components are less persistent and hence less value relevant under fair value accounting. Hann et al (2007) find that there are mixed benefits to fair value pension accounting. They conclude that it impairs both the value relevance and the credit relevance of the combined financial statements (of balance sheet and income statement) unless transitory unrealised gains and losses are separated from more persistent income components. Hann et al (2007) find that values based on the Fair Value approach are no more relevant than those values based on smoothing and refer to the 'lower persistence' of fair value income and suggest that it is less value relevant than 'smoothing' income. Combined value relevance using both income statement and balance sheet information in the 'Smoothing Model' is found to be represented in an adjusted R^2 of 0.573 compared to an adjusted R^2 of 0.551 using the Fair Value Model. It is surprising that Hann et al (2007) describe this as a significant difference as it seems more appropriate to conclude that pension accounting information produced using the Fair Value Model is neither significantly more or less value relevant than the Smoothing Model. The results of 'credit relevance' tests based on Standard and Poors' credit ratings show a less close fit. The credit relevance of the combined balance sheet and income information using the Smoothing Model is reflected in an adjusted R^2 of 0.442 and using the Fair Value Model there is an adjusted R^2 of 0.429, in both cases these are based on a study of 3,284 firm years again drawn from the Compustat files from 1991 to 2002 (Hann et al, 2007: p.42). The drawbacks of using quantitative analysis alone seem particularly relevant when trying to analyse and compare the impact of the use of different accounting models such as the Smoothing Model and the Fair Value Model for pension accounting. Until the amendment of SFAS 87 and its adoption by firms the fair value

pension accounting information is merely disclosed in the notes – the information is available to users of financial reports but research that is confined to quantitative analysis cannot tell us whether or in what way that information is used. That is the territory of behavioural research. A further criticism of the Hann et al (2007) analysis is that it is sometimes difficult to interpret. For example, it is noted that the there are positive and significant coefficients for intercept terms although these are not clearly reported nor quantified (Hann et al, 2007: p 40 and 42).

Kiosse et al (2007) undertake a study of the value relevance of pension accounting information prepared under US GAAP on basically the same basis as the Hann et al (2007) just discussed. Kiosse et al (2007) use data from the Compustat files over the period 1988 to 2005 producing 3,388 observations for the US GAAP method or smoothing basis and somewhat fewer observations of 2,312 for the Fair Value method. There is evidence of value relevance for both methods so there is an adjusted R^2 of 0.5118 using the US GAAP method and a higher adjusted R^2 of 0.5517 using a Fair Value method – results vary slightly according to different specifications. Therefore, the results are not completely consistent with the conclusions of the study by Hann et al (2007). The overall conclusion of this quantitative analysis is that the regressions are consistent with the US GAAP smoothed method of valuation while the market appears to value the unexpected return included in the Fair Value method. There are some concerns about the analysis in that it is rather inconclusive in view of the relatively large intercept terms that are a common problem of quantitative studies using regression analysis.

Werner (2011) undertakes a combined relative and incremental association value relevance study applied to pension accounting information in a more recent period. This research also looks at both value relevance and credit relevance or 'credit rating based value relevance'. Studying a period that covers 1998 to 2005 and using a sample of Fortune 200 firms (from Compustat) to provide 1,189 firm year observations for an Ohlson (1995) 'equity model' the results show an adjusted R^2 of 0.343 for the smoothing SFAS 87 version of the equity model and a virtually equal adjusted R^2 of 0.342 for the fair value version of the equity model. Werner (2011) provides results that are largely consistent therefore, with

the results of the earlier study by Hann et al (2007) that in the USA the fair value based pension accounting model is no more or less value relevant than the 'Smoothing Model' or 'SFAS 87 Model'. Perhaps surprisingly when performing analysis based on 1,069 firm years (from 1998 to 2005) in a 'credit model' in which the Standard & Poor's issuer credit rating (from the Compustat 'data item number 280') is the dependent variable in the regression model, the off-balance sheet pension amount (or the fair value measure of PBO projected benefit obligations) is not value relevant for the credit rating decision (Werner, 2011: p.427 and pp447-448). Further interesting findings are that the disclosed off-balance sheet pension amount is incrementally value relevant for determining share prices and the 'unrecognised net actuarial loss or gain' component of the off-balance sheet amount is the "main driver behind the significance" of that off-balance sheet amount (Werner, 2011: p.442 and p.443). This seems worthy of further investigation but at this stage there is apparently little further literature. A criticism of some of the quantitative analysis is that it is quite difficult to interpret. It is noted for example, that there are significant coefficients for intercept terms although these are not reported specifically (for example, Werner, 2011: p 443, 445, 448 and 451).

2.4 Incremental association studies

Barth et al (1991) perform an incremental association study to determine the value relevance of default risk of customer loans and interest rate risk of home thrift holding companies or 'thrifts' in the United States. The objective is to determine the impact on market value of equity of information disclosed in the financial statements items. A regression model is developed and market values are regressed on several variables including risk disclosures. The sources for the sample are a list of thrifts that are required to file reports under for US Securities Acts' purposes with the Federal Home Loan Bank Board (amounting to 324 firms) and a list of thrift holding companies that file information with the SEC (amounting to 77 firms) or 492 thrifts in total but after excluding firms that are not very actively traded that leaves 203 thrifts from which annual reports are requested. Of 176 responses 165 thrifts supply annual reports that are used in the analysis. The overall

period of the research is 1980-87 and the main analysis is carried out for the years 1983-87. It is found that risk data disclosed in notes is value relevant for example the coefficient for supplemental disclosure related to default risk is significant. The adjusted R^2 is less than 0.40 except for 1985 with an adjusted R^2 of 0.53. Although, use of generalised least squares analysis permits a higher adjusted R^2 of 0.65 there are still limitations in the analysis. The study is not fully conclusive as it is purely quantitative analysis and some of the results are difficult to interpret, a point conceded by the authors Barth et al (1991).

Petroni and Wahlen (1995) perform analysis to assess the value relevance of the fair value of equity and fixed maturity debt securities (such as corporate bonds) held by property-liability insurers. The focus of the study is to test whether fair value estimates of investments provide value relevant information incremental to historical costs. The researchers are motivated to undertake this study of US insurers following the introduction a short time before the time of the research of accounting standard SFAS 115 applicable for year ends 1994 onwards. The sample comprises 56 publicly held property-liability insurers operating in the period from 1985 to 1991 – most of the companies are identified on the Compustat and those that are not are identified from a report by a management consultant and actuarial firm. Accounting data relating to the investment portfolios of the sample firms are hand collected from the annual reports and data on share prices are collected from both Standard and Poors' "Daily Stack Price Records" and Compustat.

The sampling process in the Petroni and Wahlen (1995) study produces 342 insurer-year observations. A share price regression model is developed as a function of the difference between market and book values of assets and liabilities including terms relating to the difference between the fair value and historical cost of equity investments (ES-FVOHC) and the difference between the fair value and book value of fixed maturity investments (FM-FVOBV). Other components in the price regression model are historical costs of equity securities (ES-HC) and book values of fixed maturities (FM-BV). There is also a variable in the regression model that represents the liability for unpaid claims (UCLAIMS) and it is explained that this controls for potential differences in valuation across insurers with different levels of outstanding claims. The results for the price regression model are

stronger than those for the return model – the price model has an adjusted R^2 of 0.67 and the return model has an adjusted R^2 of only 0.37. As predicted in their study Petroni and Wahlen (1995) find that the coefficients on ES-FVOHC and FM-FVOBV are positive and significant at the 0.01 level. The coefficients on ES-HC and FM-BV are also reliably positive in line with predictions. Perhaps most significantly it is found that the value relevance of equity securities at fair value is greater than for other types of investment securities such as fixed maturity corporate bonds. This research has some limitations in that it is a purely quantitative study.

Ahmed and Takeda (1995) consider the value relevance of commercial banks' investment securities. The study involves analysis of both realised and unrealised stock market gains and losses associated with securities held by the banks. The researchers use a sample of 152 bank holding companies that file quarterly results with the Federal Reserve and are listed on the NYSE or NASDAQ. The period for the quarterly results runs from the second quarter of 1986 to the fourth quarter of 1991 to provide 3,256 observations for analysis. A market value model is developed from a basic form that has independent variables comprising market value of investment securities, market value of on-balance sheet net assets and market value of off-balance sheet net assets. Further independent variables are added to the basic model: accounting income before realised gains and losses, a component for realised gains and losses and a component for unrealised gains and losses. Ahmed and Takeda (1995) find that after controlling for interest rate sensitivity unrealised gains and losses have a significant positive effect on bank share returns. Another finding is that realised gains and losses have a significantly positive effect on bank share returns in normal periods although the coefficient is significantly lower in periods of low capital and earnings. The conclusion is that both realised and unrealised security returns are value relevant. Some of the results are difficult to interpret for example the researchers consider incremental effects but the effects appear very marginal as reflected in a very low adjusted R^2 that is less than 0.10. As a purely quantitative study there is a question mark about the motivation of investors.

Venkatachalam (1996) undertakes a study into the value relevance of banks' derivatives disclosures. The study is motivated by an observed and increasing reliance by banks on derivatives as a vehicle to manage financial risk. The sample for the study consists of 99 bank holding companies that meet two criteria: firstly, they have assets of $150 million (US dollars) or more at the end of 1994 and secondly, they use off-balance sheet financial derivatives. The financial accounting data are hand collected from bank annual reports and SEC 10-K filings for 1993 and 1994. The source documents in the form of annual reports and forms 10-K are obtained directly from the banks or from the LEXIS/NEXIS database and Compustat is the source of information on stock prices. The study considers the usefulness of the disclosed information about derivatives in assessing the effectiveness of the banks' risk management strategies. Venkatachalam (1996) develops a market value of equity model to perform a regression of market values on fair values of on-balance sheet and off-balance sheet derivative instruments. Results of regressions have adjusted R^2 in the range of 0.85 to 0.89 and the coefficients for the notional values of derivatives and the contractual amounts of other off-balance sheet items are significantly different from zero suggesting that this is value relevant information after controlling for their fair values. Inspection of the regressions reveals that there are large intercept terms and this together with the rather small sample suggests that the results should be interpreted with caution. Venkatachalam (1996) concedes that the evidence should be viewed as 'preliminary' and as a purely quantitative study there are inherent limitations when an attempt is made to attribute the results to a perception of decision usefulness or information that is acted upon to result in value relevance.

Nelson (1996) investigates the value relevance of fair values of financial instruments for commercial banks. The research considers the fair value estimates disclosed under SFAS 107 "Disclosures about Fair Value of Financial Instruments" in the United States. The paper has a focus on commercial banks for two reasons: firstly, financial institutions including banks in particular, are central in the debate about fair value accounting; and, secondly, financial instruments are significant to banks' operations as well as playing a part in financial reporting. The sample is made up of the 200 largest US bank holding companies ranked by total assets as of 30 June 1992 as listed by the Thomson Bank

Directory. A market value model is developed to determine the association between market value of equity and the difference between fair value and book value of four balance sheet financial instruments: investment securities, net loans, deposits and long-term debt. The model is then developed further by deflating by book value of the common equity. The analysis considers two years 1992 and 1993 (with 146 and 133 observations respectively).. It is found that the fair value measures of investment securities are value relevant but there is no evidence of value relevance for loans, deposits and financial instruments. Adjusted R^2 is 0.61 in 1992 but only 0.44 in 1993. and for a model showing the incremental ability of SFAS 107 disclosures to explain market-to-book ratios beyond return on equity and growth in book value the adjusted R^2 is 0.51 in 1992 but only 0.24 in 1993. The results are not very conclusive and the presence of large intercept terms raises some doubts about whether the model is well specified.

Anthony and Petroni (1997) analyse the possible effects of accounting estimation disclosures on firm valuation in the property-casualty insurance industry in the United States. The methodology involves the development of a price regressions model based on earnings and a return regression model based on earnings changes and unexpected earnings described as 'the earnings surprise'. The model is tested by drawing on data from a sample comprising 63 insurers or every publicly traded property-casualty insurer operating during the years 1985 to 1991 as sourced in the Compustat industrial tapes. This results in 379 insurer-year observations for which share price return data are obtained from the CRSP monthly or daily return files. The regression model has an adjusted R^2 of 0.42 and coefficients have the expected sign and are significantly different from zero – the R^2 varies over the period from 0.51 in 1989 to 0.24 in 1991. Disclosures of estimation errors in previous claim estimates are found to be value relevant and results suggest that investors use these estimates for their own valuation purposes. The research study is limited by having quite small sample size and this study is also quite specific to the insurance sector so that the conclusions may need to be treated with caution especially in the absence of the greater insight that may be provided by methods such as interviews with investors.

Shevlin (1991) considers the impact of research and development expenditure and capitalisation estimates on 'R & D firms'. The R & D firms in the United States use research and development limited partnerships (R & D LPs) as funding vehicles. The research methodology uses a regression model that presents the market value of shareholders' equity as a function of assets and liabilities of the firm. This model also incorporates a feature for limited partners' call options. The sample uses 53 R & D firms representing 73 R & D LPs. All of the R & D firms are traded on stock exchanges – 39 on the OTC market, 7 on the NYSE and 7 on the ASE. The period of the analysis is the years 1980 to 1985. It is found that research and development information in disclosures are value relevant. It is found that capitalized expenditure based on footnotes is value relevant. It is also found that the existence of the LP that increases the assets and liabilities of the R & D firms is reflected in security prices. Adjusted R^2 is in the range of 0.573 to 0.859. The coefficients on the firm assets and liabilities including components of the LP call options are statistically significant. There are some limitations for the conclusions of study in that the intercept terms in the regressions are significantly greater than zero so questions are raised over the model specification. As a purely quantitative study there is no information about the viewpoint of investors in R & D firms.

Lev and Sougiannis (1996) study the value relevance of research and development expenditures according to whether the current US GAAP 'full expensing' accounting treatment is applied as compared to a capitalisation approach. The methodology uses both price and return regression models with earnings and book value terms. The analysis considers the effects of adjusting the US GAAP figures to capitalised versions that are amortised over the period of the analysis. The sample of about 2,600 firms is drawn from the Compustat manufacturing tapes which reported R & D expenditures. Lev and Sougiannis (1996) find a close association between operating income and R & D over the years 1975 to 1981 using annual amortisation rates for R & D with regressions having an adjusted R^2 is in the range of 0.85 to 0.91 although there are significant intercept terms in some of the years. Extending the analysis to the period 1976 to 1991 to consider the effect of adjusting from the expensing form of R & D accounting to the capitalising form of R & D accounting there is a considerable difference between the share return regression model

with adjusted R^2 is in the range of 0.09 to 0.13 and the share price regression model with adjusted R^2 is in the range of 0.44 to 0.55. It is concluded that the 'corrections' to reported earnings and book values for R & D capitalisation are strongly associated with share prices and returns. Lev and Sougiannis (1996) therefore conclude that the R & D capitalisation process results in the provision of value relevant information for investors. There are some limitations in the research as it is somewhat inconclusive due to relatively large intercept terms. There is also little assurance that the interpretation of the outcomes is accurate in view of the fact that there is no discussion with investors to determine their approach to analysis and valuation of R & D expenditures. The association assumed in the authors' interpretations unfortunately still leaves questions about the decision usefulness of the reported R & D numbers.

Chaney and Jeter (1994) perform an examination of share prices and deferred taxes or more specifically security returns and the noncurrent deferred tax component of earnings to explore the extent of an association. The methodology is based on a return regression model with income and deferred tax components. The sample is taken from the Compustat files and firms are selected according to the availability of CRSP monthly data. The full period of the analysis is the years 1969 to 1985. Chaney and Jeter (1994) concentrate of the years 1982 and 1983 with samples of 512 and 529 firms. The null hypothesis of 'no association' between deferred taxes and stock returns is rejected. The regression coefficients for income measures and deferred tax are significantly different from zero at the 0.05 level and the adjusted R^2 is 0.20 in 1982 and 0.25 in 1983. It is concluded that the association is between the stock returns and deferred tax measures is relatively close even though the R^2 is not particularly high. This is another study that relies purely on quantitative analysis and there is no use of qualitative methods such as interviews with accounting users.

Amir et al (1997) investigate the value relevance of deferred tax components disclosed under US GAAP in the form recommended in SFAS 109. Quantitative methodology is used in the form of a market value regression model that is based on the Feltham and Ohlson (1995) framework with components for net operating assets, net financial assets,

current abnormal earnings and net deferred taxes. The sample is drawn from Fortune 500 firms in Compustat that have adopted SFAS 109. The period used is covers the years 1992, 1993 and 1994. Amir et al (1997) obtain deferred tax data on 1,336 firm year observations and then delete 215 observations with missing price or other accounting data resulting in a final sample of 1,121 firm years. The approach involves classifying deferred tax components into seven categories: depreciation and amortisation; losses and credits carried forward; restructuring charges; environmental charges; employee benefits; valuation allowance required by SFAS 109 and all other components. Separating deferred taxes into separate components in this way provides value relevant information. When the market price regression model is run there is an adjusted R^2 in the range 0.32 to 0.46. Although the deferred tax information is value relevant there is still a need for some caution in the interpretation of results as there are large intercept terms. The methodology is purely quantitative and therefore, the study is limited in that it is not possible to obtain a view of investors.

Ayers (1998) considers the incremental value relevance of deferred tax accounting under SFAS 109 by comparing the effects of SFAS 109 to the previous accounting standard Accounting Principles Board Opinion No 11 (or APB NO 11). The study uses a sample of NYSE and AMEX firms drawn from the 1993 Compustat Annual Industrial File that results in 1,444 firm year observations. It is found that net deferred tax liabilities disclosed under SFAS 109 provide additional value relevant information. The results suggest some limitations as there are very large and statistically significant intercept terms and the adjusted R^2 is less than 0.5 in all cases analysed. This is worthy of discussion and further analysis yet the study does not discuss this weakness. There is also a total reliance on quantitative methods and this does not help to address the limitations of the study.

Amir, Harris and Venuti (1993) investigate the vale relevance of reconciliations between US GAAP and non-US GAAP using 'Form 20-F Reconciliations'. The reconciliations are examined to address two questions: firstly, whether the differences in US and non-US GAAP as summarised in the aggregate reconciliations of earnings and shareholders' equity are value relevant; and, secondly, which differences in accounting practices summarised in

the components of the reconciliation are value relevant. Amir et al (1993) concentrate on non-US companies that trade in US markets using American Depositary Recipts (ADRs) as the basis of trade. The Compustat, Nexis/Lexis and Disclosure data bases are used to identify potential sample firms and then the Standard and Poors' Stock Guide is used to identify firms with a suffix of 'ADR'. The reconciliation data has to be hand collected and therefore, Amir et al (1993) limit the search for 20-F information to the period 1981-91. This results in a sample of 467 firm /year observations. The research design uses quantitative methodology with regression price and return models for information content over short or 'event window', longer window return-earnings associations and market to book ratio analysis. Aggregate reconciliations of equity and earnings are found to be value relevant and Amir et al (1993) conclude that this is consistent with the US GAAP measure being more value relevant than the aggregate measures from the mix of non-US GAAP systems. There is no market reaction associated with the short window information content analyses and the annual return analyses yield few significant coefficients either. The results for the market to book analyses provide evidence that the shareholders' equity and return on equity (ROE) reconciliations are value relevant. Using the non-US GAAP shareholders' equity for the full sample the adjusted R^2 is 0.47 and the coefficients on both ROE and shareholders' equity reconciliation are positive and significant at the 0.01 level. The range of adjusted R^2 is a low of 0.26 in 1988 to a high of 0.89 in 1990. Based on US GAAP shareholders' equity the adjusted R^2 is 0.24 for the full sample with the coefficients on both reconciliation measures not significantly different from zero. Overall the conclusions are that the aggregate reconciliations of both shareholders ' equity and earnings are value relevant. The limitations of this study derive from its dependence on purely quantitative methods that do not reveal information about investor motivations or approaches to analysis.

Bandyopadhyay et al (1994) consider the value relevance of the reconciliations Canada GAAP and US GAAP accounting earnings measures. A sample of 96 firms represented by 299 firm year observations is drawn from Canadian firms listed on the Toronto Stock Exchange that are also traded on the New York Stock Exchange, the American Stock Exchange or the National Association of Security Dealers and Quotation (NASDAQ)

system during the years 1983 to 1989. Bandyopadhyay et al (1994) use regression models to investigate associations between share returns and levels and change of earnings and differences between US and Canadian earnings measures. It is found that neither the coefficient on the difference between US and Canadian earnings nor the coefficient on the year-to-year change in this difference is significantly different from zero at the conventional levels of probability. Bandyopadhyay et al (1994) observe on the basis of this quantitative analysis that investors act as if the US-Canada GAAP differences do not affect pricing decisions but they say that this does not imply that the reconciliations have no value. It is pointed out that GAAP differences can have a large impact on reported earnings with half of the sample firms experiencing an aggregate US-Canada GAAP difference in earnings that lies outside a range of positive (US GAAP earnings greater than Canadian GAAP earnings) 0.5% to negative (US GAAP earnings less than Canadian GAAP earnings) 1.9%. The conclusion of the study is that although the US GAAP Canada GAAP differences are found to be irrelevant for valuation purposes this is not the same as saying that the reconciliations have no value as alternative uses of the information and the costs of providing the information are worth considering in future studies. A criticism of the study is that the analysis is quite inconclusive and caution would be appropriate in interpreting the regression results as the research is based on a small sample. A further criticism is that while the researchers imply that there is a question of decision usefulness beyond the quantitative analysis of value relevance they don't in fact proceed to any further analysis so they are unable to provide any evidence that the information on US-Canada GAAP earnings reconciliations have value as an information source.

Barth and Clinch (1996) perform a study on international accounting differences and their relation to share prices by comparing the US GAAP treatments with other countries using evidence from the UK, Australia and Canada. They use price and return regression models and summarise the different treatments of a number of accounting items. The sampling process uses Compustat and further returns and price data is obtained from Compustat's 'Global Vantage' database, the 'Australian Financial Review' and the 'Financial Times'. A sample of 400 firms is selected for analysis over the period from 1985 to 1991. It is found that the GAAP reconciliation required by SEC is value relevant so that it is concluded that

it reflects information that is useful to investors. Criticisms of the research are that it is has presentational problems that makes the quantitative analysis difficult to interpret and there is quite a small sample size that leads to doubts over the conclusions.

Rees and Elgers (1997) investigate the value relevance of retrospective reconciliations of non-US and US GAAP accounting measures. The methodology involves a price regression model with components for earnings, book value, the difference between earnings measured under US GAAP and non-US GAAP and the difference between shareholders' equity measured under US GAAP and non-US GAAP. The sampling process is based on a 1993 SEC survey of 528 non-US registrants that indicates that 84 firms that are predominately Canadian and Japanese have provided US GAAP financial statements while 158 firms provide no reconciliation because there are no material measurement differences. The sample is drawn from the remaining 286 SEC registrant firms that provide appropriate scope for analysis of reconciliation of non-US and US GAAP accounting measurement differences. The main regression models have coefficients for earnings as well as differences in shareholders equity measured under US GAAP and non-US GAAP that are significantly different from zero at the 0.01 level but the differences in earnings measured under US GAAP and non-US GAAP are not significant at either the 0.01 or 0.05 level. The adjusted R^2 is in the range of 0.509 to 0.746. The analysis is extended to consider five components of the retrospective shareholders' equity reconciliations, and these are: goodwill, asset revaluations, deferred taxation, pension benefits and "all else". The results are that for the overall sample the coefficients for goodwill, asset revaluations and "all else" are significant at conventional probability levels of 0.01 and 0.05, whereas the deferred taxation and pension variables are not significant at these levels. The analysis has some shortcomings that reduce confidence in the researchers' conclusions. The large intercept terms raise doubts about the specification of the models and there is complete reliance on the quantitative analyses with no qualitative research methods employed in the study.
Purely a quant study

Davis-Friday and Rivera (2000) investigate the effect of differences between accounting in Mexico and US on the relation between equity prices and accounting information in

Mexico and the USA. The different approach to accounting is evident in for example, the inclusion of inflation accounting within the Mexican accounting framework. The study uses the population of Mexican firms listed on US stock exchanges and registered as American Depositary Receipts (ADRs) as of December 1995 and involves an analysis of the Mexican-US GAAP reconciliations reported in the Mexican firms' 20-F forms for the years 1995 and 1996. This leads to a sample of 26 firms that are ADRs based on trading on the NYSE, NASDAQ and the American Stock exchange, AMEX. The methodology is based on market value of equity regression models that include a dependent variable that is based on the closing ADR price and components relating to book values of equity, earnings and reconciliations between US GAAP and Mexican GAAP for equity and earnings.
ADR prices are significantly related to Mexican GAAP net income. Davis-Friday and Rivera (2000) conclude from the results of the regression analysis that reconciliations between Mexican GAAP and US GAAP have no significant impact on the ADR prices of the Mexican firms in the sample. The coefficients on either the equity or earnings reconciliation terms are not significant at 0.01, 0.05 or even the 0.10 level of probability. For the overall regression with reconciliation terms the adjusted R^2 is in range 0.47 to 0.48. There are however, limitations in this purely quantitative methodology in that the results are quite inconclusive with large intercept terms in the regressions and there are no qualitative methods such as interviews with analysts and investors. There is also a very small sample size that reduces confidence in the analysis undertaken.

Barth and McNichols (1994) study the market valuation of environmental liabilities relating to so-called 'Superfund' sites that are considered to be sufficiently hazardous to be placed on a National Priority List in the USA. The financial reporting guidance for potential obligations to clean up such environmentally impaired sites is contained in the US accounting standard SFAS 5: Accounting for Contingent Liabilities. The methodology is based on a market value of equity regression model and the sampling process uses Compustat files resulting in 1496 firms from 1981-90 years. The main regression models have an R^2 of 0.5414 to 0.5495. It is found that there is relatively low 'explanatory power' of the cost models. However, seven environmental liability proxies are found to be value relevant in that they provide explanatory power incremental to recognised assets and

liabilities. A criticism of the research study is that it is a purely quantitative study. A more technical limitation of the research is that the quantitative methodology leads to an inconclusive result in that there are large intercept terms in the regressions.

D'Souza, Jacob and Soderstrom (2000) consider the value relevance of nuclear decommissioning costs. The study uses a market value of equity regression model with asset and liability components plus a component relating to estimated decommissioning liabilities. The information about investor owned nuclear units is obtained from the US Nuclear Regulatory Commission and Compustat in the sampling Years 1993 to 94. This results in a sample of 53 firms. It is found that decommissioning costs are value relevant and the coefficient is more negative for utilities with higher business or financial risk.
The regression analysis shows an adjusted R^2 in the range 0.77 to 0.79. A limitation of the research study is that it uses a small sample. Some doubt is cast on the model specification as there are large intercept terms. More concerns arise because this is purely quantitative analysis and there are significant doubts about the overall reliability of the analysis.

Aboody (1996) considers the market valuation of employee stock options (ESO) which may have implications for value relevance research. The methodology is based on a price regression model that incorporates an option pricing procedure. The sampling uses the Compustat industrial files and concentrates on the years 1983 to 1990 resulting in 3,078 firm years. The share price data is extracted from the CRSP files. There is evidence of value relevance and there is a negative correlation between option value and a firm's share price. The adjusted R^2 is in the range of 0.85 to 0.88. The limitation is that this is a purely quantitative study that does not give an insight into the perception of investors.

Aboody (1996) questions whether expectations are incorporated into the analysis. The view is that it is reasonable to assume that investors form expectations about future ESO grants and those expectations might be correlated with the paper's estimate of ESO value. It is seen in Aboody (1996) that modelling expectations is complicated and probably beyond the scope of the research.

Vincent (1997) performs a study to analyse the equity valuation implications of purchase versus pooling accounting. The valuation methodology is based on Ohlson (1995) and Feltham and Ohlson (1995) and develops a price regression model with components for both earnings and book value of equity. The sample is drawn from data on Business Source Complete and examines data on 92 US transactions (57 purchase plus 35 pooling). The period covered is 1979-86. Testing the price regression model provides evidence that investors adjust accounting numbers so the accounting method (pooling versus purchase accounting) does not 'of itself' explain any valuation differences. A criticism of the research is that there is a small sample size. Results have to be interpreted and there are no interviews (or other qualitative research methods) to assist in explaining investor behaviour.

Cheng, Liu and Schaefer (1997) consider the value relevance of cash flows from operations under the US standard SFAS 95. The analysis uses quantitative methodology involving the development of a return regression model. The accounting inputs are collected from the Compustat files and the security return data are collected from the 1994 CRSP Monthly Return Files. This process resulted in a sample of 3,982 firm year observations. It is found that SFAS 95 cash flows are relevant disclosures for investment decisions. It seems that value relevance may not be that strong with an adjusted R^2 that is less than 0.20. The doubts over the conclusions are worthy of more discussion and further analysis beyond that contained in the article. The results are more indicative than conclusive. Also there may are arbitrary elements for example, it is necessary to make assumptions for estimated inputs.

Black (1998) performs a study of the potential value relevance of earnings and cash flow measures at different business life-cycle stages. The research is based on quantitative methodology with the construction of an Ohlson (1995) derived market value of equity regression model with components representing book value of equity, earnings and cash flow. The sample uses data from Compustat and CRSP sources (US data) for the financial statement inputs and market prices. The period considered is the twenty year span from 1976 to 1995. The eventual sample is 27,924 firm years. There is evidence of value relevance in all but start-up stage for earnings and in all stages for cash flow income.

Coefficients are significant and the adjusted R^2 is in the range of 0.46 to 0.88. There are limitations in the analysis results particularly large intercept terms that raise questions over the specification of the linear regression model. As a study it is completely quantitative so there is no qualitative research to try to assess investor motivations and form a more complete picture of the possible value relevance process.

Bartov (1997) considers the value relevance of foreign currency exposure measures of multinational firms. The study is motivated by a change in the accounting standard relating to the restatement of a foreign operation's financial statements in the USA (the new accounting standard is SFAS 52 that replaces SFAS 8. The methodology uses a quantitative approach to assess the relationship between abnormal returns and earnings per share and the foreign currency adjustments in the current year and a preceding year. The sample is drawn from the Compustat files and abnormal returns are taken from the CRSP NYSE/AMEX Excess Return series. The sample covers a 15 year period and this is divided into two subperiods: an SFAS 8 period from 1976 to 1981, and an SFAS 52 period from 1984 to 1990. The total sample is 5,724 firm years made up of 1,665 firm years for SFAS 8 and 4,059 firm years for SFAS 52. It is found that there is a significant improvement in value relevance following SFAS 52 (restatement of foreign operations financial statements into parent's currency equivalents for inclusion in parent company's financial statements) replacing the previous standard SFAS 8 (following past criticisms). There are analytical problems identified meaning that the results may be inconclusive. If a linear relationship cannot be assumed then this raises doubts about the standard regression analysis yet the insertion of a non-linear model may be problematic. The cumulative accounting return or CAR_i return model approach is used initially. The econometric issue is that one of the assumptions of a linear relationship may not hold for the return/earnings relation – reference may be made to some evidence relating to this in Cheng, Hopwood and McKeown (1992) and in Freeman and Tse (1992). The methods are purely quantitative – this is insufficient to assess investor behaviour and motivations.

The pension accounting value relevance research studies are mostly incremental association studies and in some cases they also incorporate relative association studies or in a small

number of cases use marginal input content analyses. The pension accounting value relevance association studies use three types of models: earnings discount models, balance sheet models and variations of the Ohlson (1995) model. Among the earliest studies are undertaken by Oldfield (1977) and by Feldstein and Seligman (1981) that use analysis based on studies by Modigliani and Miller (1958) and Miller and Modigliani (1966). Arguably these are more finance studies than accounting studies (Glaum, 2009) so that the first pension accounting value relevance study might be that carried out by Daley (1984).

Daley (1984) develops an earnings discount model to try to determine whether there is an association between measures that US companies are required to disclose in the 1970s and stock market valuations. The model is structured to disaggregate the earnings variable into earnings before the pension cost and the pension cost itself using a sample of US companies for the years 1975 to 1979. Daley finds that estimations for the regression coefficient for pension expenses are significantly negative, so they are 'value relevant'. However, the results need to be treated with some caution due to a fairly small sample size (153 firms), large intercept terms that raise questions about the model specification and possible measurement error in the data due to the availability of several different cost methods under the then prevailing US standard, APB 8.

A development of the earnings discount model is used in the study by Barth, Beaver and Landsman (1992) when they disaggregate the pension components so that regression coefficients may differ from one another. Barth et al (1992) find as expected, that the coefficient for the independent variable 'interest cost' is significantly negative and the coefficient on the independent variable 'return on plan assets' is significantly positive. Contrary to expectations the coefficient on the independent variable 'service cost' is significantly positive (at least in some model specifications). One explanation may be that there is multicollinearity between pension cost components while another possibility is that the market does not view service costs as a measure for the pension liability. Another viewpoint is offered in a paper by Hann, Heflin and Subramanyam (2007) who suggest that the positive correlation between share prices and service cost may be attributed to the latter serving as a proxy for value created by 'human capital'. A major criticism of the analysis

by Barth et al (1992) is that there are large intercept terms and ultimately it is not possible to know whether there are omitted variables so the study is rather inconclusive.

The second type of model is described as a 'balance sheet model'. Landsman (1986) is believed to be the first of the researchers to use a balance sheet model to examine value relevance. In this form of model the companies' total assets are divided into 'pension assets' and 'non-pension assets' and the companies' total liabilities are divided into 'pension liabilities' and 'non-pension liabilities'. Landsman performs analysis using a sample of US companies for the years 1979 to 1981 – a minimum of 235 firms in 1979 rising to a maximum of 624 firms in 1981 – and finds that the market prices pension fund assets and liabilities as corporate assets and liabilities. Landsman himself concedes that there are problems with the study. In particular, there are large and in some cases very large intercept terms that suggest that the model is not correctly specified.

Dhaliwal (1986) performs a study that investigates the impact of unfunded vested pension obligations on 'market perceived risk' of the firm. The findings of the study are that the effect of unfunded vested pension liabilities is not significantly or statistically different from that of debt and other liabilities. Unfortunately the Dhaliwal (1986) research paper also has shortcomings such as a small sample size (only 55 firms over the period 1976 to 1979) and quite weak association revealed by an R^2 in the range 0.2 to 0.27. The approach of risk analysis introduced by Dhaliwal (1986) is an interesting development. Some years later a study by Jin, Merton and Bodie (2006) continues the risk analysis approach and concludes that equity betas appear accurately to reflect the betas of their pension assets and liabilities, "despite the practical difficulties of deciphering corporate pension accounts" (Jin, Merton and Bodie, 2006, p.22). The more traditional regression analysis continued to be a popular tool for the analysis of the effects of pension accounting information on the share prices of DB sponsoring firms.

The third type of model used in the pension accounting association studies is the Ohlson (1995) model – based on earlier research such as Ohlson (1991) - that looks at balance sheet and income measures simultaneously. Ohlson's research is influential in linking

accounting measures and firm value and many of the empirical models developed since the early 1990s have been influenced by the Ohlson (1991 and 1995) model – it will be convenient (and arguably appropriate) to refer to them all henceforth in this study as the 'Ohlson models' or Ohlson (1995) Model. The main argument in favour of the Ohlson models is that by incorporating balance sheet and income measures simultaneously they are better specified than either pure balance sheet or pure income models.

Barth, Beaver and Landsman (1993) use an Ohlson type model to carry out an investigation of the value relevance of pension accounting based on data for 300 US companies for the years 1987 to 1990. Barth et al (1993) find that the fair value of pension assets and the projected benefit obligation or 'PBO' (which shares fair value characteristics) disclosed in the notes are significantly correlated with share price valuations whereas the incremental explanatory value of pension cost components (also disclosed in the notes) are not significantly different from zero. The Barth et al (1993) research has a number of weaknesses in particular the large intercept terms even though the adjusted R^2 falls in the range of 0.65 to 0.75.

Gopalakrishnan (1994) considers an aspect of pension accounting value relevance by analysing the effect of recognised pension information as compared to disclosed pension information. The methodology is influenced by previous studies using both balance sheet based and earnings elements. A price model or market value of equity regression model is developed with components for book value of equity, abnormal earnings and a term for 'other value relevant information'. Sample firms are selected from the Compustat database on the basis that they have a net accrued pension liability, unfunded projected pension benefit obligations and certain other information is available in respect of the firms, particularly a closing market price of common stock. The sampling process is repeated for the years 1986 to 1990 and the final sample has 1,038 firm year observations including 352, 334 and 352 firms for each of the years 1988, 1989 and 1990. It is found that pension information disclosed in footnotes is value relevant and investors attach equal importance to recognised and disclosed information. The adjusted R^2 is 0.925, 0.898 and 0.966 for the years 1988, 1989 and 1990. The coefficients on the independent variables are significant at

the 0.01 level for all terms apart from the pension liabilities term in 1989 which is significant at the 0.05 level. A limitation is that the intercept terms although not very large are significantly different from zero at the 0.01 level. It is a purely quantitative study but there is a comment on the matter of the importance of 'perceptions' of users although this study is focused on only investors (Gopalakrishnan, 1994: p.394) although this is a criticism of many studies. It is suggested that 'usefulness' of recognition versus disclosure is judgemental depends on the 'level of user sophistication' and this is not completely 'captured' in this particular form of research.

Amir (1996) studies the value relevance of postretirement benefits other than pensions (referred to as PRBs). The research design is based on a cross-sectional valuation model relating market value to book value and earnings – dividing the components by book value (rather than the number of shares as in many other studies) reduces the key components to earnings, PRB and unfunded pension liabilities. The research motivation derives from the development of accounting standards for pensions and PRBs and in particular, in the USA the standard SFAS 106 requires disclosures of the sensitivity of the PRB liability and cost to the health care cost trend rate. The sample is drawn from the NEXIS/LEXIS database and Compustat over the period 1990 to 1992 by identifying firms that adopt SFAS 106. This results in 1035 firm year observations. It is found that PRB disclosures are value relevant and not significantly less value relevant than pension disclosures. This value relevance is increased further when US standard SFAS 106 disclosures of sensitivity are included in analysis. The conclusions may have to be treated with caution as the adjusted R^2 is less than 0.30 – indeed this is perhaps worthy of more discussion and analysis beyond that included in the research article. Overall the research is inconclusive as it conflicts with the Choi et al (1997) finding that there is a large difference in the usefulness of pension and other PRB accounting information.

Choi, Collins and Johnson (1997) consider the value relevance of non-pension postretirement obligations. Choi et al (1997) also try to assess the usefulness of accumulated postretirement benefit obligations (APBO) in determining equity market values. The methodology is quantitative and is based on a cross-sectional equity valuation

model – it is a framework that rests on the identity that a firm's market value of equity is the sum of its total asset and liability market values. The regression model is therefore, a development of that basic identity that decomposes the assets and liabilities into book values of assets and liabilities excluding those relating to pensions and terms for net unfunded pension obligations, APBO and accumulated pension obligations. The sample is constructed using The National Automated Accounting Research System (NAARS) data base highlighting SFAS 106 and the 1991 Compustat files ensuring that there are price data available on the CRSP file. This results in 336 firms that make up the final sample for 1991 and as the NAARS data are not available at the time of the research the 1992 annual reports are requested directly from each sample firm (reports for all but 43 firms are received). Regressions are run for 1991 with 336 firms and 1992 with 293 firms. It is found that accumulated PRB obligations (APBO) are 'marginally significant' in explaining equity values but capitalized at much lower rate than pension obligations. The adjusted R^2 is less than 0.40 in most cases and in all cases is R^2 is less than 0.50. There are also large intercept terms. A criticism of the research is that it is inconclusive and a concern is that it conflicts with other research preformed on the same subject in the form of Amir (1996).

A study carried out by Coronado and Sharpe (2003) uses an Ohlson (1995) type model as other researchers have but has results that are in sharp contrast to the earlier work by for example, Barth et al (1993). Coronado and Sharpe (2003) seek to determine the value relevance of recognised and disclosed pension accounting measures. They take a sample of US companies comprising the S & P 500 index over the years 1993 to 2001 using Compustat data for accounting information and I/B/E/S price and forecast data for a final dataset of 4,359 firm-year observations (Coronado and Sharpe, 2003: p.337). This research study finds that it is not the balance sheet information but the pension income and expenses that are relevant for the purposes of explaining share prices and the market seems to pay more attention to the figures in the income statement than pension assets and liabilities (Coronado and Sharpe, 2003). The adjusted R^2 is in the range of 0.578 to 0.812 in the regression analysis performed by Coronado and Sharpe (2003). It is interesting to note that in a more recent working paper Coronado et al (2008) extend the period of investigation to the years 2002 to 2005 and they find the same results and apparently more convincing

results with an adjusted R^2 in the range of 0.922 to 0.934 using observations in the range of 1,951 to 5,275 firm-year observations. It is perhaps surprising that the results are so strong and this may owe something to the form of analysis for example, "robust regression" techniques (Coronado et al 2008: p.12) also discussed below. Coronado et al (2008) base the study on a total 7,290 firm year observations (not applied in every run of the model) from the S & P 500 over the period 1993-2005 using Compustat as the source for accounting information and I/B/E/S International for stock prices and analyst earnings forecasts (Coronado et al, 2008: P.12).

Franzoni and Marin (2006) undertake a study to determine the value relevance of pension accounting information. They take a sample of US firms using Compustat accounting data for the years 1980 to 2002 and CRSP share price data to provide 36,651 firm-year observations. The findings suggest that the pension accounting information is value relevant based on the results of the regression analysis with adjusted R^2 in the range of 0.52 to 0.96. This study also concludes that investors are misled by the information. In particular, the researchers conclude that there is a tendency for investors to overvalue firms that have severely underfunded pension plans over two decades in the USA. Franzoni and Marin (2006) go on to say that investors do not pay enough attention to the implications of underfunding for future earnings and cash flows. This according to the researchers is because underfunded firms tend to be credit constrained so that cutting their cash flows to fund the pension plan causes them to give up a number of value enhancing opportunities than if they could borrow freely. Although the reasoning is interesting the analysis is based purely on quantitative analysis and interpretations of results that are by no means conclusive. There is no supporting analysis in the form of interviews or direct analysis of investor behaviour.

Picconi (2006) performs research on US firms to examine the value relevance of pension accounting information. The study uses a sample of US firms using the Compustat files to obtain accounting data for the years 1988 to 2001 and CRSP share price data. After eliminating all unlisted firms and firms with assets of less than $10 million there are 51,451 firm-year observations available for the regression analysis. The research findings suggest

that the pension accounting information is value relevant with regression results showing an adjusted R^2 in the range of 0.550 to 0.559. Nevertheless, this study concludes that neither share prices nor forecasts reflect the quantifiable future earnings effects of changes in pension information at the time it is published. This conclusion suggest that although pension accounting information is value relevant there is some uncertainty about the way in which that information is analysed. The research study suggests that there are indications that analysts fail to incorporate the quantifiable effects of "relevant and economically significant information" (Picconi, 2006: p.951). A criticism of this study is that the analysis is based purely on quantitative analysis and assumptions are made about the interpretations of analysts without actually engaging in discussions with them so that an analysis of the behavioural side is lacking. This suggests that a mixed methodology may have been helpful to attempt to corroborate some of the evidence provided by the quantitative analysis that is unfortunately left in an inconclusive state by the end of this study.

Jin et al (2006) undertake a study to try to determine the value relevance of pension plan risk. The approach used is to measure betas from the capital asset pricing model and try to determine whether the 'systematic equity risk' of US firms is related to the risk of the pension plan. The methodology is quantitative and involves the development of a risk regression model based on the relationship between the systematic risk borne by the equity and debt holders of the firm and the net pension plan risk (expressed in a beta form). The sample is constructed using data from three sources: Employee Retirement Income Security Act (ERISA) 'Form 5500' filings (providing asset allocation information for each plan sponsored by a company in the USA); Compustat and CRSP. Jin et al (2006) use the Form 5500 data for the years 1993 to 1998. This results in 4008 firm year observations that is used for the regression analysis. The findings are that there is a positive relationship between pension plan risk and firm risk. The coefficient for pension risk is significantly different from zero. The results of the regression may lack robustness in that the R^2 is between 0.1812 and 0.1875 for the various measures of firm distress such as book-market ratio, return of investments and financial leverage. The relationship between pension plan risk and the firm risk seems to break down as firms become distressed and Jin et al (2006)

conclude that the relation between pension risk and firm risk is insignificant for distressed firms. The results are not sufficiently conclusive and it is not clear how valid the estimates of betas really are – it seems to be a highly quantitative approach that is based on rather arbitrary assumptions of critical inputs so that the research may be interesting from the point of view that it offers alternative methodology but unfortunately may be of limited use in practice for the assessment and prediction of value relevance or decision usefulness.

2.5 Marginal information content studies

An early example of the use of a marginal information content study or 'event study' is that performed by Beaver et al (1980) who investigate the extent of value relevance associated with the disclosed replacement cost information following the application of Accounting Series Release (ASR) 190 in the USA. Beaver et al (1980) undertake a study of the share price reactions for certain firms in the year 1976 to investigate the extent of value relevance. The study involves the selection of a sample of 553 firms from the Compustat files and the share price data from CRSP resulting in 553 observations from the one accounting year used for the analysis. The relevant accounting data is extracted from the Replacement cost disclosures arising in accordance with ASR 190. Analysis is performed to determine monthly return data (rather than daily data due to perceived 'beta estimation problems'). The research conclusions are that the replacement cost data is not value relevant. There are concerns expressed, however about the inconclusive nature of the quantitative analysis. The researchers also identify the risk of possible misspecification in the research design.

Gheyara and Boatsman (1980) also consider market reaction to the 1976 replacement cost disclosures in the United States. This study that is also of a marginal information content form uses a sample of 106 reports that have replacement costs included and 83 reports from exempted firms – the data is taken from the Compustat files and share price data is from the CRSP files. The research study concludes that there is no evidence of information content in 'ASR 190 replacement cost disclosures'. This study may be criticised for using a small

sample. The results may also be seen as inconclusive. It is a purely quantitative study and as such there are gaps in the analysis in relation to behavioural considerations.

Givoly and Hayn (1992) study the value relevance of the deferred tax figures in the published financial statements. The research concentrates on the year 1987 and draws upon the Compustat files to select a sample of 1,348 firms to provide the same number of firm years for analysis. The study concludes that investors view the deferred liability as a real liability. The research method is based on a regression model but the results are not particularly strong with adjusted R^2 of less than 0.2 in virtually all cases and sometimes less than 0.1. This US study is based only on a quantitative approach and ultimately the Givoly and Hayn (1992) research is even more inconclusive than a number of incremental association studies investigating the same topic of deferred tax.

The marginal information content or 'event study' approach has also been used in a small number of pension accounting value relevance studies. A study by Chen and D'Arcy (1986) investigates the possible effects on market prices of a sample of firms in the USA following a change in required pension accounting disclosures after the release of SFAS 36 (or 'FASB Statement 36) 'Disclosure of Pension Information' in 1980 that mandated publication in a footnote to the annual report, of information on pension plan assets and liabilities and the assumed interest rate for estimating pension costs. SFAS 36 followed the release two months earlier of SFAS 35 'Accounting and Reporting by Defined Benefit Plans' that provided uniform standards for pension plan reporting including disclosure of such information as net assets available to pay benefits and the actuarial present value of accumulated plan benefits as well as the probability of payment considering the probability of the specific outcomes of death, disability, withdrawal and retirement. Chen and D'Arcy (1986) examine whether the market is sensitive to different pension interest rate assumptions around the issue date of the revised pension accounting proposals.

Chen and D'Arcy (1986) use a very large data bank of 1,113 firms for the year 1980 (taken from 'FASB Statement 36 Data Bank' maintained by The Accounting Research Center, Columbia University). Three samples of firms are selected. Two samples consist of firms

with large pension liabilities and these are distinguished between one group that uses low interest rate assumptions in projecting pension plan costs and the other group that uses high interest rate assumptions. The study by Chen and D'Arcy uses 52 firms for the 'low interest group'; 80 firms for the 'high interest group'; and, 33 firms for the 'low pension exposure group'. It is found that the securities of firms that make a low interest rate assumption outperform the securities of other firms in the sample and there is also evidence that they provide significantly positive risk-adjusted returns (Chen and D'Arcy, 1986).

Klumpes and McMeeking (2007) consider the potential effect of discount rate assumptions on share price performance in a UK study through an examination of 'abnormal returns' of UK listed companies that alternatively switched or did not switch to market based valuation assumptions under the UK pension accounting standard 'FRS 17'. This study entails empirical tests using a sample comprising 62 UK firms that switched to a market-based actuarial valuation of their assets and liabilities during the period 1995-1998 and an industry matched pair sample of 31 UK firms that either did or did not switch during this period. The year of announcement of the change in the pension accounting standard was 1999 when the financial reporting exposure draft, FRED 20 was released (July 1999) – the ASB issued FRS 17 on 24 November 2000 in the face of intense industry opposition to the proposals (Klumpes and McMeeking, 2007: p. 223). The data is pooled into the periods of 4 years between January 1995 and December 1998, and between January 2000 and December 2003 (so avoiding the year of the announcement of the change, in FRED 20 in 1999). The empirical results support the prediction that changing from actuarial cost based to market based pension asset values and discount rates that are based on corporate bond rates rather than being equity-linked, is "potentially-value relevant to capital market participants" (Klumpes and McMeeking, 2007: p.244). There are limitations in this research. All these purely quantitative analyses may be criticised for failing to shed any light on the behaviour and precise analytical techniques of investors.

A summary of important value relevance studies is shown in Table 2.1 on the following pages.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) – date	Subject / Sample	Main findings	Criticisms
V1	Beaver and Dukes (1972) Meth = RA	Tax deferral accounting impact on value relevance Period 1963-67 (576 firm years) Compustat files as source	Stronger evidence of value relevance of accounting income numbers based on tax deferral than income that is not based on such interperiod tax allocation.	Research is purely quantitative and relies on levels of statistical significance that are not conclusive – 48 out of 60 models are significant beyond the 0.01 level but another 5 models are only significant at the 0.05 level and the rest are even more inconclusive.
V2	Alford et al (1993) Meth = RA	Relative 'informativeness' of accounting disclosures in different countries. Sanple from 17 countries using Global Vantage Files	Income numbers have a significant association with share prices although this varies between countries. Only in the UK and Ireland does the VR info in the form of earnings become more rapidly impounded into the share price than in the matched US sample.	A number of limitations in the analysis seem to be inadequately discussed for example, the very low adjusted R^2 of less than 0.20 in a number of cases. The attempt to apply the conclusions to 'usefulness' or 'decision usefulness' may be criticised for its lack of testing of the viewpoints or analytical approach of users of accounting information such as investors.
V3	Joos and Lang (1994) Meth = RA	Effects of accounting diversity Years 1982-90 172/ 228/ 675 German/French/UK firms	There are substantial accounting differences in the different jurisdictions and EU directives have done little to reduce them	Adjusted R^2 is 0.28 / 0.24 / 0.19 in France / UK/ Germany post EU directive. As Adjusted R^2 is actually quite low the analysis is not very conclusive. Quite small samples for Germany and France although UK higher. Purely a quant study.
V4	Chan and Seow (1996) Meth = RA	Association between stock returns and foreign GAAP earnings versus earnings adjusted to US GAAP Year 1987-92 45 firms / 147 firm years Compustat	Earnings based on foreign GAAP are more closely associated with contemporaneous stock returns than earnings reconciled to US GAAP.	Small sample size. Adjusted R^2 is quite low in range 0.16-0.33 for several cases. Complex analysis goes beyond regression analysis – comparing competing sets of independent variables (Chen and Seow, 1996: p.146) Not very conclusive
V5	Dhaliwal, Subramanyam and Trezevant (1999) Meth = RA	Comparison of comprehensive income and net income as a measure of firm performance 11,425 firm years from 1994-95 years in Compustat	Results "do not support the claim that comprehensive income is a better measure of firm performance than net income".	Sophisticated quantitative analysis is undertaken but even this leaves a question mark over the true motives and responses of investors.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) – date	Subject / Sample	Main findings	Criticisms
V6	Harris and Ohlson (1987) Meth = RA and IA	Oil and gas properties reported in balance sheet – different bases Period 1979-83 (283 firm years)	Adjusted R^2 in the range of 0.48-0.80 for market values associated with book values determined on 'successful efforts basis'; 0.26-0.54 for MV associated with BV determined on full costing basis and zero to 0.52 using present value measures .	Purely a quantitative study that is not very conclusive in a number of aspects. Provides no insight into behavioural aspects such as the use and interpretation of accounting information by investors.
V7	Pope and Rees (1992) Meth = RA and IA	International differences in GAAP and the pricing of earnings Period: 1987-90 (85 firm years) LBS database / Compustat	The GAAP earnings adjustments add marginally to the ability of earnings to explain returns.	Small sample (inevitable given nature of the study) Some caution required in interpreting the conclusions – adjustments only 'add marginally' to ability of earnings to explain returns.
V8	Harris, Lang and Moller (1994) Meth = RA and IA	VR of German accounting measures: An empirical Analysis 230 firms in sample In year 1991	Accounting data are significantly associated with share price levels and returns (contrary to the notion that accounting data are essentially meaningless for German corporations).	Adjusted R^2 is less than 0.20 – sometimes significantly less in certain cases Purely a quant study
V9	Biddle, Bowen and Wallace (1997) Meth = RA and IA	A comparison of the stock return association with earnings versus a measure of shareholder value (a proprietary version) 1983-94 (2,271 firm years) Compustat / CRSP files	Earnings generally outperforms the proprietary shareholder value measure in terms of VR (stock returns and firm values) – note the proprietary measure is EVA® by Stern Stewart & Company	Adjusted R^2 is in the range of 0.11 to 0.30 – so all quite low – the study concentrates on marginal effects as well Inconclusive? As a purely quantitative study there are gaps in the analysis – no behavioural considerations (interviews would be very interesting and probably helpful)
V10	Bodnar and Weintrop (1997) Meth = RA and IA	The valuation of the foreign income of US multinational firms Years 1985-93 2,570 firm years Compustat (source)	Association coefficients (suggesting VR) for foreign (non-US) income are significantly larger than for domestic (US) income	Possible misspecification problems – results may (unfortunately) be explained by "measurement errors in our earnings expectations" Purely quantitative study – how do investors really undertake the financial analysis? – what are the views/motivations Appropriateness of the CAR_i return analysis is questionable.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) - date	Subject / Sample	Main findings	Criticisms
V11	Balsam and Lipka (1998) Meth = RA and IA	Share prices and alternative measures of EPS 3,646 firm years from 1975-93 Compustat	Alternative measures of EPOS are 'incrementally informative' – fully diluted EPS even more informative than basic EPS.	Adjusted R^2 is 0.23 to 0.72 – overall not very conclusive A relatively early US study – questionable applicability to UK and other markets. No interviews / discussion with investors. Only a quants study.
V12	Fields, Rangan and Thiagarajan (1998) Meth =RA and IA	Usefulness of Non-GAAP accounting measures in Real Estate Inv Trust industry	Net income has stronger association with share price than FFO (funds from operations)	Quite a small sample Questionable applicability of this study to other topics. The very specific subject of the FFO comparison might have been usefully extended by undertaking surveys and/or interviews.
V13	Vincent (1999) Meth = RA and IA	The information content of funds from operations (FFO) for real estate investment trusts (REITs) 138 REITs from 1994-96 Ann reps Forms 10-K and CRSP for share prices	Evidence for VR – i.e. both FFO and EPS "consistently provide incremental information content"	Quite a small sample and not really conclusive about the best earnings measure in terms of VR Purely quantitative study – does not reveal how investors undertake the financial analysis or their views/motivations. Furthermore, the quantitative research involves complicated incremental information analysis that is difficult to interpret.
V14	Harris and Muller (1999) Meth = RA and IA	The market valuation of IAS versus US-GAAP accounting measures using Form 20-F reconciliations 104 observations (31 firms from 13 countries) Period 1992-96	Earnings reconciliation is VR	Small sample Large intercept terms In spite of sophisticated quantitative analysis question marks remain – in common with other quant studies there is no study of a possible link with user behaviour.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) – date	Subject / Sample	Main findings	Criticisms
V15	Kiosse, Lubberink and Peasnell (2007) Meth = RA and IA	Comparison of the value relevance of pension accounting information prepared on fair value and 'smoothing basis' Using Compustat files Sample over period 1998-2005 - 3,388 observations for US GAAP abd 2,312 for FV	Value relevance of pension accounting numbers based on smoothed US GAAP method of valuation. It is also found that the market appears to valuye the unexpected return included in the Fair Value method. The adjusted R^2 is in the range of 0.5118 for the US GAAP methods to 0.5517 for the FV method.	The results are not very conclusive as there are large intercept terms in the regressions and there are the common drawbacks of purely quantitative analysis as there is no indication as to how investors actually interpret the pension accounting information.
V16	Hann, Heflin and Subramanyam (2007) Meth = RA and IA	A comparison of the value relevance of pension accounting information prepared on fair value and 'smoothing basis' Sample over period 1991-2002 from 2000 firms (13,610 firm years) from Compustat files.	Combined value relevance using both income statement and balance sheet information in the 'Smoothing Model' is found to be represented in an adjusted R^2 of 0.573 compared to an adjusted R^2 of 0.551 using the 'Fair Value Model'.	The drawbacks of using quantitative analysis alone seem particularly clear when trying to analyse and compare the use of different models for pension accounting – in particular, quantitative analysis cannot tell us whether or in what way information such as pension account ting information that is merely disclosed in notes is used. There are positive and significant intercept coefficients and the quantitative analysis is sometimes difficult to interpret.
V17	Werner (2011) Meth = RA and IA	A comparison of the value relevance of pension accounting information prepared on fair value and 'smoothing basis' Sample over period 1998-2005 Fortune 200 firms (1,189 firm years) from Compustat files.	The VR under the SFAS 87 'smoothing model' is virtually equal to 'fair value model' with an adjusted R^2 of 0.343 and 0.342 respectively. Off balance sheet pension amount – mainly the unrecognised net actuarial loss or gain is incrementally value relevant.	The interesting outcome about the value relevance of the unrecognised net actuarial loss or gain component – a disclosed off-balance sheet amount is not discussed further. The quantitative analysis is quite difficult to interpret. It is noted that there are significant coefficients for intercept terms although these are not reported specifically.
V18	Barth, Beaver and Stinson (1991) Meth = IA	Banks /fin institutions Period: 1980-87 Main analysis 1983-87 165 US thrifts From Compustat	Risk data disclosed in notes is value relevant.	Adjusted R^2 is < 0.4 except for 1985 with an adjusted R^2 of 0.53. Although, use of Generalised Least Squares analysis permits a higher adjusted R^2 of 0.65 – still not fully conclusive as it is purely quantitative analysis. Some of the results are difficult to interpret (a point conceded by authors Barth et al (1991)

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) - date	Subject / Sample	Main findings	Criticisms
V19	Petroni and Wahlen (1995) Meth = IA and measurement	Fair values of equity and debt securities ad share prices of property casualty insurers Period: 1985-91 (344 firm years) Compustat	VR of equity secs at FV is greater than for other types of investment securities e.g. corporate bonds	Adjusted R^2 is 0.37 so not very high. A purely quantitative study – so does that limit the inferences that may be made.
V20	Ahmed and Takeda (1995) Meth = IA	Commercial banks' investment securities – stock market valuation of gains and losses Years 1986-91 (152 banks) 3256 observations - Compustat	VR of realised and unrealised sec returns – after control both types of returns are VR.	Looks at incremental effects – very low adjusted R^2 is < 0.1 Only a quantitative study so leaves a gap – a question mark about the motivation of investors.
V21	Venkatachalam (1996) Meth = IA and measurement	VR of banks' deriv disclosures 99 bank holding cos for 1993 and 1994 fiscal years Ann reports Lexis/Nexis and Compustat for stock prices	VR of banks' risk management strategies – FV of derivatives have "incremental explanatory power over and above notional amounts of derivatives.	Relatively large intercept terms Small sample - Author concedes that the evidence should be viewed as 'preliminary' Purely quantitative study – although this is a criticism of many studies
V22	Nelson (1996) Meth = IA and measurement	Fair value accounting for commercial banks. Year 1992 (200 firm years) Largest US bank holding cos in Thomson Bank Directory	FV of investment securities are VR but no evidence for loans, deposits and financial instruments.	Adjusted R^2 is 0.51 in 1992 but only 0.24 in 1993. Large intercept terms Mixed results means the articles is not very conclusive.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) - date	Subject / Sample	Main findings	Criticisms
V23	Anthony and Petroni (1997) Meth = IA	Accounting estimate disclosures and firm value in the property casualty insurance industry 379 firm years from 1985-91 years in Compustat	Disclosures of estimation errors in previous claim estimates are apparently value relevant and results suggest that investors use these estimates.	Quite small sample size Quite an early study Quite low Adjusted R^2 of 0.39 to 0.52 over period 1986 to 1991. Purely a quantitative study.
V24	Shevlin (1991) Meth = IA and measurement	R & D firms valuation Period: 1980-85 53 firms /firm years From US stock exchanges	R & D info in disclosures are VR i.e. capitalized expenditure (based on footnotes)	Adjusted R^2 is 0.83 so quite high Large intercept terms. Purely quantitative study
V25	Lev and Sougiannis (1996) Meth = IA	VR of R & D Years 1979-91 2,600 firms Compustat	Significant intertemporal association between firms' R & D capital and subsequent stock returns	Low incremental adjusted R^2 Relatively large intercept terms Not very close association contrary to authors' interpretations – leaves question marks!
V26	Chaney and Jeter (1994) Meth = IA	Deferred Taxes effect on security prices Years 1969-85 Concentrate on 1982 and 83 512 or 529 firms Compustat	Null hypothesis of 'no association' is rejected	Adjusted R^2 is only 0.20 in 1982 and – 0.25 in 1983. So even though coefficient for deferred taxes is significantly different from zero at 0.10 level there is reasonably low R^2 so not a particularly close association and therefore an inconclusive result. Purely a quantitative study and no effort is made to try to assess how the accounting information is analysed by users.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) - date	Subject / Sample	Main findings	Criticisms
V27	Amir et al (1997) Meth = IA and measurement	Deferred Tax valuation 1,121 firm years Drawn from Fortune 500 firms in 1992 -94 years in Compustat	Separating deferred taxes into components provides VR information.	Adjusted R^2 is 0.32 – 0.46 Not particularly high association so although the conclusion is that the info is VR there is still a need for some caution in the interpretation of results. Purely quants study
V28	Ayers (1998) Meth = IA	Deferred Tax Period: 1992 and 1993 1,444 firm /year observations Compustat	Net deferred tax liabilities disclosed under SFAS 109 provide additional value relevant information	Adjusted R^2 is < 0.5 in all cases analysed and this was worthy of discussion and further analysis. Other weaknesses not discussed were large intercept terms and the total reliance on quantitative methods.
V29	Amir, Harris and Venuti (1993) Meth = IA and MIC	Comparison of VR of US v non US GAAP Form 20-F Reconciliations Period: 1981-91 467 firm /year observations Nexis/Lexis / Compustat	Aggregate reconciliations of equity and earnings are value relevant – consistent with US GAAP measure being more VR than the aggregate measures from the mix of non-US GAAP systems	Adjusted R^2 is in range 0.36 to 0.52 Purely a quantitative study – no indication of investor motivations. Deficiencies suggest that a behavioural study is needed.
V30	Bandyopadhyay, Hanna and Richardson (1994) Meth = IA and MIC	Capital market effects of US-Canada GAAP Differences Years 1983-89 299 firms/firm years Toronto and NYSE and American NASDAQ	Investors act as if US-Canada GAAP differences do not affect pricing decisions but this does not imply that the reconciliations have no value.	Quite small sample GAAP differences can have a large impact on reported earnings (p.275) but empirical tests suggest that "on average investors act as if US-Canada GAAP differences do not affect pricing decisions" – so inconclusive and perhaps confusing results.
V31	Barth and Clinch (1996) Meth = IA	International accounting differences and their relation to share prices – UK, Australia and Canada Period: 1985-91 400 firms Compustat	GAAP reconciliation required by SEC is VR (reflects info useful to investors)	Quite small sample size. 'Seemingly unrelated regression' problems – may require more sophisticated statistical analysis Still question marks over conclusions even though there are arguments that GAAP reconciliations are 'useful to investors' (Barth and Clinch, 1996) Purely a quants study and results difficult to interpret.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) - date	Subject / Sample	Main findings	Criticisms
V32	Rees and Elgers (1997) Meth = IA	Retrospective reconciliations of non-US and US GAAP 286 non-US registrants filing annual reports with the SEC in 1993 year.	Some of the VR info in the SEC mandated disclosures is available to the market from sources other than the annual reports filed with the SEC – shareholders' equity reconciliations are VR.	Quite large intercept terms raise doubts even though adjusted R^2 is over 0.5 Purely a quant study
V33	Davis-Friday and Rivera (2000) Meth = IA	Inflation accounting and 20-F disclosures: Evidence from Mexico - 26 firms in 1995 and 1996 NYSE and NASDAQ and American Stock exch AMEX	ADR prices are significantly related to Mexican GAAP net income.	Very small sample size. Large intercept terms raise doubts Also although adjusted R^2 is in range 0.5 – 0.66 in 1995 this is in the range 0.24-0.30 in 1996. Purely a quant study
V34	Barth and McNichols (1994) Meth = IA	MV of environmental liabilities relating to superfund sites 1496 firms from 1981-90 years in Compustat	Relatively low 'explanatory power' of cost models however, 7 environmental liability proxies were VR – they provide explanatory power incremental to recognised assets and liabilities.	Purely quantitative study Large intercept terms raise question marks about specification problems (using MVE regression models).
V35	D'Souza, Jacob and Soderstrom (2000) Meth = IA and measurement	Nuclear decommissioning costs – the impact of recoverability risk on valuation Years 1993-94 53 firms in US Compustat	VR of decommissioning costs – more negative cost/firm value association for utilities with higher business or financial risk.	Small sample Large intercept terms Adjusted R^2 is 0.77 to 0.79 Purely quantitative analysis – usual concerns
V36	Aboody (1996) Meth = IA	Market valuation of employee stock options Years 1983-90 3,078 firm years Compustat and CRSP files	Evidence of VR – there is a negative correlation between option value and a firm's share price	Adjusted R^2 is in the range of 0.85 to 0.88 – so all quite high – but limitations as it is only a quants study Perception of investors is not covered Questions about how expectations are reflected in quantitative analysis. Issues also raised by Aboody (1996) - modelling expectations is complicated even beyond the scope of the research Does not analyse investor / analyst perceptions directly.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) - date	Subject / Sample	Main findings	Criticisms
V37	Vincent (1997) Meth = IA and measurement	Equity valuation implications of purchase versus pooling accounting Period: 1979-86 92 transactions (57 purchase plus 35 pooling)	Evidence that investors adjust accounting numbers so the accounting method (pooling versus purchase accounting) does not 'of itself' explain any valuation differences.	Small sample size Results have to be interpreted and there are no interviews (or other qualitative research methods) to assist in explaining investor behaviour.
V38	Cheng, Liu and Schaefer (1997) Meth = IA	VR of SFAS 95 Cash Flows from Operations Period: 1994 3,982 firm /year observations Compustat / CRSP returns	SFAS 95 cash flows are relevant disclosures for investment decisions – also when estimated cash flows included SFAS 95 disclosures are found to have VR beyond estimated cash flows	VR association evidence is not that strong. Adjusted R^2 is < 0.2 and this is worthy of more discussion and further analysis beyond that contained in the article. Results more indicative than conclusive. Also there may be significant arbitrary elements for example, it is necessary to make assumptions for estimated inputs. Total reliance on quants study.
V39	Black (1998) Meth = IA	VR of earnings and cash flow measures at different business life-cycle stages 1979-90 (27,924 firm years) Compustat – US data	Evidence of VR in all but start-up stage for earnings and in all stages for cash flow income.	Adjusted R^2 is 0.46 to 0.88 Large intercept terms Question marks over specification of linear regression model Purely a quants study – so no qualitative research to try to assess investor motivations
V40	Bartov (1997) Meth = IA	Foreign currency exposure measures and market valuation Period: 1976-90 5,724 firm /year observations Compustat / CRSP NYSE/AMEX series	Significant improvement in VR following SFAS 52 (restatement of foreign operations financial statements into parent's currency equivalents for inclusion in parent company's fin statements) replacing previous standard SFAS 8 (considered a poor measure).	Analytical problems identified – the results may be inconclusive. Linear relationship is questioned yet the suggestion of insertion of a non-linear model may be problematic. An ad hoc model may not be the answer – CAR_i return model approach used initially. The methods are purely quantitative – this is insufficient to assess investor behaviour and motivations.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) - date	Subject / Sample	Main findings	Criticisms
V41	Daley (1984) Meth = IA	Pension earnings under US accounting standard APB 8 and value relevance Period 1975-79 (153 US firms)	Evidence of value relevance – estimations for the regression coefficient for pension expenses are significantly negative.	Results need to be treated with caution due to quite small sample size and large intercept terms that raise questions about the model specification. Possible measurement error in data due to different cost methods.
V42	Barth, Beaver and Landsman (1992) Meth = IA	Value relevance of disaggregated pension cost and return components US data – Compustat	Coefficient for the independent variable 'interest cost' is significantly negative and the coefficient on independent variable 'return on plan assets' is significantly positive as expected.	Need for some arbitrary assumptions to try to explain some unexpected findings e.g. the coefficient on the independent variable 'service cost' is significantly positive – suggestion that this may be due to multicollinearity between pension cost components or due to it being a proxy for human capital. Purely a quantitative study with no user behaviour analysis.
V43	Landsman (1986) Meth = IA	Value relevance of pension assets and liabilities Period 1979-81 (between 235 and 624 firms)	Pension fund assets and liabilities are value relevant and treated similarly to corporate assets and liabilities.	Large and in some cases very large intercept terms suggest that the model is not correctly specified. No interviews or other behavioural analysis to support the findings from the quantitative research.
V44	Dhaliwal (1986) Meth = IA	Study of the impact of unfunded vested pension obligations on market perceived risk / valuation Period 1976-79 (55 firms)	The effect of unfunded vested pension liabilities is not significantly or statistically different from that of debt or other liabilities.	Small sample size and quite a weak association between the accounting numbers and market values revealed by an R^2 in the range of 0.20 to 0.27. A purely quantitative study with no research into investor approach.
V45	Barth, Beaver and Landsman (1993) Meth = IA	Value relevance of pension assets and liabilities and pension cost components. Period 1987-90 (300 US firms)	Pension assets and liabilities (measured as 'PBO' or projected benefit obligation) are value relevant whereas pension cost components are not (coefficients are not significantly different from zero).	Large intercept terms cast doubt on the specification of the model even though the adjusted R^2 falls in the range of 0.65 to 0.75. This is only a quantitative study with no interviews, surveys or other research approaches that may consider the investor behaviour or use of the specific accounting data for decisions.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) - date	Subject / Sample	Main findings	Criticisms
V46	Gopalakrishnan (1994) Meth = IA	Pension accounting recognition v disclosure and investor valuation 1038 firm years from 1988-90 years in Compustat	Pension info disclosed in footnotes is value relevant and investors attach equal importance to recognised and disclosed information.	Purely quantitative study but tries to examine 'perceptions' of investors (1994: p.394) Only one user group (investors) is examined – although this is a criticism of many studies 'Usefulness' of recognition versus disclosure is judgemental and depends on 'level of user sophistication' that is a variable and is 'not fully captured in the research design' Gopalakrishnan (1994: p.394)
V47	Amir (1996) Meth = IA	Pensions and PRBs Period: 1990-93 1035 firm /year observations Nexis/Lexis / Compustat	PRB disclosures are value relevant – this VR increased further when US standard SFAS 106 disclosures of sensitivity are included in analysis	Adjusted R^2 is < 0.3 and this was worthy of discussion and further analysis. Indeterminate – results inconclusive as they conflict with Choi et al (1997) finding that there is a large difference in the usefulness of pension and other PRB accounting information. No further analysis that may help to resolve conflicting results and only a quantitative study.
V48	Choi, Collins and Johnson (1997) Meth = IA and Measurement	Pensions and PRBs Year 1991 336 firms/firm years Compustat	Accumulated PRB obligations (APBO) found to be 'marginally significant' in explaining equity values but capitalized at much lower rate than pension obligations	Adjusted R^2 is < 0.4 in most cases and in all cases is R^2 is < 0.5 Large intercept terms Conflicts with other research i.e. Amir (1996) No further analysis that may help to resolve conflicting results and only a quantitative study.
V49	Coronado and Sharpe (2003) Meth = IA	The value relevance of recognised and disclosed pension accounting measures. Period 1993-2001 – S & P 500 Compustat 4,359 firm years	Pension income and expenses are value relevant but balance sheet pension information is not.	Uncertainty caused by major conflict between the findings and earlier research of Barth et al (1993). Lack of detail in some of the quantitative results for example, statistically significant intercept terms. Only a quantitative study so that there is a lack of insight into investor behaviour that may have been useful to explain results.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) - date	Subject / Sample	Main findings	Criticisms
V50	Franzoni and Marin (2006) Meth = IA	Value relevance of pension accounting information. Sample taken from Compustat files and tested against CRSP data over period 1980-2002 representing 36,651 firm years.	Pension accounting information is VR with adjusted R^2 in range 0.52 to 0.96. It is concluded that there is a tendency for investors to overvalue firms that have large pension scheme exposures and in particular where pension schemes are underfunded.	There are aspects of the analysis that are inconclusive and the results vary quite widely even though they suggest value relevance on the whole. There is also some doubt about how investors actually use the information in practice – it is a purely quantitative study.
V51	Picconi (2006) Meth = IA	Value relevance of pension accounting information. Sample taken from Compustat files and share prices from CRSP data over period 1988-2001 representing 51,451 firm years.	It is concluded that there is evidence of value relevance of pension accounting information but it is also concluded that neither prices nor forecasts fully reflect the quantifiable future earnings effects of changes in pension accounting information at the time it is published. Adjusted R^2 in range 0.550 to 0.559.	There are a number of conclusions that would benefit from qualitative analysis – for example, it is concluded that there is VR but there are implications that the information is inadequately analysed so that analysts fail to incorporate the quantifiable effects of 'relevant and economically significant information' (Picconi, 2006: p.951). There is no direct analysis including discussion with the analysts themselves that could help to corroborate these assumptions. It is purely a quantitative study.
V52	Jin, Merton and Bodie (2006) Meth = IA	The value relevance of pension plan risk. Period 1993-98 – 4008 firm years using Form 5500 data showing asset allocations Compustat and CRSP data	There is a positive relationship between pension plan risk and firm risk – in the regression model the coefficient for pension risk is significantly different from zero.	Results of the regression lack robustness with an R^2 of between 0.1812 and 0.1875 for the various measures of firm distress such as book-market ratio, return of investments and financial leverage. The relationship seems to break down as firms become distressed. Validity of beta measures is questionable. Overall the analysis is inconclusive and it is only a quantitative study.
V53	Coronado, Mitchell, Sharpe and Nesbitt (2008) Meth = IA	The value relevance of recognised and disclosed pension accounting measures. Period 1993-2005 – S & P 500 Compustat 7,290 firm years	Uses an Ohlson (1995) based model and finds VR with adjusted R^2 in range 0.922-0.934. Pension income and expenses are value relevant but balance sheet pension information is not.	Conflict of earlier research of Barth et al (1993). Lack of detail in some of the quantitative results for example, statistically significant intercept terms. Only a quantitative study so that there is a lack of insight into investor behaviour that may have been useful to explain results.

Table 2.1 Review of Value Relevance Articles

Ref	Author(s) - date	Subject / Sample	Main findings	Criticisms
V54	Beaver, Christie and Griffin (1980) Meth = MIC	Replacement cost disclosures – information content of Accounting Series Release (ASR) 190 in USA Period: 1976 553 firm /year observations Compustat / CRSP files	Replacement cost data not value relevant.	Analysis seems inconclusive – possible misspecification in the research design is conceded by the authors as well This is a very early study (data from 1976) – at least from the perspective of a reader in 2012 – the format of accounting in financial statements and disclosures has changed in the USA and elsewhere (UK of course) so the applicability is questionable. Only a quantitative study.
V55	Gheyara and Boatsman (1980) Meth = MIC	Market reaction to the 1976 Replacement Cost Disclosures Years 1976 106 reports and 83 exempted Compustat CRSP files	No evidence of information content in ASR 190 replacement cost disclosures	Small sample size Inconclusive. A point common to other studies of this type - as a purely quantitative study there are gaps in the analysis – no behavioural considerations (interviews would be very interesting and probably helpful)
V56	Givoly and Hayn (1992) Meth = MIC	Deferred Tax Year 1987 1,348 firms/firm years Compustat	Investors view the deferred liability as a "real liability".	Low Adjusted R^2 is < 0.2 and in many cases < 0.1 Very specific to accounting in the USA context. Purely quantitative study.
V57	Chen and D'Arcy (1986) Meth = MIC	Effects on market prices of firms of a change in pension accounting disclosures Year 1980 - 165 firms from 'FASB SFAS 36 data bank'	Analysing SFAS 36 disclosures it is found that securities of firms that make a low interest rate assumption outperform securities of other firms in the sample.	Quite a small sample size. Concerns about purely quantitative research and the applicability of the 'event study' approach for pension accounting value relevance.
V58	Klumpes and McMeeking (2007) Meth = MIC	Examination of abnormal returns of firms that alternatively switched or did not switch to market based pension valuation assumptions under FRS 17 1995-98 – 62 UK listed firms	Changing from actuarial based to market based pension valuations is 'potentially value relevant'.	Conclusions are quite cautious. Quite a small sample size. Similar concerns to those expressed about Chen and D'Arcy (1986) about purely quantitative research and the applicability of the 'event study' approach for pension accounting value relevance.

2.6 Decision usefulness

This literature review is concerned with value relevance and decision usefulness. Decision usefulness is an aspect of the value relevance discussion. This study has already explained the process of testing for value relevance using quantitative methods, mainly regression studies with equity market value as the valuation benchmark to assess how well accounting amounts reflect information used by investors (Barth et al, 2001: p.6). Testing for decision usefulness is probably more difficult in that it needs to go beyond a purely quantitative study by incorporating qualitative methods. This also raises the question of whether it is better to try to assess the 'perception of decision usefulness' as a criterion that may be explored through methods such as interviewing users of accounting information. Furthermore, it is suspected that it is the 'perception of decision usefulness' that provides the link to value relevance since it is such perception that influences investment decisions.

Gonedes (1976) provides a theoretical analysis of the relationship between the capital market, the 'market for information' and external accounting (or financial accounting information). This analysis is pertinent to the discussion about decision usefulness and value relevance. The market for financial accounting information is influenced by attributes such as decision usefulness that is in turn determined by financial reporting practices. The extent to which financial accounting information is reflected in share prices is connected to the notion of capital market efficiency (which in its absolute form is where prices fully reflect all available information as proposed by Fama, 1970) including information-production aspects (Gonedes, 1976). There is reference to the theoretical connection between 'information-production activities' and capital market equilibrium and how this provides some of the theoretical underpinnings for aspects of external accounting for example, information content and disclosure issues (Gonedes, 1976: p.611).

McNally et al (1982) try to find out which financial accounting information is perceived as important by external decision-making groups. The study is performed in New Zealand and involves a questionnaire survey being sent to financial editors and stock exchange

members. Out of 187 questionnaires mailed out there were 83 completed responses received (a 44% response rate). The questionnaire requests that participants score the relative importance of disclosing each of 41 items on a scale of 1 (meaning 'little or no importance') to 5 (where the item is 'very important'). The responses show that users regard as important the voluntary disclosure of a wide variety of items. The 'leaders' in voluntary disclosure tend to be the larger companies perhaps due to the larger resources available to prepare more comprehensive financial reports. The overall conclusion is that voluntary disclosure is low in relation to external user preferences even with respect to larger companies that might have been expected to respond to higher disclosure expectations of investors or lenders. The outcome of this study suggests that external users in this New Zealand research have similar attitudes to users in studies in the United States and the United Kingdom. McNally et al (1982) believe it may be necessary to extend the variety of items subject to mandatory disclosure requirements or for professional external users to exert more pressure for disclosure improvements. There are some limitations in this research for example, the survey questionnaire could have been extended by undertaking interviews with at a sample of the survey respondents that might have given greater insight into user preferences and decision processes.

Arnold and Moizer (1984) undertake research that helps to give some insight into the decision usefulness of financial accounting information by investigating methods used by UK investment analysts (both fund managers and investment intermediaries) to appraise investments in ordinary shares. This involves a postal survey of a sample of analysts selected from the UK section of the Member Societies Yearbook of the European Federation of Financial Analysts' Societies resulting in 304 replies from analysts of whom only 202 analysts were involved in analysing the ordinary shares of companies listed on the UK Stock Exchange. The research design is augmented by including unstructured interviews of analysts in 6 firms. This study provides insight into investment appraisal techniques used by analysts – for example, fundamental analysis is preferred to technical analysis or beta analysis methods. Limitations in the research include the small sample size for interviews. It is also suggested that a postal questionnaire survey is unlikely to be a

satisfactory means of capturing differences of detail between precise procedures used by analysts (Arnold and Moizer, 1984: p.206).

Moizer and Arnold (1984) consider the share appraisal techniques used by investment analysts including portfolio managers and thereby provide some insight into what information is regarded as decision useful and how this information is used. A postal questionnaire survey provides data from 202 UK equity analysts who are involved in analysing UK listed companies – this includes 92 portfolio managers and 110 'information intermediaries'. The questionnaire includes questions about sources of information used during investment appraisal; the frequency of discussion of corporate financial performance; and a five point scale of criticism of annual accounts. The respondents' answers revealed differences in the amount of analysis undertaken by portfolio managers and information intermediaries but they did not reveal a significant difference in the analysts' approach to share appraisal. The study could have been extended to include some interviews with the analysts to expand on the data obtained in the survey – indeed interviews were undertaken in a 'sister study' in the same years by the same authors (see Arnold and Moizer, 1984). There could also have been a link to empirical research using some quantitative research to investigate whether the decision processes are supported by capital market evidence.

Day (1986) considers how annual reports are used by UK investment analysts and the resulting study is an important contribution to the decision usefulness literature. This research study uses interviews and 'think-aloud' approaches based on a selected set of accounts to observe analysts' approach to appraising financial accounting information. The sampling approach is to start by inviting 18 stockbroking firms to take part in the study and after 2 firms decline to help and another firm is removed as it employs no analysts at their London office, the remaining 15 firms nominate a senior analyst or partner to participate in the study. The 15 analysts are split into 9 specialists who follow the chosen company and 6 non-specialists. The study uses a 'content analysis' technique to obtain an understanding based on the frequency with which certain pre-selected topics are mentioned. Day (1986) believes that the research design is sufficiently objective and unbiased in that to a large

extent the analysts are left free to demonstrate which information they use and need. It is found that analysts are interested in projecting EPS and cash flows but the balance sheet does not seem to be of particular interest to the analysts as far as forecasts are concerned. A limitation of the research study is that it is not possible to draw statistically valid inferences because of the sample size and the lack of random selection. The Day (1986) study suggests a need for further empirical research on the impact of accounting information including and specifically mentioning cash flow data on share prices.

Mear and Firth (1990) consider elements of decision usefulness in their study of differences in financial analyst judgement. The study is interested in whether there is 'judgement consensus'. The research is carried out in New Zealand and uses a sample of 38 professional security analysts, portfolio managers and stockbrokers drawn form a variety of financial institutions throughout the country. The participants in the study perform analysis on a hypothetical investment scenario and are asked to indicate risk levels and expected returns on an evaluation form. Each participant evaluates 38 different financial profiles with only the first three cases in each task booklet identical and common to all participants (to provide 'task familiarisation'). The simulation exercise is carried out in two locations, firstly, in conjunction with a two-day conference organised under the auspices of The New Zealand Society of Investment Analysts and in the other case in the board room of a stockbroking firm.

Mear and Firth (1990) analyse the results of the simulation exercise to reveal the extent of correlation between the participants' risk (return) judgements. The mean level of the 703 unique pairwise Pearson product moment correlations is 0.356 (risk) and 0.323 (return) that suggests that the financial analysts possess only moderate to low levels of judgement consensus in their appraisals of security prospects (Mear and Firth, 1990). Regression analysis is used to test the judgement reliability by using the participant risk judgements (return judgements) as the dependent variable resulting in a mean R^2 of 0.727 (for the risk measure) and 0.733 (for the return measure) with approximately half of the R^2 coefficients in the interval 0.62 to 0.82 for the risk measures and in the interval 0.66 to 0.81 for the return measure. It is concluded from the magnitude and distribution of these R^2 values that

security analysts use highly consistent 'linear judgement strategies' (Mear and Firth, 1990). The research is limited in a number of ways, for example the sample size is small and there may be concerns about potential bias in the results. A further limitation is that the discussion of the type of financial accounting information used in the simulation exercise is not revealed in any detail and there is no discussion about the possible relationship between 'judgement consensus' and the perception of decision usefulness of financial accounting information.

Bence et al (1995) undertake a study that has potential to add to the decision usefulness research since it examines the financial information sources that are used by professional investors (the researchers use the term 'sophisticated investors'). The method of research is interviews with a sample of 21 investment analysts and 12 institutional investors. The interviews are used to collect various data and this is then analysed to determine the most important types of information in the view of the sample of participants. Cluster analysis is used to determine the important sources of financial information for example, direct review of information in the form of annual reports and interim statements or telephone discussions and company visits for meetings with management. The focus for the interviews is the analysis of one particular fully listed company which permits discussion of the content of the annual report and related matters. All interviewees are asked to examine a list of possible information sources and then rank them according to perceived importance as sources for decision making on a scale of 1 to 5 where 1 is the most important and 5 is not important. The findings suggest that there is general agreement on the perception of importance of information sources and are consistent with some of the findings of an earlier study by Moizer and Arnold (1984). The sample size is relatively small and there is no significant linkage identified to empirical research. The study unfortunately stops short of investigating whether a perception of decision usefulness might be reflected in value relevance by analysing share price movements.

Breton and Taffler (1995) add to the decision usefulness research by using methods such as interviews of 63 analysts from 5 stockbroking firms and observation using a case study approach. It is found that only experienced analysts are capable of advanced analysis

evidenced by the fact that they make adjustments for creative accounting but that these experienced analysts have an influence on other less experienced analysts – this leads the researchers to conclude that only a small number of accounting experts may be required for the market as a whole to identify and adjust for so called 'window dressing'. Limitations of the study are that it uses only a relatively small sample of 5 firms and it leaves a question mark over how applicable these research findings are to the whole market.

Rippington and Taffler (1995) consider the information content of firm financial disclosures and the possible impact on security prices. As such it is related to value relevance studies although it also considers decision usefulness issues from a quantitative analysis approach. As Rippington and Taffler (1995) point out the evidence relating to the 'usefulness' of the annual report and accounts to investors is sparse. The study uses a return model applied to a sample of 337 firms drawn from the London Stock Exchange as at 30 June 1981 and daily return data over the period from 1 May 1979 to 30 June 1981. The researchers' conclusions are quite surprising as they suggest that the annual accounts convey relatively little information compared to the preliminary and interim statements that convey substantial amounts of information. The researchers concede that there may be problems associated with analysing varying levels of trading, for example the difficulty of reaching conclusions in 'thin trading' environments yet they still say that the annual report and accounts have information content for only a relatively small number of actively traded firms. A limitation of this research is that it is based on an event study and is a purely quantitative approach. The results are so surprising that they deserve further analysis of active market participants to try to explain the anomalous conclusion by Rippington and Taffler (1995) in relation to the information content of the annual report and accounts as a source of financial information.

Bartlett and Chandler (1997) consider the decision usefulness of the financial report and the viewpoint of private investors. The study uses a postal questionnaire that is tailored to reflect the contents of a recent annual report of a company chosen 'at random' from 'The Times Top 100' in 1994. The questionnaire is mailed to 300 shareholders 'randomly selected' from the shareholders' register. The analysis is then carried out on the basis of 76

'usable returns'. The questionnaire is designed to reveal information about the respondent in terms of their background and investment decisions, how they read the annual report and accounts and then an indication of other information sources (financial press reports are the most widely read). A key conclusion of the research is that the annual report is still not widely read – it might be emphasised that this research covers private investors rather than professional investors. Bartlett and Chandler (1997) concede that there are risks in the selection of the focus company for analysis purposes for the participants – they point out that there is no reason to believe that the company in question or its annual report are unusual and there is some confirmation of this by the fact that the findings are similar to those of a number of other surveys os shareholders in other companies. Perhaps a bigger question arises about the differences between private and professional investors and the extent to which the different investor groups influence the market. The research does not consider any possible link between the perception of decision usefulness and capital market effects.

Barker (1998) considers the market for financial accounting information in a study that makes direct contact with users in the form of analysts and fund managers (as well as finance directors as preparers). The research contributes to the literature on the analysis of decision useful information by considering the relative usefulness of information generated directly by the company compared to data that has been 'processed' by analysts. The importance of fund managers is underlined since fund managers make investment decisions that determine share prices (Barker, 1998). The market for information has two aspects – the market for financial reporting and the market for financial analysis where analysts sell information to fund managers. The commercial trade in financial analysis will only arise if fund managers believe that the cost of it is outweighed by the benefit (Barker, 1998). Information must be decision useful if it is to be beneficial. To consider the question of which types of information sources analysts and fund managers find useful and the reasons for their preferences Barker (1998) performs a largely interview-based empirical analysis. Semi-structured interviews are held with 32 analysts, 39 fund managers and 40 finance directors. The research methodology which has a core of semi-structured interviews is extended with participant observation over a period of a a month with a firm of analysts. It

is found that 'raw' data in the form of financial reporting information received directly from companies is considerably more important to fund managers than processed data provided by analysts. The findings contribute to the literature particularly by providing a 'grounded theory of the market for information' (Barker, 1998) but a limitation is that this form of study provides no direct link to the effects of decisions on share prices so that inferences are made without a quantitative basis.

Barker (1999) discusses another aspect of decision usefulness by considering the role of dividends in valuation models used by analysts and fund managers. Valuation models require inputs from sources including or perhaps that are solely in the form of financial accounting information. This study involves the assessment of the use made by analysts and fund managers of different valuation models including the price earnings (P/E) based model, DCF, net asset value as well as dividend yield model. The analysis uses data collected using three complementary research methods (Barker, 1999): participant observation over one month with a leading firm of analysts; questionnaires completed by 42 analysts and semi structured interviews with 40 finance directors, 32 analysts and 39 fund managers. The fieldwork was carried out between July 1994 and May 1996. Barker (1999) considers the characteristics of 'useful information' and points out that the reliability and accuracy of any valuation model is a function of the reliability and accuracy of the information used in the model. Based on the findings it is concluded that accounting information is clearly influential even though it is historic in nature and arguably not necessarily relevant to valuation. Valuation is a 'dynamic company-specific process' where personal communication with management is important – dividends and other variables may be analysed but valuation models such as dividend yield 'play only a limited role' – in conclusion valuation models are not used exclusively 'in themselves' to value shares. A limitation of this study is that it is confined to qualitative approaches of questionnaires and semi-structured interviews so that the testing is unable to expand to provide quantitative analysis of decisions – this would require a mixed methodology using both qualitative and quantitative approaches.

Breton and Taffler (2001) undertake a content analysis study to consider accounting information and analyst stock recommendations. Decision usefulness of financial accounting information is considered as an aspect of this study. The data is obtained from 5 of the 6 top ranked brokerage houses in the City of London (according to the 1990 Extel analyst survey) participated. The sampling process involves obtaining 105 analysts reports including 37 buy recommendations, 39 'holds' and 29 sell recommendations. These analysts reports (usually produced in the form of monthly summary books showing the brokerage houses' share recommendations) are studied and analysed by the researchers. The researchers use a computer program specifically designed for the analysis of texts into word classifications and themes. The results demonstrate that profit numbers and earnings forecasts are not necessarily the most important info items used by analysts in their firm valuation decisions. The researchers believe that the potential relevance of balance sheet measure may be overstated. Furthermore, it is argued that non financial information is 'crucial' and it is pointed out that much of the information is informal and generated directly by the company. Breton and Taffler (2001) conclude that analysts rely on non-financial or qualitative and imprecise information in their primary task of making stock recommendations. A limitation of this research is that the focus is very much on the analysts' reports but there is little information about how the information is derived from the financial accounting information or whether the apparent importance of non-financial information relates to underlying sources in historic financial accounting information for example, financial and narrative information in annual reports.

Ho and Wong (2001) perform a study that highlights matters of importance to the decision usefulness discussion by investigating corporate disclosure practice and effectiveness in Hong Kong. The study was undertaken after a period of economic turmoil in Asia that the researchers said led to a wider recognition of the importance of corporate transparency and disclosures in financial dealings. The principal objective of the Ho and Wong (2001) study is to provide evidence of current practice and perceived effectiveness of corporate disclosure of listed companies in the emerging economy of Hong Kong. The methodology involves a postal questionnaire survey about how listed companies communicate with the capital market, sent to 610 'corporate report preparers' (finance directors or chief financial

officers of all listed companies in Hong Kong) and 535 'corporate report users' (financial analysts in all investment/brokerage firms in Hong Kong).

Ho and Wong (2001) undertake the survey with two mailings of the questionnaire between November 1997 and January 1998 that result in usable responses from 98 CFOs and 92 financial analysts. One of the questions that the survey seeks to answer is whether participants (either CFOs or analysts) think there should be more financial reporting and disclosure regulations and whether they believe more disclosure regulations alone would improve corporate transparency and market efficiency. Likert-scale questions are used with a range from 1 (not important at all) to 5 (very important) so that for example, results indicate that CFOs rank financial statements in annual reports (mean = 4.57) as the most important type of media for communication and other information in annual reports (mean = 4.28) as the second most important medium (Ho and Wong, 2001: p.84). Analysts also consider financial statements in annual reports (mean = 4.47) as the most important source of information but unlike the view of CFOs analysts believe the second most important information source is visits to companies and communications with management (mean = 4.28). Ho and Wong (2001) conclude that analysts perceive a much higher need than CFOs for increased financial reporting regulations. A limitation of the research is that it relies on a questionnaire survey and does not augment the study with other methods such as semi-structured interviews.

Kachelmeier and King (2002) provide a commentary on the relevance of 'laboratory experiments' in an attempt to understand decision usefulness and consider related accounting policy issues. It is suggested that 'accounting experiments' are unrealistic yet there is a role for individual judgement studies as a contribution to the study of user behaviour. Accounting experiments may provide realistic case materials especially when they benefit from the participation of experienced professionals. Nevertheless, accounting experiments may lack a real insight into strategic interaction and there is the danger that researchers infer behaviour from hypothetical judgements rather than actions (Kachelmeier and King, 2002). It is argued that laboratory experiments or other 'interactive designs' offer the discipline of a well-defined competitive incentive structure and permit

measurement of actual behaviour rather than hypothetical judgements and are therefore more likely to provide empirically testable questions. Kachelmeier and King (2002) say that accounting experiments and 'laboratory experiments' are often 'highly abstracted' from real-world settings and as a result are often limited for practical reasons to student participants. The research commentary is limited to studies such as laboratory or accounting experiments but does not consider whether such methods might be successfully combined with other methods in mixed methodology research settings.

Sharma and Iselin (2003) investigate the decision usefulness of reported cash flow and accrual information for assessing corporate insolvency. The objective of this study is to determine the extent of information content by testing it against the assessment of solvency. The method used is a two-group 'between subjects' design behavioural field experiment. The sampling involves using bankers with at least three years corporate lending experience and 'randomly' forming two experimental groups that are provided either accrual information or cash flow information (without any premeditation). The source for the study is several trading banks in Queensland, Australia. The analysis involves selection of a sample of companies selected by screening the Australian Stock Exchange to identify companies that declared involuntary receivership or involuntary liquidation between 1994 and 1997. The participants are asked to complete an experimental task based on either four cash flow or four accrual ratios over three consecutive years and then make a series of 14 failure or non-failure judgements. The findings are that there is powerful evidence that cash flow information has greater decision usefulness than accrual information for assessing corporate solvency. Sharma and Iselin (2003) suggest that studying judgement contexts other than corporate solvency would be a useful extension of their research. This research could perhaps be extended to combine a study of decision usefulness with aspects of value relevance that would require a mixed methodology approach.

Hodge (2003) considers investor perceptions of the usefulness of audited financial information. The study is undertaken in the United States with the objective of determining whether non-professional investors share concerns over perceived declines in earnings quality and auditor independence. Hodge (2003) also seeks to find out how much investors

rely on a firms audited financial statements and fundamental analysis of those statements when making investment decisions. A questionnaire survey method is used and the source of data is the membership of the National Association of Investors Corporation (NAIC) a body consisting of individual and investment club members so that most members buy securities on their own account (Hodge, 2003). The questionnaire consisting of 102 questions is distributed in two phases in the NAIC regional chapter's Spring 2001 quarterly newsletter (mailed to 13,250 members) with a reminder in the Summer 2001 quarterly newsletter resulting in 414 completed responses or a 3% response rate (Hodge, 2003).

The findings of the Hodge (2003) study suggest that there have been declines over time in perceived earnings quality for all publicly traded firms as well as perceived auditor independence and the perceived reliability of audited financial information. In spite of the decline in perceived reliability of audited financial information the perceived relevance of that information has increased. Furthermore, there is evidence from the study that lower perceptions of earnings quality are associated with greater reliance on audited financial statements and fundamental analysis of those statements in the process of making investment decisions (Hodge, 2003). This highlights a possible distinction between the concepts of 'decision usefulness' and 'decision relevance' if lower perceived reliability is associated with greater reliance or relevance on the audited financial information. A limitation of the study is that it is largely confined to private non-professional investors so there might be question marks over how representative it is in re3lation to the wider capital market.

Holland (2003) considers the organisation of the market for financial information that is pertinent to the decision usefulness discussion. This commentary describes the process by which listed companies are 'primary information producers' or 'information disclosers' for example, through the route of financial accounting statements although they may also provide information through the private route in certain circumstances. Holland (2003) also describes how the information market consists of many other primary and secondary information processors, users, and producers or disclosers such as sell-side analysts and fund managers. Holland (2003) refers to the example of intangibles and the challenge of

valuation that has resulted in volatility in stock markets characterised by 'systemic failures in the market for information' and 'information asymmetry' that in certain cases may even be exploited by 'opportunistic management' for their own purposes. This point is perhaps central to the concerns about decision usefulness of financial accounting information. Holland (2003) raises important issues but a limitation is that it is merely a commentary and there is a need for more empirical studies.

Graham et al (2005) consider matters relevant to decision usefulness of corporate financial reporting information by studying the factors that motivate the CFOs as preparers of the information. This study has the objective of determining the factors that drive reported earnings and disclosure decisions. The research uses methodology incorporating a combination of field interviews and a questionnaire survey. Graham et al (2005) prefer the survey approach to large sample archival analyses as even though the latter provide statistical power and cross sectional variation there may be weaknesses such as variable specification and the inability to ask qualitative questions. The survey is directed at CFOs or Chief Accounting Officers or executives with similar titles – for convenience all termed 'CFOs' contacted in a variety of ways including using CFO forums at the University of Illinois and University of Washington. The intention is to analyse the questionnaire responses from the CFOs of public firms so an initial sample of 401 CFOs is reduced to a final sample of 312 CFOs. In addition to the survey there are 20 one-to-one interviews with senior executives, typically CFO or Treasurer. The findings that might call into question the decision usefulness of some financial accounting information include the result that 78% of the sample admits to sacrificing long term value to smooth earnings and makes voluntary disclosures to boost the share price. It is also found that managers try to maintain predictability in earnings and financial disclosures. This research is limited as it considers the perceptions of preparers of financial accounting information but does not provide evidence of how the information is perceived and analysed by users – this is however, the subject of other studies.

Glaum and Friedrich (2006) perform research that highlights some aspects of decision usefulness of financial accounting information by considering how financial analysts value

telecommunications companies. The researchers are motivated by the market events of the European telecommunications sector in the "bubble period" at the end of the 1990s followed by the capital market crash of the early 2000s and are interested to find out how analysts' practices change over this period (Glaum and Friedrich, 2006: 160-161). The research method employed is the semi-structured interview that the researchers believe is better for complex issues as it provides 'differentiated answers' to questions.

The sample used by Glaum and Friedrich (2006) consists of 25 sell-side analysts specialising in the European telecommunications sector. Most of the interviewees work for large international banks. The questions cover aspects relating to information needs including financial accounting information and the metrics used to value companies. Analysts are asked to rank a list of information sources according to their perceived importance using a four-point scale ('very important', 'rather important', 'rather unimportant' and 'of no importance') after which answers are coded ('very important' = 3, 'of no importance' = 0). The findings are that the most important information sources are financial statements (mean coded score: 2.84) and with a virtually identical score meetings with company representatives (mean coded score: 2.88). There is also a ranking process for the individual elements of the financial statements so that it is found that analysts rank the income statement (mean coded score: 2.76) and the segment report (mean coded score: 2.72) as the most important elements. The cash flow statement is ranked third (mean coded score: 2.64) among the financial statement elements confirming that it is an important input for valuation in the view of analysts. The balance sheet and notes (mean coded scores: 2.48 and 2.40) are ranked fourth and fifth suggesting that they are also both important although the management report (mean coded score: 1.76) is of somewhat more minor importance to the analysts interviewed as part of the study. It is also found that there are some changes in analysts' approaches or attitudes following the "high tech bubble" for example, there is greater attention given to the assessment of profitability and cash flow generation of businesses and analysts claim to have become more diligent and critical when undertaking their own analysis. The limitations of this research are associated with its use of quite a small sample size and the focus on the telecommunications sector though interesting in its own right raises some questions about its applicability to other sectors.

Mangena et al (2007) perform a study into the use by investment analysts of information disclosed in the interim reports of UK listed companies. This research study is motivated by the need to extend prior studies by investigating the perception of usefulness of different sections of the interim report. The research methodology is based on a questionnaire survey. The sample of analysts is obtained by sending the questionnaire to the companies that are members as at 31 July 2002 of the London Stock Exchange (LSE) comprising 242 companies - and the Institute of Fund Managers' Association (IFMA) comprising 82 companies. Of the total of 324 questionnaires sent out there are 79 fully completed and usable questionnaires returned meaning a response rate of 25.2 per cent that is considered a good response rate on the basis of previous studies (Mangena et al., 2007). The questionnaire contains 113 items that respondents are asked to rank in order of importance on the basis of a Likert scale (range from 1 = not at all important up to 5 = extremely important).

Mangena et al (2007) organise the responses relating to the 113 items so that they are classified into six categories. The overall analysts' rating for the categories reveals that all sections of the interim report are important to analysts with none of them receiving a mean rating of less than 3. The overall ratings are profit and loss (mean rating of 4.000); cash flow statement (mean rating 3.885); management commentary (mean rating 3.653); balance sheet (mean rating 3.628); segmental information (mean rating 3.496); and, accounting policies and notes (mean rating 3.321). Looking at the two groups of analysts there is broad agreement between financial analysts and fund managers on the importance of four of the six categories and although the ranking is different for management commentary (ranked third by fund managers and fourth by financial analysts) and the balance sheet (ranked third by financial analysts and fourth by fund managers) nevertheless the results are very similar for management commentary and balance sheet for financial analysts. The overall results confirm that even at the interim reporting stage analysts pay considerable attention to profit and cash flow measures as well as the management commentary section in order to probe behind the balance sheet numbers. It is concluded that investment analysts find information disclosed in interim reports useful for their decisions and it is

clear that they in fact use such information. This research is valuable as a guide to accounting standard setters in relation to disclosure level and quality. There are limitations with the questionnaire survey method and as suggested by the researchers the study could be extended by including in-depth interviews with analysts to increase understanding of the way interim report information is used.

Gassen and Schwedler (2010) investigate the decision usefulness of financial accounting measurement concepts. The researchers observe that accounting research has not produced an 'undisputed' measure of decision usefulness. In order to try to answer the question of how users view decision usefulness the researchers undertake a survey of the opinions of a major user group of professional investors and their advisers. The formation of a research sample relies mainly on the network of the European Federation of Financial Analysts Societies (EFFAS) and overall there is a potential research sample of 20,000 investors. The survey period was from May to October 2007. There are 383 responses or a low response rate of 1.9% that the researchers put down to the surveying procedure that is based on an anonymous email with no incentives. The researchers argue that in 'absolute number' and compared to similar studies the sample offers a sufficiently extensive dataset to provide an opportunity to address the research question – there is in fact a further reduction in the sample number to 242 valid responses after ensuring respondents answer all required questions including some on cultural background and can be assigned to the following predetermined groups (numbers of respondents in each group are shown in brackets): financial analysts (71 sell-side and 34 buy-side); fund managers (74 respondents); institutional investors (40 respondents); and credit/corporate rating managers (23 respondents). The survey instrument is designed so that responses are coded from 1 (strongly agree) to 5 (strongly disagree). The rate of agreement is found to be highest with a mean rating of 1.624 for the following statement: "My advice or decision is based on accounting data of the company and its industry (fundamental analysis)". The statement with the second highest rate of agreement with a mean rating of 2.128 is as follows: "My advice or decision is based on first hand information and the impression of management quality". Respondents are also asked to evaluate different information sources on the basis of their perceived relevance and reliability. Annual financial statements are viewed as the

most relevant information source (with a mean rating of 1.911) and the next most relevant sources are direct personal contact with management (mean rating = 2.047) and notes to the annual financial statements (mean rating = 2.073).

Other findings of the Gassen and Schwedler (2010) study are that investors are reasonably familiar with historical cost accounting and mark-to-market fair value accounting but significantly less familiar with other measurement concepts such as value-in-use or mark-to-model fair value accounting. It is concluded that mark-to-model are viewed by professional investors and their advisors as significantly less decision useful than market-based fair values and historical cost measures for virtually all asset and liability classes – the only exception to this being found for financial assets. As this research relies purely on a survey questionnaire approach it is possible that the study could be extended by including interviews with a sample of professional investors and their advisers or analysts to give greater insight. The researchers also concede that the research is limited as it uses data obtained prior to the financial crisis – indeed this is a limitation of most of the studies.

A summary of the important decision usefulness studies is shown in Table 2.2 on the following pages.

Table 2.2 Review of Decision Usefulness Studies

Ref	Author/method	Subject / Sample	Main findings	Criticisms
D1	McNally et al (1982) Questionnaire survey	Survey to find out perception of importance of types of financial accounting information. Financial editors and stock exchange members in New Zealand. 83 completed responses to 187 mailed out (44% response rate)	Users regard as important the voluntary disclosure of a wide variety of accounting items. 'Leaders' in voluntary disclosure tend to be the larger companies. Overall conclusion is that voluntary disclosure is low in relation to external user preferences even with respect to larger companies.	Limitations in the research as there is not very much insight into how information is used – interviews could have been undertaken to extend the research. No specific insight into use of pension accounting information.
D2	Arnold and Moizer (1984) Stuctured interviews and postal questionnaire	Survey of the methods used by UK investment analysts to appraise investments in ordinary shares Postal survey – 202 analysts Unstructured interviews – analysts in 6 firms	Provides insight into investment appraisal techniques used by analysts – for example, fundamental analysis preferred to technical analysis or beta analysis methods.	Small sample size for interviews. Postal questionnaire survey is unlikely to be a satisfactory means of capturing "differences of detail between precise procedures used by analysts". Doesn't address pension accounting information specifically.
D3	Moizer and Arnold (1984) Postal questionnaire	Do investment analysts use different appraisal methods depending on whether they are portfolio managers? Postal survey – 202 analysts	Rejection of null hypothesis that there is no difference but although differences in the amount of analysis undertaken there is no signif difference revealed in the analysts' approach to share appraisal	Postal survey might be effective for general issues but not for capturing differences of detail or an insight into the motivations and different approaches of analysts. Doesn't address pension accounting information specifically.
D4	Day (1986) Interviews	The use of annual reports by investment analysts Interviews including assessment through 'think aloud analysis' of analytical techniques	Analysts showed interest in projecting EPS and cash flows but the balance sheet did not seem to be of particular interest to the analysts as far as forecasts are concerned. Hints at possible future empirical research (on cash flows).	Although interesting insight provided it is not possible to draw statistically valid inferences from the study due to the relatively small sample size and a lack of random selection. Doesn't address pension accounting information specifically.

Table 2.2 Review of Decision Usefulness Studies

Ref	Author/method	Subject / Sample	Main findings	Criticisms
D5	Mear and Firth (1990) Simulation exercise	Participants are asked to perform analysis on a hypothetical investment scenario and indicate risk levels and expected returns on an evaluation form. Sample of 38 professional security analysts in New Zealand.	Security analysts use highly consistent 'linear judgement strategies' – regression analysis is used to test the judgement reliability in appraisals of security prospects.	The sample size is small and there may be concerns about potential bias in the results. The discussion of the type of financial accounting information used in the simulation exercise is not revealed in any detail and there is no discussion about the possible relationship between 'judgement consensus' and the perception of decision usefulness of financial accounting information.
D6	Bence, Hapeshi and Hussey (1995) Interviews and cluster analysis	Examination of the information sources that are used by professional investors Sample of 21 investment analysts and 12 institutional investors	There is general agreement on the perception of the importance of information sources that include annual reports. Findings are consistent with Moizer and Arnold (1984)	Although the finding suggest that information such as the annual report is useful for decision making the research uses a small sample and there is no significant linkage to empirical research.
D7	Breton and Taffler (1995) Interviews / observation through case study approach	Investigation of investment analysts use of financial accounting information – particularly assessing ability to identify creative accounting practices. 63 analysts from 5 stockbroking firms in the period Feb to June 1990	Highlighted the importance of having experienced analysts within the team – it was found that only the experienced analysts made adjustments for creative accounting. Evidence suggested that only a small number of accounting experts may be required for the market as a whole to identify and adjust for 'window dressing'.	Relatively small sample – only 5 firms – leaves question mark over how applicable these research findings are to the whole market. Doesn't address pension accounting information specifically.
D8	Rippington and Taffler (1995) Interpretation of return model	Considers decision usefulness from a value relevance point of view. Period 1979-81 -return model applied to 337 firms listed in UK	Annual accounts convey relatively little information compared to the preliminary and interim statements that convey substantial amounts of information.	Limitation in the research as it is an event study and is purely quantitative – yet the results and conclusions are so surprising that they deserve further analysis with other methods such as interviews or surveys for example, to try to explain the anomalous conclusion in relation to the information content and relative lack of usefulness of the annual accounts.

Table 2.2 Review of Decision Usefulness Studies

Ref	Author/method	Subject / Sample	Main findings	Criticisms
D9	Bartlett and Chandler (1997) Postal questionnaire	Study of the decision usefulness of the financial report of one company chosen at random Sample of 300 private investors selected at random from the 'Times Top 100' in year 1994.	Concludes that the annual report is not widely read – the study is about private investors rather than professional investors.	Risks in the selection of the company – a point conceded by Bartlett and Chandler (1997) even though they say that there is no reason to believe that the company in question or its annual report are unusual. Questions about possible difference between private and professional investors are not answered.
D10	Barker (1998) Interviews and survey questionnaire	Investigation of decision usefulness – informativeness – of financial accounting information Semi-structured interviews (incvluding 32 analysts and 39 fund managers and 40 finance directors) Survey questionnaire (42) 'Observation' of analysts	Accounting information has an important role in direct communication between companies and fund managers – 'raw' data flowing directly from companies is of considerably greater importance to fund managers than 'processed' data generated by analysts. Disputes the assumption that analysts act as the equilibrium mechanism – suggests that research literature has given undue prominence to analysts' earnings forecasts and trading recommendations.	Relies purely on surveys and semi-structured interviews (albeit having a reasonable sample size) – so no quantitative study to provide further triangulation. Doesn't cover the specific issue of pension accounting information.
D11	Barker (1999) Interviews, questionnaires and observation of analysts	Examination of decision usefulness of information by considering the role of dividends in valuation models. Semi-structured interviews (incvluding 32 analysts and 39 fund managers and 40 finance directors) Survey questionnaire (42) 'Observation' of analysts	Accounting information is clearly influential in valuation even though that accounting information is historic in nature and arguably not necessarily relevant to valuation.	Relies purely on surveys and semi-structured interviews (albeit having a reasonable sample size) – so no quantitative study to provide further triangulation. Doesn't cover the specific issue of pension accounting information.

Table 2.2 Review of Decision Usefulness Studies

Ref	Author/method	Subject / Sample	Main findings	Criticisms
D12	Breton and Taffler (2001) Content analysis	Investigation into use of accounting information by analysts. 5 'top ranked' brokerage houses Sample of 105 texts analysed	Accounting information is of fundamental importance but it is not the only or even the most important (debatable?) source of information for analysts.	Small sample of firms Problem of interpreting analyst reports using content analysis – how conclusive? How realistic? Doesn't address pension accounting information specifically.
D13	Ho and Wong (2001) Questionnaire survey	Investigation of corporate disclosure practice and effectiveness. Postal questionnaire mailed to 610 corporate report preparers and 535 corporate report users in Hong Kong	Analysts and CFOs (report preparers) rank financial statements in annual reports as the most important source of information. Another conclusion was that analysts perceive a much higher need than CFOs for increased financial reporting regulations.	The research is considerably limited in that it relies on a questionnaire survey and does not augment the study with other methods such as semi-structured interviews.
D14	Sharma and Iselin (2003) Behavioural field experiment	Investigation of decision usefulness of reported cash flow and accrual information for assessing corporate insolvency. Sampling involves using bankers with at least 3 years experience from banks in Queensland Australia who have to analyse a selection of companies from the Australian Stock Exchange that declared involuntary receivership or liquidation between 1994 and 1997.	There is powerful evidence that cash flow information has greater decision usefulness than accrual information for assessing corporate solvency.	The research is limited to judgement contexts for corporate insolvency – but it would be useful to consider other contexts. There is no link provided to value relevance so the research could be usefully extended to combine considerations of decision usefulness with value relevance that would require using a mixed methodology approach.

Table 2.2 Review of Decision Usefulness Studies

Ref	Author/method	Subject / Sample	Main findings	Criticisms
D15	Hodge (2003) Questionnaire survey	A study in the USA into investor perceptions of the usefulness of audited financial information. Questionnaire survey is sent to non-professional investors from the 13,250 strong membership of the National Association of Investors Corporation distributed in the Spring Quarterly Newsletter, 414 completed responses (3% response rate)	It is found in the responses that there is a decline in the perceived reliability of audited financial information but in spite of this the perceived relevance of that information is found to have increased. Overall there is the view that there is greater reliance on the audited financial information.	The study is largely confined to private non-professional investors so the applicability to the wider capital market is questionable. There is no link to the market value of firms (value relevance) and no specific reference to pension accounting information.
D16	Graham, Harvey and Rajgopal (2005) Interviews and questionnaire survey	A study of the economic implications of corporate financial reporting including factors that motivate the CFOs as preparers of the information and how this may affect decision usefulness. 312 questionnaire responses are used and there are 20 interviews	Findings that call into question decision usefulness include the result that 78% of the respondents in the sample admit to sacrificing long term value to smooth earnings and make voluntary disclosures to boost the share price.	A major limitation is that the research considers the perceptions of preparers of financial information but does not provide evidence of how the information is perceived and analysed by users such as investors. There is no specific discussion of pension accounting information – an apparently universal shortcoming in the literature.
D17	Glaum and Friedrich (2006) Interviews	Research relevant to decision usefulness considers how financial analysts value telecommunications companies following the end of the "bubble period" from the end of the 1990s to the early 2000s. Sample of 25 analysts.	The most important information sources are financial statements (the most important source) and meetings with company representatives. The income statement, segment report and cash flow statement are ranked in that order by the analysts as the most important financial statement elements.	The research is limited in that there is quite a small sample size. The focus is on the telecommunications and that raises questions about the applicability of the research to other sectors or the wider market. There is no specific reference to value relevance or the specific analysis of pension accounting information.

Table 2.2 Review of Decision Usefulness Studies

Ref	Author/method	Subject / Sample	Main findings	Criticisms
D18	Mangena et al (2007) Survey analysis	A study of investment analysts' perception of disclosure in UK interim financial reports Sample of 79 firms (completed usable returns from 313 postal questionnaires)	Investment analysts find information disclosed in interim reports useful for investment decision-making processes. Analysts rank management's discussion of changes in capital structure and balance sheet position more highly than balance sheet figures themselves.	Very useful insight from the survey method yet this could be even more informative if the study could be extended with interviews with analysts. Helpful study but it does not address pension accounting information specifically.
D19	Gassen and Schwedler (2010) Questionnaire survey	Decision usefulness of financial accounting measurement concepts Online sample: 250 valid responses from 20,000	Respondents rank mark to market fair values as most decision useful and marked-to-model fair values as least decision useful (except for financial instruments) Accounting information is the most useful source of information for analysts – the highest score indicating agreement given statements is for one that says that "..my advice or decision is based on accounting data of the company and its industry…".	Survey does not permit significant probe into issues of analysis to determine reasons behind answers to survey – survey questions have to be limited in number and scope to try to ensure the questionnaire is not too long and therefore, has a greater chance of being completed and returned to researchers. The research could be extended by including interviews with a sample of professional investors and their advisers or analysts to give greater insight.

2.7 The limitations of the literature and scope for contribution

There are a number of important limitations in the literature and this provides opportunities to make a contribution to the research. Firstly, there is scope to add to research using methodological triangulation as a single method may be inadequate (Morse, 1991) to address the complexity of a social science based research question (Creswell, 2009) such as whether pension accounting information is value relevant and perceived to be decision useful. It is argued that a mixed methodology approach incorporating triangulation ensures that any inherent bias of one measure is counterbalanced by the strengths of the other (Gray, 2009). Mixed methods research is one of the three major 'research paradigms' (Johnson et al, 2007) and many research designs have been developed over recent years leaving the researcher with the challenge of selecting the most appropriate research design (Leech and Onwuegbuzie, 2009). This confirms that there is considerable scope for using a mixed methods approach for the research.

There appears to be no literature concerning the decision usefulness or perception of decision usefulness of pension accounting information. The literature is concerned mainly with pension accounting from a technical point of view or from a value relevance perspective. There is a reference to 'usefulness' in Gopalakrishnan (1994: p.394) but this is only by way of commentary as part of a quantitative value relevance study and there is no specific analysis of 'decision usefulness' or the perception of decision usefulness'. Barth et al (2001) in a general review of value relevance refer to any test of value relevance being a joint test of relevance and reliability and there is a discussion of the difference between the concepts of value relevance and 'decision relevance' but this is merely a commentary and does not include an empirical study of decision usefulness or the link to value relevance.

Much of the data used in the literature on pension accounting value relevance is now quite old and even the more recent literature analyses periods no more recent than 2005. Many of the major studies of pension accounting value relevance were performed in the 1980s and 1990s for example, Daley (1984), Landsman (1986), Dhaliwal (1986), Barth et al (1992) and Barth et al (1993). Major studies after the year 2000 include Coronado and Sharpe (2003) examining results in the period 1993 to 2001, Franzoni and Marin (2006)

examining results in the period 1980 to 2002, Picconi (2006) examining results in the period 1988 to 2001, Hann et al (2007) looking at results in the period 1991 to 2001, Kiosse et al (2007) examining the results in the period 1998 to 2005, Coronado et al (2008) examining the period 2002 to 2005 – to extend the earlier study of Coronado and Sharpe (2003) and Werner (2011) that examines the period 1998 to 2005.

Virtually all the pension accounting value relevance research is carried out in the US market and therefore, uses accounting information prepared on the basis of US GAAP. There is therefore, a question mark about the applicability of such research to the UK and indeed, to other markets where the prevailing accounting regime is IFRS/IAS or a local GAAP. Even if there are similarities between the US and UK markets (and increasingly convergence of the regimes represented by the accounting standards of the FASB and IASB) it is always important to try to perform research in different markets and explore different perspectives that may be possible in some situations but not others. There are suggestions from the review of the wider value relevance literature, that there are significant differences in the association between share prices and accounting data in different jurisdictions (see for example, Alford et al, 1993 and Joos and Lang, 1994).

2.8 Summary and conclusions

This chapter has provided the context of the research by reviewing related academic literature to the subject of the value relevance and the perception of decision usefulness of pension accounting information. Value relevance studies extend over forty years and cover many different aspects of accounting. It is believed that there is a link between decision usefulness or the perception of decision usefulness and value relevance yet there are apparently no research studies that adequately test both aspects. Gopalakrishnan (1994) makes a reference to 'usefulness' in a value relevance study but there is no specific analysis of decision usefulness or the perception of decision usefulness. In their general review of value relevance research Barth et al (2001) suggest that any test of value relevance is a joint test of relevance and reliability that is associated with the concept of decision usefulness but this is only a commentary and does not involve an empirical study of decision

usefulness or the link to value relevance. Problems arise in interpreting the results of many value relevance studies as there are often significant statistical uncertainties and even conflicting results between studies of similar topics. The overall uncertainty resulting in value relevance studies is therefore compounded by their failure to address the perception of decision usefulness.

Decision usefulness studies have been performed to assess how users such as analysts and fund managers perceive financial accounting information. In some cases the decision usefulness studies have provided evidence of how the accounting numbers may be used in making decisions for example, in earlier studies such as Arnold and Moizer (1984), Day (1986) and Barker (1998) as well as in more recent studies including Glaum and Friedrich (2006), Mangena et al (2007) and Gassen and Schwedler (2010). There are apparently no decision usefulness studies that focus on pension accounting information.

The major conclusion is that there is a gap in the literature in value relevance and in particular pension accounting value relevance. There is an absence of studies that seek to explain value relevance by exploring evidence of the perception of decision usefulness. The intention in this PhD is to try to undertake a study that considers the perception of decision usefulness as a necessary part of value relevance by using a mixed methodology approach that offers the possibility of triangulating evidence obtained from both quantitative and qualitative research methods.

Chapter 3

Research methodology

3.1 Introduction

This chapter discusses research methodology and concludes by setting out the research proposal with an outline of the approach to be used. Research methodology may be distinguished from research methods, the practical means of undertaking research, and concerns the approach that is influenced by philosophical and theoretical perspectives adopted by the researcher (Gray, 2009). It is useful to consider a relationship from the theoretical end of a range leading to a practical end – this has been presented as a relationship between 'epistemology', theoretical perspectives, methodology and research methods (Crotty, 1998). At the philosophical end of the spectrum concepts of 'ontology' and 'epistemology' may be distinguished as follows. Ontology is the study of being, that is, the nature of existence, so while ontology embodies understanding *what is*, epistemology tries to understand *what it means to know*. Epistemology provides a philosophical background for deciding what kinds of knowledge are legitimate and adequate (Gray, 2009).

The philosophical basis for research methodologies is explored further in this chapter with a view to ensuring that the best practical approach is adopted for this research. At the practical end of the spectrum it is useful to consider as Creswell (2009) does, three types of research designs: qualitative, quantitative and mixed methods. The conceptual basis for the research design in this thesis is that the quantitative and qualitative approaches "represent different ends of a continuum" rather than "polar opposites or dichotomies" - on this basis a mixed methods research design occupies a space somewhere along such a research design continuum since it "incorporates elements of both qualitative and quantitative approaches" (Creswell, 2009, p.3).

The mixed methodology approach developed and used here is strongly influenced by Creswell's framework for research design that recognises an interconnection of 'epistemologies' or 'philosophical worldviews' with 'strategies of enquiry' and 'research

methods' (Creswell, 2009, p.5). Before discussing the matter of research design choice for this study it is important to identify the main epistemologies and consider their relevance.

3.2 Epistemologies, paradigms or worldviews

3.2.1 The grounds of knowledge

The preparation of a research proposal should start with the explicit identification of the larger philosophical ideas espoused by the researcher as this will help to explain the type of research methods chosen (Creswell, 2009, p.5). The concepts of 'epistemology' and 'ontology' have already been introduced in section 3.1. These philosophical ideas have also been termed as an individual's "worldview" defined as "a basic set of beliefs that guide action" (Guba, cited in Creswell, 2009, p.6). Other terms for "worldviews" are "paradigms" and "broadly conceived research methodologies" (Creswell, 2009, p.6). 'Epistemology' has also been defined as a "theory of the method or grounds of knowledge" (in the Concise Oxford English dictionary, 1933) which suggests the link between 'methodology' at an intellectual level and 'method' at a practical level. The epistemology or worldview is an important determinant in the selection of research methods for a study (Creswell, 2009). It is also interesting to consider the influences on the epistemologies or worldviews themselves and suggested determinants. Creswell (2009), for example, suggested that these worldviews are shaped by the discipline area of the student, the beliefs of advisers and faculty in a student's area and past research experiences. Four epistemologies are outlined in Creswell (2009, p.6) under the headings "postpositivism","constructivism" or "interpretivism", "advocacy" or "participatory" and "pragmatism".

3.2.2 Postpositivism

The epistemology of positivism is considered to be a traditional form of research sometimes called the "scientific method' with assumptions that are more associated with a quantitative than a qualitative basis of research (Creswell, 2009, p.6). A powerful argument for the scientific approach is made by Kelvin (1889, p.73) when he says:

> "In physical science the first essential step in the direction of learning any subject is to find principles of numerical reckoning and practical methods for measuring some quality connected with it. I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the state of Science, whatever the matter may be."

Positivism was the dominant epistemology in social science from the 1930s through to the 1960s (Gray, 2009). In the 1960s there was criticism of the positivist approach by Popper (Gray, 2009, p.19). The term 'postpositivism' describes the thinking after positivism and challenges the notion of the absolute truth of knowledge (Creswell, 2009). Numeric measures or observations are central to this postpositivist epistemology as the observation or measurement of objective reality in the world provides knowledge viewed though a "postpositivist lens" (Creswell, 2009, p.7).

Several key assumptions may be outlined: knowledge is conjectural (and anti-foundational) so that absolute truth can never be found; research is the process of making claims which are then refined or in some case abandoned for other claims; data, evidence and rational considerations are the basis for knowledge; research seeks to develop true statements of relevance in that they explain a particular situation or causal relationship; objectivity is an essential aspect of competent enquiry; and, methods and conclusions must be examined for potential bias (Creswell, 2009).

3.2.3 Constructivism or Interpretivism

Constructivism or "social constructivism" is often combined with interpretivism as an epistemology that is typically seen as an approach to qualitative research (Creswell, 2009, p.8). There are a number of features that define this epistemology, among which are the use of quite open-ended rather than close-ended questioning of participants to understand the world in which they live and work and the recognition by researchers that their own backgrounds shape their interpretation (Creswell, 2009, p.8). Gray (2009) suggests that interpretivism asserts that natural reality (and the laws of science) and social reality (the social sciences) are different and therefore, require different kinds of method.

There are a number of important assumptions in constructivism such as: the assumption that meanings are constructed by human beings as they engage with the world they are interpreting; the assumption that humans engage with the world and interpret it or make sense of it based on their historical, cultural and social perspectives; and, the assumption that the basic generation of meaning is always social and formed through the interaction with a human community (Crotty, 1998). The epistemology of constructivism or interpretivism is associated with qualitative research which is largely inductive, with the inquirer generating meaning from the data collected in the field (Creswell, 2009).

3.2.4 Advocacy and participatory epistemology

The advocacy and participatory epistemology developed from the philosophical assumptions of individuals who believed that the postpositivist assumptions imposed structural laws and theories that were not appropriate to "marginalised individuals" in society or "issues of social justice that needed to be addressed" (Creswell, 2009, p.9). It has been suggested that the philosophical epistemology described as advocacy and participatory focuses on the needs of groups and individuals in society and that the research itself provides a vehicle or 'voice' for these participants raising their consciousness or advancing an agenda for change to improve their lives (Creswell, 2009). This line of thinking introduces the notion of a 'theoretical lens' to construct a picture of the issues that are subjected to examination.

There are a number of key features of the advocacy or participatory epistemology: participatory action is recursive or dialectical so that researchers advance an action agenda for change at the conclusion of their research; as a form of enquiry it is geared to helping individuals free themselves from constraints found in the media, language, work procedures and in education-power relationships; it is emancipatory by helping to free people from the constraints of irrational or unjust structures that inhibit self-development and self-determination; and it is practical and collaborative as it is undertaken with the engagement of other participants (Creswell, 2009).

3.2.5 The Pragmatic Epistemology

The pragmatic epistemology is considered to be important as a philosophical underpinning for mixed methods studies. A key feature is flexibility and it is argued that a 'pragmatist world' is a world to be explored and optimised rather than subjected to radical criticism (Crotty, 1998: p.74). An explanation of the basis of the epistemology of 'pragmatism' is that pragmatism as a worldview arises out of actions, situations and consequences rather than antecedent conditions (as in postpositivism) (Creswell, 2009). There are a number of important features that may be identified in the pragmatic epistemology as follows: pragmatism draws from both quantitative and qualitative research assumptions as it is not committed to any one philosophy and reality; pragmatists do not see the world as an 'absolute unity' so that truth is what works at the time; mixed methods researchers need to establish a purpose and rationale to the mixing of quantitative and qualitative data; pragmatists also undertake research in the belief that the research always occurs in social, historical, political and perhaps other contexts (Creswell, 2009, p.10). There is an interesting contrast with the positivist view of absolute truth in that pragmatists have believed in an external world independent of the mind as well as that lodged in the mind (Creswell, 2009). The flexibility and adaptability of the pragmatic epistemology opens the door to multiple methods, different worldviews and different assumptions, as well as different forms of data collection and analysis for the researcher (Creswell, 2009).

3.3 Research design choice for this project

Most of the value relevance studies have used a quantitative approach for research methodology. In this study it is intended to use a combination of quantitative and qualitative methods to assess the value relevance of pensions accounting. The intention is that by using the two methods there will be increased likelihood of solving the research problem (Morse, 1991). A natural starting point for the research is to take a quantitative approach since the study of value and accounting measures invites inquiry into possible relationships between them in a "positivist" way. Positivism has been described by Gray (2009, p.18) as "…the dominant epistemological paradigm in social science from the 1930s

through to the 1960s, its core argument being that the social world exists externally to the researcher, and that its properties can be measured directly through observation". In presenting arguments against positivism the 'Popper View' offers an explanation of how theories cannot be proved to be true, they can only be proved to be false (Gray, 2009, p.19). Interpretivism may be presented as the alternative to positivism and a major part of the theoretical basis for the proposed research methodology. The study of value relevance and more particularly, the 'perception of decision usefulness' involves a consideration of subjective issues.

Interpretivism as a theoretical perspective leads to a number of different approaches such as 'phenomenology' which is considered particularly relevant to this study. Phenomenology holds that any attempt to understand social reality has to be grounded in people's experiences of that social reality (Gray, 2009). Interviews will be used in this study as interpretations of experienced participants are expected to be particularly useful in the analysis of quantitative data and the consideration of the impact on market value. Interviews will also provide important information to try to understand the market dynamics and more precisely, the movement in share prices. Qualitative studies have been criticised for lacking in methodological rigour or being prone to researcher subjectivity, small cases or limited evidence, although the research can be strengthened by using numerous examples, or by verifying the analysis using other researchers (Gray, 2009, p. 493). When it comes to selecting interviewees the "key informant technique" used by Tremblay (1957) is considered to be pertinent to the study while other approaches such as random sampling would be inappropriate.

In summary, it is considered appropriate to use a combination of quantitative and qualitative methods for this research. The benefits of mixed methods research have been emphasised by discussing the concept of 'triangulation' which seeks convergence, corroboration and correspondence of results from different methods (Gray, 2009). It has been pointed out that even though there are clear benefits in using a mixed methods approach from a practical perspective, collecting both quantitative and qualitative data can be expensive and time consuming (Gray, 2009). Nevertheless, these challenges may be

overcome if careful consideration is given to the timeframe for the research especially for the proposed interviews. The interviewees are expected to be drawn primarily from fund managers and buy-side analysts and secondarily, corporate finance advisers, private equity investors and specialist advisers. The quantitative research will be undertaken using a longitudinal study so that it may be possible to analyse any effects of such matters as varying market conditions.

3.4 Mixed methods procedures

3.4.1 Definitions of qualitative, quantitative and mixed methods research

Mixed methods research has been defined by Creswell (2009) as "…an approach to inquiry that combines or associates both qualitative and quantitative forms". It has been said for example, that methodological triangulation – involving at least two methods usually quantitative and qualitative – may be used to solve a research problem when a single research method is inadequate (Morse, 1991, p.120). It is important to confirm the nature of qualitative and quantitative forms of inquiry (see below).

Qualitative research

Qualitative research has been defined as "…a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (in which) the process of research involves emerging questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data" (Creswell, 2009, p.4). Gray (2009) suggests that "qualitative research is more closely linked (than quantitative research) to a constructivist paradigm, which sees truth and meaning as constructed and interpreted by individuals"

Quantitative research

Quantitative research has been defined by Creswell (2009, p.4) as "a means for testing objective theories by examining the relationship among variables (where) these variables, in turn, can be measured, typically on instruments, so that numbered data can be analysed

using statistical procedures". Gray (2009, p.201) also points out that quantitative research emanates from an objectivist position which holds that reality exists independently of the researcher – the truth is 'out there'".

3.4.2 History and nature of the mixed methods research

The origins of mixed methods research have been traced to disciplines such as psychology (Creswell, 2009). Some concerns have been expressed about the use of mixed methods, for example, Gray (2009, p.215) suggests that problems can arise in trying to synthesise the findings and interpretations from the two approaches. More specifically in a type of mixed methods (or two methods) approach known as 'methodological triangulation' the greatest threat to validity is the use of inadequate or inappropriate samples and also perhaps for reasons of convenience investigators are tempted to use the same subjects for both qualitative and quantitative methods even though it is clearly inappropriate to interchange these samples (Morse, 1991). A further concern is a practical matter in that the collection of both quantitative and qualitative data can be expensive (Gray, 2009, p.215).

Mixed methods research may be viewed as a combination of quantitative and qualitative approaches which have been developed into a "distinct method of inquiry" (Creswell, 2009, p.204). The mixed methods research approach is recognised as one of the three major 'research paradigms' (Johnson et al, 2007). There are many mixed methods research designs have been developed over recent years (Leech and Onwuegbuzie, 2009).

3.4.3 Justification for using mixed methods research

It is suggested that mixed methods research procedures have gained popularity as they utilize the strengths of both qualitative and quantitative research methods (Creswell, 2009). It may even be that any research approach other than a combination of qualitative and quantitative methods is insufficient for tackling complex research projects. However, one of the greatest perceived strengths of a mixed methods approach is in the use of triangulation because the application of multiple methods ensures that the inherent bias of one measure is counterbalanced by the strengths of the other (Gray, 2009). However, a mixed methods approach poses challenges in the form of extensive data collection needs

including the time-intensive nature of analysing both text and numeric data and the requirement to be familiar with both quantitative and qualitative forms of research (Creswell, 2009). Nevertheless, the benefits including enhanced insight to be gained from the combination of qualitative and quantitative research (Creswell, 2009) seem to justify the use of a mixed methods research approach.

3.4.4 Planning aspects of mixed methods research

Four important planning aspects of mixed methods research are timing, weighting, mixing and theorizing (Creswell, 2009, p.206-208). In considering these aspects it is useful to note in the case of mixed methods research (in particular, 'methodological triangulation') the blending or merging of the data does not occur in the process of analysis but in the fitting of the results from each study into a cohesive and coherent outcome or theory, or confirming or revising existing theory (Morse, 1991).

The timing aspect refers to the collection of quantitative and qualitative data. The data may be collected sequentially or concurrently. In sequential data collection the qualitative phase may precede the quantitative phase or vice versa. The decision as to which type of data is collected in the first phase depends on the initial intent of the researcher (Creswell, 2009). Data may be collected concurrently when it is impractical or unworkable to collect data over a longer period – Creswell (2009, p.206) refers to the example of health sciences when medical personnel may have limited time in the field.

The second factor is weighting which concerns the balance between qualitative and quantitative research – they may be equal or one type may be emphasised. The researcher may intentionally use one form of data in a supportive role to a larger study. The weighting may also depend on "the interests of the researcher" or "the audience for the study" (Creswell, 2009, p.207). The third factor is the mixing of data which is acknowledged to be "difficult at best" since "qualitative data consists of text and images and quantitative data of numbers" (Creswell, 2009, p.207). Data may be mixed in a process of connecting, integrating or embedding and data may be connected in a two phase project starting with quantitative analysis to identify participants for qualitative data collection in a subsequent

phase – this is different from merging or integrating data where qualitative themes may be transformed into "counts" (Creswell, 2009, p.208). Another form of mixing data involves "embedding a secondary from of data within a larger study" so that one form of data (say qualitative provides supportive information for the other form of data (say quantitative) as discussed in Creswell (2009, p.208).

The final factor is theorising or transforming perspectives and concerns the extent to which researchers bring their own perspectives to the research and the potential for this to affect the study itself. For example, all researchers bring theories, frameworks and hunches to their inquiries and these theories may be made explicit in a mixed methods study or be implicit and not mentioned (Creswell, 2009). A 'transforming lens' is a term that is sometimes used and more particularly "…an orienting lens…shapes the types of questions asked, who participates in the study, how data are collected, and the implications made from the study" (Creswell, 2009, p.208).

3.4.5 Mixed methods strategies

The justification for the use of mixed methods research may be explored further by considering some of the developments in the accounting research literature. Accounting research in the 1970s involved increasing use of empirical studies that may be attributed to the influence of the economics and behavioural wings of the research community (Laughlin, 1995, p.63). "Middle range thinking" is proposed on the basis of the argument that generalisations about reality are possible but they will always be "skeletal" and require "empirical detail" to make them meaningful (Laughlin, 1995, p. 81). Six types of mixed methods strategies are outlined by Creswell (2009). Three of these strategies are described as 'sequential' in form and three are 'concurrent'. Each of the strategies are analysed and summarised according to the perceived relevance to this research (an overview is given in Figure 3.1 below). It should be mentioned that the terminology varies and as 'triangulation' is such an important concept in this study, it is worth pointing out that the strategy described as 'sequential explanatory' (in Figure 3.1 below) could also be termed as 'sequential triangulation' (Morse, 1991, p.120).

Figure 3.1 – Mixed Methods Strategies and Relevance to the Research

Mixed Methods Strategies	Relevance to this research
Sequential Strategies	
Explanatory	Moderate to high relevance
Exploratory	Moderate to high relevance
Transformative	Low to moderate relevance
Concurrent Strategies	
Triangulation	High relevance
Embedded	Moderate to high relevance
Tranformative	Low to moderate relevance

Each of the mixed methods strategies is now analysed in turn to show how the relevance has been estimated and to provide a basis for the design of a strategy that is considered to be most suitable for this research study.

The sequential explanatory strategy

The sequential explanatory strategy involves a quantitative phase followed by a qualitative phase – the greater weight is typically given to the quantitative data and analysis. The sequential explanatory strategy is characterised by the collection and analysis of quantitative data in a first phase of research followed by a collection and analysis of qualitative data in a second phase that builds on the results of the initial quantitative results (so that) the initial quantitative results *informs* the secondary qualitative data collection (Creswell, 2009). The sequential explanatory strategy or 'sequential triangulation' is used if the results of one method are essential for planning the next method. The qualitative method is completed before the quantitative method is implemented or vice versa (Morse, 1991)

The design structure with two separate phases may be viewed as a favourable feature since it is easy to implement because the steps fall into clear, separate stages. In addition, this design feature makes it easy to describe and to report. The main weakness of this design is the length of time involved in data collection, with the two separate phases. This is

especially a drawback if the two phases are given equal priority (Creswell, 2009). The preliminary analysis of quantitative data may help to guide some of the qualitative research, for example semi-structured interviews may incorporate questions that seek to explain certain features identified in the quantitative research, so this type of strategy is considered to be of at least moderate and possibly high relevance to this study.

The sequential exploratory strategy

The sequential exploratory strategy is similar to the sequential explanatory strategy with the phases reversed – this may be expressed as a first phase of qualitative data collection and analysis, followed by a second phase of quantitative data collection and analysis that builds on the results of the of the first qualitative phase (Creswell, 2009). The basic approach is to use quantitative data and results to help to interpret the qualitative findings. As with the sequential explanatory strategy the two phase approach - qualitative research followed by quantitative research - of the sequential exploratory strategy makes it easy to implement and straightforward to describe and report (Creswell, 2009). Again the extent of time required to assemble data may be a significant disadvantage as with the sequential explanatory approach, the sequential exploratory model requires a substantial length of time to complete both data collection phases, which can be a drawback for some research situations (Creswell, 2009). The preliminary analysis of qualitative data may help to guide some of the quantitative research, for example the outcome of semi-structured interviews may help to identify the need to extract certain quantitative data. For this reason this type of strategy is considered to be of at least moderate and possibly high relevance to this study.

The sequential transformative strategy

The sequential transformative strategy has two distinct collection phases occurring consecutively as for the two strategies already described above. This strategy has "a theoretical lens" such as gender, race or social science theory "overlaying the sequential procedures" (Creswell, 2009, p.212). It is the guidance of the study by a theoretical perspective that differentiates this strategy from the sequential explanatory and sequential exploratory strategies. The theoretical lens is a factor in the introduction to a proposal, shapes a directional research question aimed at exploring a problem (e.g. inequality,

discrimination, injustice), creates sensitivity to collecting data from marginalised or underrepresented groups and ends with a call for action (Creswell, 2009). Some of these features may be less relevant to the current study but there are important issues about the association between the two phases and as with all sequential strategies, key decisions need to be made about what findings in the first phase will be the focus of the second phase (Creswell, 2009). The researcher may well have a theoretical lens based on his own education, professional training and practical experience. Elements of a transformative strategy may be relevant but overall, the technical nature of this study and the researcher's long experience and training in roles that require high levels of objectivity and independence lead to a conclusion that a transformative aspect is probably only of low to moderate relevance.

The concurrent triangulation strategy

The concurrent triangulation strategy has been described as: "probably the most familiar of the six major mixed methods models" (Creswell, 2009, p.213). It has been defined as a research approach in which the researcher collects both quantitative and qualitative data concurrently and then compares the two databases to determine if there is convergence, differences, or some combination (Creswell, 2009). This strategy typically starts with an assumption of equal weight for the two methods but often in practice priority may be given to either one of the qualitative or quantitative methods. This model generally uses separate quantitative and qualitative methods as a means to offset the weaknesses inherent within one method with the strengths of the other (or conversely, the strength of one adds to the strength of the other (Creswell, 2009).

There are a number of advantages in using a concurrent strategy such as this one, for example, this traditional mixed methods model is advantageous because it is familiar to most researchers and can result in well-validated and substantiated findings (and furthermore) the concurrent data collection results in a shorter data collection time period as compared to one of the sequential approaches because both the qualitative and quantitative data are gathered at one time at the research site (Creswell, 2009). In this research project the 'research site' is expanded to include the quantitative databases such as

Thomson Analytics and the offices of the analysts and other "key informants" in the words of Tremblay (1957). The triangulation strategy is considered to be highly relevant as it appears to permit the research to overcome some of the problems and limitations associated with purely quantitative research and opens the way to identification of possible convergence or critical differences between conclusions arising from the analysis of quantitative and qualitative databases.

The concurrent embedded strategy

The concurrent embedded strategy is similar to the concurrent triangulation approach in that there is one data collection phase during which both quantitative and qualitative data are collected simultaneously. However, unlike the concurrent triangulation strategy, a concurrent embedded approach has a primary method that guides the project and a secondary database that provides a supporting role in the procedures (Creswell, 2009). The distinction between the two strategies is that the purpose of concurrent validation is to ascertain whether the results of two methods measuring the same concept are equivalent. The purpose of simultaneous triangulation is to obtain different but complementary data on the same topic, rather than to replicate results (Morse, 1991). There are similar points that may be made in respect of embedded and triangulation strategies that are highly relevant (as explained in the previous section) however, the embedded strategy is considered to be of moderate to high relevance rather than highly relevant as in the case of the concurrent triangulation strategy. This is due primarily to the view that neither quantitative nor qualitative aspects of the research are necessarily seen to have prominence over the other.

The concurrent transformative strategy

The concurrent transformative strategy shares an important feature with the sequential transformative model in that it is directed by the researcher's use of a specific theoretical perspective or the guidance of a theoretical lens (Creswell, 2009, p.215). As noted for the concurrent version of the transformative strategy some aspects may limit the relevance to this study. For example, the requirement in this study to emphasise key informant selection (Tremblay, 1957) is more marked than the need for giving diverse participants a voice (Creswell, 2009, p. 215). There is scope under the concurrent transformative model to mix

quantitative and qualitative data through merging, connecting or embedding the data. Points that were made in respect of the sequential transformative strategy are also relevant in the analysis of the concurrent transformative strategy, for example, the researcher may well have a theoretical lens based on his own education, professional training and practical experience. As observed in the case of the sequential transformative strategy earlier, elements of a concurrent transformative strategy may be relevant but overall, the technical nature of this study and the researcher's professional experience and training in roles that require high levels of objectivity and independence lead to a conclusion that a transformative aspect is probably only of low to moderate relevance. This is not to risk complacency and it is considered important to keep in mind the possible impact of a theoretical lens on the part of researcher and interviewees or key informants (Tremblay, 1957).

3.4.6 A synthesis of mixed methods strategies – 'extended adapted triangulation'

Careful consideration of the six strategies outlined by Creswell (2009) together with important concepts discussed by Tremblay (1957) and Morse (1991), suggests that elements of a number of the strategies can be combined to form a further strategy or synthesis of strategies specifically suited to the current PhD research project. At first sight the 'concurrent triangulation strategy' seems to be the best basis for a research strategy. This strategy really needs to be extended however, so that quantitative and qualitative data are collected over a period of approximately one year and perhaps, it could be described as an 'Extended Adapted Triangulation Strategy' or for convenience, 'EAT' Strategy.

The composite strategy may also be termed the 'synthesis strategy' for the purposes of this discussion. There are elements of both the sequential and concurrent strategies in the synthesis strategy. The strategy that is most relevant has perhaps more in common with the concurrent strategies since it does not occur simply in two phases and neither the quantitative nor qualitative approach precedes the other. In practice there may be several phases of either quantitative or qualitative data collection. The flexibility and adaptability of the synthesis strategy are the key characteristics that seem convincing in securing its selection for this PhD research project. The following sections provide outlines of the

quantitative and qualitative research design including data collection processes, methods and analyses. Another feature of the EAT strategy is that a 'purposive sampling technique' is used for the semi-structured interviews.

> "The purposive sampling technique, also called judgement sampling, is the deliberate choice of an informant due to the qualities the informant possesses. It is a nonrandom technique that does not need underlying theories or a set number of informants"
> (Tongco, 2007, p.147).

As indicated earlier the process requires judgement on the part of the researcher and it is the view in this study that the requirement for key informant selection (Tremblay, 1957) is more marked than the need for giving diverse participants a voice (Creswell, 2009, p.215). The last point raised by Creswell (2009) may be discussed further in that the opportunity for an informant (or potential informant) to opine on the matter of pension accounting may not be supported by sufficient knowledge, training or experience on the part of that informant. It is not a matter of democracy it is a matter of capacity!

3.5 The quantitative research design and analysis

3.5.1 Introduction – a consideration of the requirements of research design

This section covers the research design in an empirical model before considering the detailed data collection issues. The objective is to examine the impact on investor's valuations of DB pension accounting information. For the purposes of the analysis the pension accounting information is considered in the form of information in, or affecting, the balance sheet or accounting earnings (income statement and statement of comprehensive income). The main stages of the process concern an empirical modelling and data collection and within this there are several distinct phases as follows:

- Develop an empirical model
- Determine data that is required for the empirical model
- Plan data collection process (for example, ensuring feasibility)
- Adapt the empirical model to ensure that it is viable (and relevant for the objective)

The empirical model is intended to help in testing the extent of the relationship between market values of companies and information in the financial statements. The design of such an empirical model builds on the concepts discussed earlier in the literature review: the current design uses the framework of a valuation model (Ohlson, 1995, and Feltham and Ohlson, 1995) and the developments of value relevance studies, particularly Barth, Beaver and Landsman (1992 and 1993), Coronado and Sharpe (2003), Franzoni and Marin, 2006, Hann et al (2007), Kiosse et al, 2007 and Coronado et al (2008).

3.5.2 Research Design – An Empirical Model

Background

It is considered preferable for the quantitative research to use or adapt existing research methods rather than create an entirely new approach. The research design builds on the models used in previous research articles and this permits the development of new models appropriate for the current research. The literature review reveals a number of different approaches to modelling for quantitative analysis. In the following discussion the appropriateness of different models for this PhD research is discussed.

Marginal Information Content Studies

Marginal information content or 'short window' studies are used to investigate how the release of an accounting number (adding to and conditional on other accounting information released) is associated with value changes. Chen and D'Arcy (1986) use earlier methodology as employed by Dodd and Warner (1983) to perform a study on the effects of interest rates on pensions. For each security "j" the market model is used to calculate an excess return or prediction error (PE) for event day "t" within the analysis period using the following form of prediction error regression model:

$$PE_{jt} = R_{jt} - (\alpha_j + \beta_j R_{mt})$$

where R_{jt} is the rate of return on security "j" for event day "t", R_{mt} is the rate of return on the market value-weighted index on event day "t" (using the Center for Research in Security Prices or "CRSP" daily return file) and the coefficients α_j and β_j are the ordinary least squares estimates of the intercept and slope respectively in the regression model.

The problem with marginal information content studies is that they are suited to the analysis of events associated with changes in accounting treatment – they are 'event studies' – and this effectively restricts the periods for appropriate study of the effects on market values or returns. For this reason this method is not used in this PhD study.

Earnings Discount Models

Earnings discount models are used for a number of incremental association value relevance studies – also known as 'long window studies'. It is useful to discuss the different earnings discount models under headings for the academics considered to have made particularly noteworthy contributions to the literature. In all cases regression coefficients are expressed in the form '**α**' and/or '**β_1'** with appropriate subscripts.

Daley (1984) develops an earnings discount model to try to determine whether there is an association between measures that US companies are required to disclose in the 1970s and stock market valuations. The model is structured to disaggregate the earnings variable into earnings before the pension cost and the pension cost itself, as follows:

$$\mathbf{MVE = \alpha + \beta_1 EbPC + \beta_2 PC + \varepsilon}$$

Where:
MVE = companies' market value of equity
EbPC = earnings before pension cost
PC = pension cost
ε = a random error term

Barth, Beaver and Landsman (1992) disaggregate the pension components so that regression coefficients may differ from one another:

$$\mathbf{MVE = \alpha + \beta_1 EbPC + \beta_2 SVC + \beta_3 INT + \beta_4 RPLNA + \beta_5 Other\ PC + \varepsilon}$$

Where:
MVE = companies' market value of equity
EbPC = earnings before pension cost

SVC = service cost
INT = interest cost
RPLNA= return on plan assets
OtherPC = other pension costs
ε = a random error term

Balance Sheet Models

Balance sheet models are used for a number of incremental association 'long window' studies. The different balance sheet models are considered under headings for the academics considered to have made particularly noteworthy contributions to the literature.

Landsman (1986) is the first of the researchers to use a balance sheet model to examine value relevance. He splits the companies' total assets into pension assets and non-pension assets and the companies' total liabilities into pension liabilities and non-pension liabilities. The Landsman (1986) model has the following form:

$$\mathbf{MVE = \alpha + \beta_1 NPA + \beta_2 NPL + \beta_3 PA + \beta_4 PL + \varepsilon}$$

Where:
MVE = companies' market value of equity
PA = pension assets
PL = pension liabilities
NPA = non-pension assets
NPL = non-pension liabilities
ε = a random error term

Mixed Earnings / Balance Sheet Models

The Ohlson (1995) model – looks at balance sheet and income measures simultaneously. Ohlson's research has been influential in linking accounting measures and firm value (See also Beaver, 2002). Many of the empirical models developed since 1995 have been influenced by the Ohlson model – it will be convenient (and arguably appropriate) to refer to them all henceforth in this study as the 'Ohlson models' - and while they may differ in detail they are all broadly of the following structure:

$$\mathbf{MVE = \alpha + \beta_1 NPE + \beta_2 EbPC + \beta_3 PA + \beta_4 PL + \beta_5 PC + \varepsilon}$$

Where:
MVE = companies' market value of equity
NPE = companies' owners' equity (plus net PL or less net PA – see below)
EbPC = earnings before pension costs
PA = pension assets
PL = pension liabilities
PC = pension costs
ε = a random error term

The empirical research on value relevance is to a significant extent based on a theoretical framework that has developed from the valuation research using earnings models (Oldfield, 1977) and combined earnings and net asset (book value) formats (Feltham and Ohlson, 1995; Ohlson, 1995). The work of Feltham and Ohlson is influential and much of the subsequent value relevance empirical studies by other academics may be described as 'Feltham-Ohlson modelling' (Beaver, 2002). The model will be referred to here as the 'Feltham-Ohlson Model' although it is also referred to in the literature as the 'residual income model' (for example, by Frankel and Lee, 1998 and Myers, 1999). Feltham-Ohlson modelling has a basis in fundamental analysis. 'Fundamental analysis' involves studying a firm's current activities and prospects for the purposes of estimating its value and, even though this task requires assessing factors beyond accounting data, such as product demand, corporate strategy and industry outlook, interpretation of financial statements' data is central to that task (Bernard, 1995, p.734). The Feltham-Olson approach relies on a 'measurement perspective' as opposed to the 'information perspective' and offers a theoretical grounding for the prediction of fundamentals such as earnings more than price explanation as the dominant paradigm (Bernard, 1995, p. 733).

Studies by Ohlson (1995) and Feltham and Ohlson (1995) develop a valuation model based on current and future earnings, book values and dividends. This represents work based on earlier studies but really developing a research branch of its own (Bernard, 1995, p.733). Elements of the valuation model may be traced to earlier work (Bernard, 1995) for example, structured analysis by Preinreich (1938) and Modigliani and Miller (1958). Important concepts that are developed include the 'clean surplus relation' (Ohslon, 1995,

p.661) under which the change in book value is equal to earnings minus dividends (net of capital contributions) – it is called the clean surplus condition since all changes in assets and liabilities unrelated to dividends must pass through the income statement. Ohlson (1995, p.663) discusses the development of a model starting with the background explanation that in neoclassical models of security valuation, the present value of expected dividends (PVED) determines the market value. The clean surplus relation can be applied to shift the value analysis away from PVED to book value plus the present value of expected abnormal earnings (Ohlson, 1995). The significance of the Ohlson (1995) analysis for pension accounting research is that the models developed look at the impact of earnings on market value and provide a structure for analysing value relevance – hence the models have been used by a number of other researchers.

The Feltham Ohlson Valuation Function

One form of the valuation function that is potentially useful as a basis for valuation relevance studies of pensions accounting information (explored in the next section) is expressed as follows (Feltham and Ohlson, 1995, p.705):

$$P_t = bv_t + \alpha_1 ox_t^a + \alpha_2 oa_t + \beta v_t$$

where,

P_t is the firm's market value at date **t**

bv_t is the book value of the firm's equity at date **t**

ox_t^a represents the abnormal operating earnings for period to date **t**

oa_t represents operating assets net of operating liabilities at date **t**

v_t is other information (available at date **t**) that is relevant to the prediction of future abnormal operating earnings.

α_1 , α_2 and β are the valuation coefficients for earnings, operating assets and other information respectively.

The Feltham-Ohlson analysis also considers goodwill (shown as g_t below) which may be presented as follows:

$$g_t = P_t - bv_t$$

Substituting the expression for P_t permits us to present goodwill as follows:

$$g_t = \alpha_1 ox_t^a + \alpha_2 oa_t + \beta v_t$$

The model is based on the 'clean surplus relation' that is a restriction on the relation between accounting earnings, accounting book value of equity, and net dividends through time (Feltham and Ohlson, 1995, p.694):

$$bv_t = bv_{t-1} + x_t - d_t$$

where,

bv_t and bv_{t-1} are book value of the firm's equity at dates **t** and **t-1**

and,

x_t represents the accounting earnings for period to date **t**

d_t represents net dividends for period to date **t**

The model also describes assets that are segregated on the basis of financial and operating activities so that the book value may be expressed as follows (Feltham and Ohlson, 1995, p.694):

$$bv_t = fa_t + oa_t$$

where,

bv_t and oa_t are as defined above and,

fa_t represents financial assets net of financial obligations at date t

Clean Surplus and Abnormal Earnings – Incorporated in the Model

The valuation function assumes the clean surplus relation discussed earlier and introduces the concept of abnormal earnings as the difference between actual earnings and a notional and implied normal earnings figure. The normal earnings are expressed as the product of the risk free rate and the book value of the firm's equity in the preceding period meaning that abnormal earnings may be expressed as follows (Feltham and Ohlson, 1995, p.697):

$$x_t^a = x_t - (R_F - 1)\, bv_{t-1}$$

where,

x_t^a represents abnormal earnings for the period ending t (from t-1 to t)

x_t represents earnings for the period ending t

R_F is described as "the risk-free interest rate" but is adjusted (*see Note below*)

bv_{t-1} is the book value of the firm's equity at date t-1

Note: R_F is described as "the risk-free interest rate (the present value relation)" but it is important to be aware that R_F is actually one plus the risk-free interest rate (Feltham and Ohlson, 1995, p.694) and the above relationship might be more clearly expressed as follows:

$$x_t^a = x_t - r_F\, bv_{t-1}$$

where,

r_F is the risk-free interest rate

and other terms are as defined above.

The discussion and analysis of the concepts of clean surplus, abnormal earnings and the risk free interest rate provides a basis for a valuation of goodwill (Feltham and Ohlson, 1995, p.696) and this is outlined in the next section.

Goodwill and Accounting Conservatism

In accounting theory there is a dichotomy between two approaches described as 'unbiased accounting' and 'conservative accounting' that centres around how the market value differs on average from the book value. Unbiased accounting is achieved if on average, the market value equals the book value while conservative accounting results in a situation where on average, the market value exceeds the book value (Feltham and Ohlson, 1995, p.692). Unbiased accounting is presented in terms of a two part model comprising a 'Stock Model' with a basis in book value and a 'Flow Model' based on the firm's earnings plus a zero mean variable that adjusts for other information (Feltham and Ohlson, 1995, p.692). The impact of accounting conservatism is potentially significant in that it may result in unrecorded goodwill and this is better understood if we consider the basis of goodwill in terms of the valuation of a firm. According to Feltham and Ohlson (1995) goodwill can reflect either the understatement of the value of existing assets or the anticipation of future positive net present value investments.

The extent of capitalisation of investment in operating assets is another area of difference between unbiased and conservative accounting. For this reason conservative accounting is expected to result on average in low earnings in the early periods and "offsetting large earnings in later periods" (Feltham and Ohlson, 1995, p.693). The principles outlined for goodwill accounting seem analogous to some of problems of accounting for DB pensions, for example there is uncertainty of measurement or outcome and results are subject to a variety of interpretations. The Feltham-Ohlson analysis introduces the present value relation to assume that the firm's market value equals the present value of expected dividends discounted by R_F which as indicated is the risk free interest rate plus one (Feltham and Ohlson, 1995, p.696). The same approach may be applied in the valuation of goodwill "g_t"so that it becomes the sum of expected abnormal earnings x_t^a (see expression below – where E_t **[.]** denotes the expected value operator at date "**t**")**.**

$$g_t = \sum_{\tau=1}^{\infty} R_F^{-\tau} E_t [x_{t+\tau}^a]$$

Feltham and Ohlson (1995) point out that the goodwill at a particular date will depend on the accounting principles employed but draw support from earlier theoretical research that emphasises that the goodwill function based on discounted expected abnormal earnings remains valid for all accounting principles that satisfy the clean surplus relation (Preinreich, 1938 and Peasnell, 1982). The conclusion is that an accounting framework may be introduced in valuation without specifying accounting principles (Feltham and Ohlson, 1995, p.699).

Feltham-Ohlson Models and Information Dynamics

In terms of equity valuation, a key improvement offered by the Ohlson or Feltham-Ohlson model may result from the "information dynamics" relating to the formation of abnormal earnings expectations while it provides a "unifying framework" for models using book value, earnings and short-term forecasts of earnings (Dechow et al, 1999: p.32). In contrast with the Ohlson model some other valuation models are based on the dividend discounting model, for example see Kothari and Zimmerman (1995). The Ohlson model focuses directly on forecasting future abnormal earnings so that it is not necessary to forecast future dividend policy and payments – this may be a considerable strength of the approach (Dechow et al, 1999, p.32). On the other hand the approach by Kothari and Zimmerman (1995) assumes a 100 per cent dividend payout ratio that has been criticised as unrealistic (Dechow et al, 1999, p.32).

One approach for developing the concept of information dynamics is consistent with fundamental analysis in that it involves testing whether observed share prices have a tendency to revert (after temporary 'mispricing') towards the 'fundamental' or 'intrinsic' values implied by the specific valuation models (Dechow et al, 1999, p.32). It has been suggested that a simple valuation model that capitalises analysts' earnings forecasts in perpetuity may be better at explaining contemporaneous share prices due to investors' tendency to 'over-weight' information in analysts' earnings forecasts and 'under-weight' information in current earnings and book value (Dechow et al, 1999: p.32). In view of these considerations an interesting question concerns the extent to which analysts' earnings

forecasts might be influenced by pension accounting information included in a firm's financial statements and notes.

Valuation theory and discretionary financial reporting

If asset values are associated with future performance expectations then it is reasonable to expect that a positive relationship might be observed between movements in net assets and operating performance. It has been observed that even where asset values are subject to discretionary revaluation by management there is a positive relationship with future operating performance and also share prices (Aboody et al, 1999). Nevertheless, there is a question mark over the motivation for revaluations in some cases and suspicion may arise about the substance of asset value adjustments where for example, a firm has high gearing and the management may wish to improve financial ratios in order to satisfy debt covenant tests. The association between fixed asset revaluations and future performance and share prices has been found to be weaker where debt-to-equity ratios are higher (Aboody et al, 1999).

More Empirical Studies - Further Development of "Mixed Method"

Hann et al (2007) use a model similar to the standard Ohlson format (shown earlier) but with pensions assets and liabilities netted ('NetPAL') and with pension costs 'PC' disaggregated into a recurring component 'RecPC' (service cost plus interest cost less return on plan assets) and 'PGL' a gains / losses component. They find the PC components are less persistent and hence less value relevant under fair value accounting. Kiosse, Lubberink and Peasnell (2007) arrive at similar results using US data with a sample comprising 3,388 firm years for the years from 1998 to 2005. The model used by Hann et al (2007) is structured as follows:

$$MVE = \alpha + \beta_1 NPE + \beta_2 EbPC + \beta_3 NetPAL + \beta_4 RecPC + \beta_5 PGL + \varepsilon$$

Where:
MVE = companies' market value of equity
NPE = companies' owners' equity plus net pension liabilities
EbPC = earnings before pension costs
NetPAL = pension assets less pension liabilities
RecPC = service cost plus interest cost less expected return on plan assets

PGL = a gains/losses component of “pension costs”
ε = a random error term

Analysis of the relative importance of pension and other information

The studies by Coronado and Sharpe (2003) and Coronado et al (2008) in particular build on earlier value relevance studies in an attempt to obtain evidence that helps to understand the relative importance of earnings and balance sheet information. Two main forms of models are introduced, namely the Transparent Model and the Opaque Model (Coronado and Sharpe, 2003 and Coronado et al, 2008).

The Coronado and Sharpe Transparent Model may be expressed as follows:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \varepsilon_{ti}}$$

Where (in all cases for company “i” at time “t” or period ending “t” as appropriate):
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

The Transparent Model is modified by adding the current period pension earnings, ‘PensionEPS’ to form the Opaque Model (shown below).

The Coronado and Sharpe Opaque Model may be expressed as follows:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti}}$$

Where (in all cases for company “i” at time “t” or period ending “t” as appropriate):
$\mathbf{P_{ti}}$ = market value of equity per share

$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{PensionEPS_{ti}}$ = pension earnings per share (pension return or pension costs other than service cost)
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

These two alternative models of pension valuation developed by Coronado and Sharpe (2003) form the basis for the first stage of this quantitative research: (1) The Standard Transparent Model; and, (2) The Opaque Model.

Model development

The purpose of the models that will now be developed here is to help in determining the existence and strength of any relationship between the reported accounting information and the market values of listed companies. The data are mainly in the form of accounting numbers supplemented by notes in the financial reports. In the Transparent Model ('Model 1' see below) the market value of equity per share (P) has been presented as a function of core book equity value per share (BVCS), the book value of net pension assets per share (NPAS) and the earnings per share generated by core operations (CoreEPS).

Core EPS is total EPS minus pension earnings per share (PensionEPS) where PensionEPS is the Net Periodic Pension Cost per share (NPPC) minus the service cost component (Coronado et al, 2003). Therefore, PensionEPS represents the accruals arising from the financing and management of the pension obligations and assets. In all the models and variations thereof that follow the terms have subscripts to indicate that they relate to a point in time or a period ending at a point in time 't' for firm 'i' where i is in the range from 1 to 'n' and n is the number of firms in the sample.

The Transparent Model (Model 1) may be expressed as follows:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \varepsilon_{ti}} \quad \mathbf{(1)}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

In Model 1, 'CoreEPS' which is the earnings per share of the core activities of the sponsoring company is included in the model but 'PensionEPS' is not included as it is theoretically redundant since the capitalised value of current and expected earnings, or costs, from outstanding net pensions assets, or obligations should already be incorporated into the NPA value (Coronado and Sharpe, 2003). The final term is the error term $\boldsymbol{\varepsilon_{ti}}$ which is assumed to be the sum of two components, the measurement error and the stochastic error. The measurement error portion is associated with a wide range of factors such as human error and various reporting inaccuracies and the stochastic error results from "the inherent irreproducibility of biological and social phenomena" (Wonnacott and Wonnacott, 1970, p.17). Model 1 may be modified by adding the current period pension earnings, 'PensionEPS' to the Model 1 regression equation to form "Model 2" which is described as the Opaque Model (shown below).

The Opaque Model (Model 2) may be expressed as follows:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti}} \quad \mathbf{(2)}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share

$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{PensionEPS_{ti}}$ = pension earnings per share (pension return or pension costs other than service cost)
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Variations of the models – tax considerations and expansion of terms

The potential importance of tax in the analysis of pension accounting has been recognised in the literature for example, since contributions are tax deductible, each pound of liability incurred and funded through those contributions reduces equity value by only (1 – T) where T is the corporate tax rate and for similar reasons each pound of the pension fund's asset portfolio might be valued at its replacement cost which is (1 – T) (Black, 1980). As well as the tax deductibility of contributions another favourable tax aspect is that returns on the pension fund assets are not taxable (Black, 1980; Tepper, 1981 and Feldstein and Seligman, 1981).

Tax effects are addressed in accounting practice through periodic adjustments to deferred tax and 'actuarial gains and losses' to which reference is made in the development of the models below. There are a number of potential complications in the analysis since individual companies may engage in tax planning strategies that reduce the effective rate of taxation they have to pay. Little or no attention seems to be paid to this complication in the literature. Furthermore, many of the listed companies are international groups that may have to pay tax in different jurisdictions so that the effective rate of taxation may be subject to different national tax rates depending on the location of economic activity of international subsidiaries and the provisions of double taxation agreements between jurisdictions.

This study develops new models that owe much to the Ohlson (1995) form of valuation model and may be considered as variations of the opaque model. The first set of model variations described as 'V1' to 'V5' include more pension cost and pension return components and in case of 'V3' the NPAS term is decomposed into two pension balance

sheet components. The second set of model variations 'V6' to 'V10' include an analysis of gearing by including a long term debt term 'LTDS', and in the case of the model variations 'V7' to 'V10' by disaggregating the core net book value figure, 'BVCS' into the measures of total net assets, 'TNAS' and long term debt, 'LTDS'. The model variations are summarised below.

The Variation Models – an outline and summary

All the variation models (V1 to V10) assume standard Corporation Tax rates in order to adjust for possible transient tax planning effects in the actual (effective annual) tax rates. The variation models have additional core or DB pension components as outlined for the individual cases below.

Model V1 – This is the same as the Base Case (Opaque Model) with the only difference being the assumption of standard Corporation Tax rates rather than the actual tax rates:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{PensionEPS_{ti}}$ = pension earnings per share (pension return or pension costs other than service cost)
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V2 – This has additional pension cost and return components including PSC so that CoreEPS needs to be adjusted to core earnings before deduction of PSC or CorebPSCEPS:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \beta_{4C} IntCostPS_{ti} + \beta_{4D} ERPAPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\mathbf{IntCostPS_{ti}}$ = interest cost per share (periodic increase in PV of DB liabilities)
$\mathbf{ERPAPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V3 – This has the additional pension cost and return components that were included in model V2 and also has the disaggregated pension asset and pension liability terms, PAS and PLS, as shown below:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_{3A} PAS_{ti} + \beta_{3B} PLS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \beta_{4C} IntCostPS_{ti} + \beta_{4D} ERPAPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{PAS_{ti}}$ = fair market value of pension fund assets per share
$\mathbf{PLS_{ti}}$ = pension obligations – the actuarial present value of benefits - per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\mathbf{IntCostPS_{ti}}$ = interest cost per share (periodic increase in PV of DB liabilities)
$\mathbf{ERPAPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V4 – This is a more parsimonious form following removal of the IntCostPS and ERPAPS terms and the NPAS term is reinstated, as shown below:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V5 – This variation of the model is closer to the first variation of the Base Case, V1 but instead of reinstating the PensionEPS term one of the disaggregated components, namely the term ACTGLPS is retained as the sole pension cost / pension return term – this was found to be the best performing pension cost / pension return component in the other variations (see regression analysis section, below). The V5 model variation is summarised in the expression below:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Models with a gearing (long term debt) component

The second set of model variations V6 to V10 include an analysis of gearing by including a long term debt term 'LTDS', and in the case of the model variations V7 to V10 by disaggregating the core net book value figure, 'BVCS' into the measures of total net assets, 'TNAS' and long term debt, 'LTDS'. All the model variations V6 to V10 continue to

include the standard corporation tax adjustment introduced in the model variations V1 to V5.

Model V6 – This retains the BVCS term and includes the long term debt term 'LTDS'. The full range of pension cost and pension return terms are included as may be seen below.

$$\mathbf{P_{ti} = \beta_0 + \beta_{1A}BVCS_{ti} + \beta_{1B}LTDS_{ti} + \beta_2CorebPSCEPS_{ti} + \beta_3NPAS_{ti} + \beta_{4A}ACTGLPS_{ti} + \beta_{4B}PSCPS_{ti} + \beta_{4C}IntCostPS_{ti} + \beta_{4D}ERPAPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{LTDS_{ti}}$ = long term debt per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\mathbf{IntCostPS_{ti}}$ = interest cost per share (periodic increase in PV of DB liabilities)
$\mathbf{ERPAPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V7 – This model variation disaggregates 'BVCS' into a total net assets term TNAS and the long term debt term 'LTDS'. As for V6, the full range of pension cost and pension return terms are included as may be seen below.

$$\mathbf{P_{ti} = \beta_0 + \beta_{1A}TNAS_{ti} + \beta_{1B}LTDS_{ti} + \beta_2CorebPSCEPS_{ti} + \beta_3NPAS_{ti} + \beta_{4A}ACTGLPS_{ti} + \beta_{4B}PSCPS_{ti} + \beta_{4C}IntCostPS_{ti} + \beta_{4D}ERPAPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{TNAS_{ti}}$ = total net assets per share
$\mathbf{LTDS_{ti}}$ = long term debt per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share

$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\mathbf{IntCostPS_{ti}}$ = interest cost per share (periodic increase in PV of DB liabilities)
$\mathbf{ERPAPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V8 – This model variation is similar to V7 but goes further by disaggregating 'NPAS' into 'PAS' and 'PLS' similarly to model variation V3 (discussed earlier). As for V6 and V7, the full range of pension cost and pension return terms are included as may be seen below.

$$\mathbf{P_{ti} = \beta_0 + \beta_{1A}TNAS_{ti} + \beta_{1B}LTDS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_{3A}PAS_{ti} + \beta_{3B}PLS_{ti} + \beta_{4A}ACTGLPS_{ti} + \beta_{4B}PSCPS_{ti} + \beta_{4C}IntCostPS_{ti} + \beta_{4D}ERPAPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{TNAS_{ti}}$ = total net assets per share
$\mathbf{LTDS_{ti}}$ = long term debt per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{PAS_{ti}}$ = fair market value of pension fund assets per share
$\mathbf{PLS_{ti}}$ = pension obligations – the actuarial present value of benefits - per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\mathbf{IntCostPS_{ti}}$ = interest cost per share (periodic increase in PV of DB liabilities)
$\mathbf{ERPAPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V9 – This is a more parsimonious form following removal of the IntCostPS and ERPAPS terms and the NPAS term is reinstated, as shown below:

$$\mathbf{P_{ti} = \beta_0 + \beta_{1A}TNAS_{ti} + \beta_{1B}LTDS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A}ACTGLPS_{ti} + \beta_{4B}PSCPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share

$\mathbf{TNAS_{ti}}$ = total net assets per share
$\mathbf{LTDS_{ti}}$ = long term debt per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V10 – This variation of the model is closer to the first variation of the Base Case, V1 and closer still to the further variation V5 discussed above. Instead of reinstating the PensionEPS term one of the disaggregated components, namely the term ACTGLPS is retained as the sole pension cost / pension return term – this was found to be the best performing pension cost / pension return component in the other variations (see regression analysis section, below). The V10 model variation is summarised in the expression below:

$$\mathbf{P_{ti} = \beta_0 + \beta_{1A}TNAS_{ti} + \beta_{1B}LTDS_{ti} + \beta_2CoreEPS_{ti} + \beta_3NPAS_{ti} + \beta_{4A}ACTGLPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{TNAS_{ti}}$ = total net assets per share
$\mathbf{LTDS_{ti}}$ = long term debt per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

A summary of definitions of all the variables used in the models V1 to V10 is shown in Table 3.1 (below).

Table 3.1 Terms used in Regression Model Variations V1 to V10

Term	Explanation of input (in each case preceded by regression coefficient β_i)
$\mathbf{P_{ti}}$	Price or market value of equity per share
$\mathbf{\beta_1 BVCS_{ti}}$	Core book value per share
$\mathbf{\beta_{1A} TNAS_{ti}}$	Total net assets per share
$\mathbf{\beta_{1B} LTDS_{ti}}$	Long term debt per share
$\mathbf{\beta_2 CoreEPS_{ti}}$	Core earnings per share
$\mathbf{\beta_2 CorebPSCEPS_{ti}}$	Core earnings before pension service cost per share
$\mathbf{\beta_3 NPAS_{ti}}$	Recognised net pension assets per share
$\mathbf{\beta_{3A} PAS_{ti}}$	Fair market value of pension assets per share
$\mathbf{\beta_{3B} PLS_{ti}}$	Actuarial present value of pension liabilities per share
$\mathbf{\beta_4 PensionEPS_{ti}}$	Pension earnings per share
$\mathbf{\beta_{4A} ACTGLPS_{ti}}$	Actuarial gains and losses per share
$\mathbf{\beta_{4B} PSCPS_{ti}}$	Pension service cost per share
$\mathbf{\beta_{4C} IntCostPS_{ti}}$	Interest cost per share (the increase during a period in the present value of a DB obligation arising because the benefits are one period closer to settlement)
$\mathbf{\beta_{4D} ERPAPS_{ti}}$	Expected return on pension assets per share (based on market expectations at the beginning of the period for returns over the entire life of the related obligation)
	All terms have subscripts to show that inputs relate to firm 'i' for time period to (or at date) 't'

Note: the above definitions reflect the definitions in IAS 19 (the version before the revised version of June 2011 that is not relevant to the period is research 2006-2010)

3.5.3 Data Collection for the Empirical Model

The quantitative data comprise accounting numbers and share price data. The accounting data are extracted from the financial reports of a sample of FTSE 100 companies over the period 2006 to 2010. All the companies are required to apply IAS 19 over this period so this permits consistency and comparability in the analysis. The sample contains 70 companies (rather than all 100) which arises from excluding banks and other financial institutions as well as other companies that have been the subject of capital restructuring; or have been listed within the period; or are very recent additions to the FTSE 100. The sample provides data for 350 firm years over the five year period 2006 to 2010.

Principal sources of share price data are Thomson Analytics and Datastream. Most of the pension accounting data for a firm is contained in the specific pension notes in the audited accounts contained in the annual reports of the sample companies. For that reason the data is 'hand picked' from the financial statements and notes. This inevitably makes it more time consuming than some other types of value relevance studies (not on pensions) and this seems to be the only way of proceeding with sufficient precision consistent with the objectives of this PhD research. For value relevance analysis purposes accounting data of companies with accounting year-ends in October through to March (mostly December year ends) are matched to price data published in the following May; and, accounting data for companies with accounting year-ends in April through to September are matched to price data published in the following November – this follows the methods employed by Coronado and Sharpe (2003, p.337) and repeated in Coronado et al (2008).

The analysis performed by Coronado and Sharpe (2003) and Coronado et al (2008) examined US data and relied on figures for 'pensions earnings' that were calculated by deducting the service cost from the NPPC or net periodic pension cost (referred to above). The data is presented differently under IAS 19. Significantly, the terms and process of retrieval of relevant data is somewhat different for this study based on a sample of UK FTSE 100 listed companies that all prepare financial statements under IFRS (IAS 19).

3.5.4 The level of exposure to DB pension schemes

The data from the financial reports of the sample of FTSE 100 companies on the basis of their exposure to defined benefit or 'DB' pension plans. The categories are determined on the basis of gross pension liabilities rather than net pension liabilities (that take pension assets into account) – the reason for this is that this gives a guide to the real potential exposure rather than relying on the net asset (or net liability) position that may conceal the extent of the liabilities especially when the pension asset values happen to be high. The DB pension exposure categories are as follows (1)Companies with very high exposure to DB schemes ('VH PL') (2) Companies with high exposure to DB schemes ('H PL') (3) Companies with medium exposure to DB schemes ('Mod PL') (4) Exposure to DB schemes ('Low PL') (5) Companies with very low exposure to DB schemes ('VLow PL').
As there are five categories it seems logical to analyse these categories as quintiles of exposure to DB pensions. Further analysis is carried out on the discount rates used by companies in the different DB scheme categories (indicated above) and also across the years 2006 to 2010.

3.6 The qualitative research design and analysis

3.6.1 Introduction – a consideration of the requirements of research design

As discussed above in section 3.4 this research uses a mixed-methods approach in what is described as an Extended Adapted Triangulation (EAT) Strategy. Similarly to the quantitative research design section this section covers the research design in a qualitative approach as part of the mixed-methods approach before considering the detailed data collection issues. The emphasis is on triangulation so that two databases one quantitative and one qualitative are produced and then these databases are compared "to determine if there is convergence, differences, or some combination" (Creswell, 2009, p.213).

3.6.2 Research design – semi-structured interviews

The nature of pension accounting information, particularly its complexity and variability has guided the selection of qualitative research methods. Possible qualitative research methods include interviews and surveys. Interviews may permit a greater depth of analysis through discussion. As Creswell (2009, p.181-183) points out 'qualitative interviews' involve unstructured and generally open-ended questions that are few in number – perhaps 4 to 5 questions with follow up 'probes' for these questions. 'Structured interviews' are quite different in that they "are used to collect data for quantitative analysis, and use pre-prepared questionnaires and standardised questions, that is, the same questions are posed to all respondents" (Gray, 2009, p.373). There are advantages in both approaches.

The use of semi-structured interviews in this research is driven by the objective to benefit from the comparability and analytical potential of structured interviews and also the permit the insight that may be achieved from more open-ended or unstructured interviewing. This seems particularly relevant in the matter of interpreting pension accounting which is described by one of the respondents as "a particularly complex area of financial reporting" (Analyst 'A7', 2011). Another key informant stated that "the majority of accounting is definitive – it exists" but pension accounting "brings companies into our world of estimating the future" (Analyst 'A8', 2012). Very importantly, a semi-structured interview "allows for probing of views and opinions where it is desirable for respondents to expand on their answers" which is "vital when a phenomenological approach is being taken where the objective is to explore subjective meanings that respondents ascribe to concepts or events" (Gray, 2009, p.373).

The semi-structured questions and themes are as follows:

General themes

- General usefulness of financial reports to investors/analysts
- Complexity / clarity / transparency of accounting information
- Disclosures – extent and appropriateness
- Supplementary information used – unpublished material?
- What are the most useful analytical techniques applied to financial statements?

Specific pensions accounting matters (answers to include comments/reflections)

- Is pensions info better / worse than general / other accounting information?
- Is B/S info more/less useful than P/L information?
- Are notes to accounts useful enough / how could they be improved?
- What are the most useful analytical techniques for pensions accounting information?
- What are the major problems (say 3) with pension accounting / financial reporting?
- Do you use the services of a qualified actuary – in house or external?
- How much use is made of actuarial reports / specific actuarial information?

Audit / auditors

- General audit environment - Do you or other analysts (in your view) have any particular concerns about the auditing environment e.g. in relation to independence or potential consultancy bias?
- Specific pension audit environment – Are there concerns about audit of pensions information and disclosures (and are these concerns greater than the general case)?

3.6.3 Data collection and interview protocol

A sample of 'key informants' (Tremblay, 1957) is used. All the interviewees in the sample are or have been in financial analytical roles although not all have a frequent need to analyse pension accounting information and it is acknowledged that their specific knowledge of pension accounting issues may vary. A summary of the backgrounds of the key informants is shown in Appendix 1.

An 'interview protocol' (along the lines of Creswell, 2009, p.183) has been followed to help to ensure inter alia consistency and comparability between the semi-structured interviews. The interview protocol includes the following features:

- A heading (including date and interviewee name)
- The questions (see outline above)
- Space between the questions to record the responses

- A final "thank-you" statement to acknowledge the interviewee's (valuable) time spent in the interviewee process

3.7 Summary and conclusions

This chapter considers research methodology as a basis for setting out the research proposal. The literature review reveals that there are limitations in the literature and there is scope for contributions in terms of both pension accounting value relevance (literature is now quite old and virtually all the pension accounting value relevance research is carried out in the US while virtually none of the research relates to the UK) and the perception of decision usefulness as there appears to be no literature at all concerning the perception of decision usefulness of pension accounting information. The discussion of research methodology concludes that a mixed methods approach is best suited to the research proposal which seeks to answer four research questions: (1) Is pension accounting information value relevant? (2) Is pension accounting information more or less value relevant than other accounting information? (3) Is pension accounting information perceived to be decision useful? (4) Is pension accounting information perceived to be more or less decision useful that other accounting information? On the one hand, the analysis of value relevance is quantitative in that market value effects may be measured and compared to accounting information. On the other hand, the analysis of decision usefulness or 'perceived decision usefulness' is a qualitative exercise as it requires an understanding of the viewpoints and insights of decision takers.

The research design strategy developed for this PhD is the Extended Adapted Triangulation or 'EAT' strategy that is a synthesis of other mixed methods strategies reviewed. The quantitative research involves using multivariate regression analysis. The regression models are based on the framework of a valuation model (Ohlson, 1995 and Feltham and Ohlson, 1995). The qualitative research is in the form of semi-structured interviews with analysts who are selected on the key informant principle (Tremblay, 1957). The analysts as key informants are selected using a non-random 'purposive sampling technique' (Tongco, 2007) as the informants need to possess certain levels of expertise. The semi-structured interviews are conducted using questions covering general themes, specific pension

accounting matters and audit issues. The EAT strategy utilizes the strengths of both quantitative and qualitative methods and is particularly helpful in analysing the perception of decision usefulness as the qualitative aspect of value relevance.

Chapter 4

Value relevance of pension accounting information

4.1 Introduction

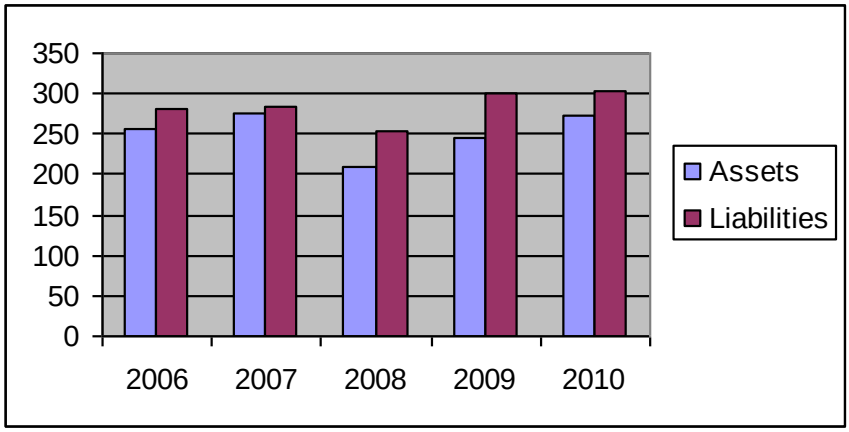
This chapter is concerned primarily with Research Question 1 and Research Question 2 set out in Chapter 1 as these are questions that may be answered at least in the first place by using quantitative methods. More specifically the quantitative methods are based on regression models derived from earlier value relevance studies discussed in the literature review and the review of research methodology. The conclusion reached is that an approach incorporating research methods based on 'mixed methodology' is more likely to be successful in helping to explain the extent of the relationship between reported accounting information and the market value of companies. This chapter together with Chapter 5 (next) summarises the quantitative and qualitative research undertaken in accordance with the chosen research strategy. This particular research strategy that has been given the name 'Extended Adapted Triangulation Strategy' (EAT Strategy) is a synthesis of established mixed research strategies as referred to and explained in Chapter 3 (Methodology). The analysis process is integrated so that there are elements of both the sequential and concurrent strategies in the EAT Strategy and neither the quantitative nor qualitative approach precedes nor has prominence over the other. There are several phases of either quantitative or qualitative data collection. Chapter 6 compares the findings from the qualitative analysis and the triangulation process with an overall assessment of the evidence obtained.

4.2 Defined benefit pensions exposure of the sampled companies

The scale of the exposure to DB pension fund liabilities as reported under IAS 19 is very significant throughout the 5 year period as shown in Figure 4.1 (this shows the overall position for the 70 FTSE 100 companies in the sample – the sample selection is discussed in more detail later).

Figure 4.1. Pension Assets and Liabilities of FTSE 100 Sample Firms 2006-2010

Sterling £ billion



The aggregate pension fund deficits are very large particularly in the years 2008 to 2010. There has been on the whole an upward trend for defined benefit pension scheme liabilities over the period 2006-2010, with the exception of 2008 when perhaps curiously, there is a significant decline from £285 billion in 2007 to £253 billion in 2008 – this is associated with a rise in the level of discount rates used for the purposes of valuing pension liabilities at that time. It may also be observed that in spite of the decline in overall reported DB pension liabilities of companies in the sample in 2008, the deficit increases from £9 billion in 2007 to £44 billion in 2008 due to the very significant fall in pension asset values over the period. In spite of the subsequent recovery in pension scheme asset values enabling them to reach a valuation of £272 billion in 2010 (which was nearly back to the 2007 valuation of £276 billion) the deficits remain high, rising to £54 billion in 2009 before falling back to (a still very large) £32 billion for the sample companies in 2010. These movements in aggregate DB pension assets and liabilities for the sample companies are displayed in Figure 4.1.

4.3 Regression analysis results

4.3.1 Background and reasons for performing regression analysis

The decision to undertake empirical research using regression analysis is influenced by the literature on valuation, value relevance and pensions accounting especially Ball and Brown

(1968), Oldfield (1977), Dhaliwal (1986), Ohlson (1995), Feltham and Ohlson (1995), Barth et al (2001), Beaver (2002), Coronado and Sharpe (2003), Hann et al (2007) and Coronado et al (2008). The literature review summarised in Chapter 2 (above) is extensive and it is impractical to make very detailed reference to all the regression analyses included therein but the key conclusions and acknowledged weaknesses of the earlier studies have been carefully considered. Quantitative analysis including regressions is considered to be a valuable part of this research but unlike many of the previous studies in the literature, the quantitative analysis is not the sole source of evidence as explained in Chapter 3 (Research Methodology).

4.3.2 Sources of data

The quantitative data is primarily extracted from the publicly available annual reports of 70 companies in the FTSE 100 as at 23 July 2010 as well as market data primarily in the form of listed share prices provided by Thomson Analytics. The FTSE 100 provides a good source of substantial listed entities with relatively high volumes of shares traded and about which information is readily available. The sample of 70 companies results from the decision to exclude certain FTSE 100 companies from the analysis. The companies that are excluded fall into certain categories as follows (the main reasons for exclusion are also given):

- banks and financial institutions such as insurance companies (on the basis that these have a different financial reporting system and are not really comparable with other companies);
- entities that have undergone capital restructuring or corporate mergers (since these are very difficult to analyse); and,
- recently listed companies about which there is insufficient information.

Share price data collection follows Coronado and Sharpe (2003) and Coronado et al (2008) so that for value relevance analysis purposes accounting data of companies with accounting year-ends in October through to March are matched to price data in the following May; and, accounting data for companies with accounting year-ends in April through to September are matched to price data in the following November. The process of matching

to share prices on only one particular date is a potential weakness of the analysis particularly if there is a high degree of volatility in share prices since this may have a major effect on the outcomes for regression analysis purposes. Nevertheless, the share price variations in the 30 days around the end of May 2011 were found to be mostly in the range of 3% to 7%.

The analysis covers a period of 5 years from 2006 to 2010 so there are 350 firm years from which to draw data.

4.3.3 Determining the period for the research data and regression analysis

Overall regression analysis using the main empirical models for all 350 firm years is undertaken as a first stage and then analysis is undertaken for each year from 2006 to 2010 as a second stage so that results may be compared and differences analysed.

When looking at separate years consideration is given to the market and economic conditions at the time to try to determine patterns. Certain periods may be characterised by greater market volatility and this could have a material effect on the analysis. An example of a study covering a period of changing market circumstances is Hann et al (2007) in which analysis is performed across the following two periods: 2000-2002 – an 'abnormal period' witnessed rapid deterioration in pension funding levels and, 1995-1999 – a 'normal period'. Going beyond the period of the Hann et al (2007) study the period 2003 to 2006 was more 'normal' although market volatility was starting to return by 2007. For the purposes of this PhD research the start of the period of value relevance analysis commences with the 2006 results (these relate to annual accounting periods ending on dates from 30 June 2006 to 31 May 2007).

The market circumstances over the period of this study might be summarised briefly as follows: from 2006 (second half) to 2009 (first half) – an 'abnormal period' - since there was considerable turbulence in equity markets associated with the credit crisis that resulted in a considerable deterioration in pension funding levels - to be assessed and determined (this consistent with the pattern observed in Figure 4.1 above – note that the results for

2008 are reported in the first half of 2009. From 2009 (second half) to 2011 (first half) – there was a 'normal period' or at least 'relatively normal' to be assessed and determined - although it should be noted that by the time the 2010 annual reports were expected to have an impact in the second quarter of 2011 there was significant turbulence in equity markets again! All companies in the sample apply IAS 19 (even when it is not mandatory in the very early part of the period) over the full period covering accounting years 2006 to 2010 that are covered by this research.

4.4 Review of the empirical models used

4.4.1 Background and model development

The empirical models were introduced in the previous chapter on research methodology. It has already been explained that the purpose of these models is to help in determining the existence and strength of any relationship between the reported accounting information and the market values of listed companies. The data are mainly in the form of accounting numbers supplemented by notes in the financial reports. It will be recalled that two main forms of models were introduced, namely the Transparent Model and the Opaque Model based primarily on the empirical studies by Coronado and Sharpe (2003). In the Transparent Model ('Model 1' see below) the market value of equity per share (P) has been presented as a function of core book equity value per share (BVCS), the book value of net pension assets per share (NPAS) and the earnings per share generated by core operations (CoreEPS). 'Core EPS' is total EPS minus pension earnings per share (PensionEPS) where PensionEPS is the pension return or pension costs other than the service cost. In all the models and variations thereof that follow the terms have subscripts to indicate that they relate to a point in time or a period ending at a point in time **'t'** for firm **'i'** where **i** is in the range from 1 to **'n'** and **n** is the number of firms in the sample. The term $\boldsymbol{\varepsilon_{ti}}$ is the error term which is assumed to be the sum of two components, the measurement error and the stochastic error. In Chapter 3 it was explained that the measurement error portion is associated with a wide range of factors such as human error and various reporting inaccuracies and the stochastic error results from "the inherent irreproducibility of biological and social phenomena" (Wonnacott and Wonnacott, 1970, p.17). Model 1 and

Model 2 (as shown below) were introduced in Chapter 3 in the discussion of empirical value relevance models.

The Transparent Model (Model 1) may be expressed as follows:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \varepsilon_{ti}} \qquad \mathbf{(1)}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

The Opaque Model (Model 2) may be expressed as follows:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti}} \qquad \mathbf{(2)}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{PensionEPS_{ti}}$ = pension earnings per share (pension return or pension costs other than service cost)
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

4.4.2 Models with adjusted tax and additional DB pension components

The regression models are explained in detail in Chapter 3 and for convenience are also summarised below.

Model V1 – This is the same as the Base Case (Opaque Model) with the only difference being the assumption of standard Corporation Tax rates rather than the actual tax rates:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{PensionEPS_{ti}}$ = pension earnings per share (pension return or pension costs other than service cost)
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V2 – This has additional pension cost and return components including PSC so that CoreEPS needs to be adjusted to core earnings before deduction of PSC or CorebPSCEPS:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \beta_{4C} IntCostPS_{ti} + \beta_{4D} ERPAPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\mathbf{IntCostPS_{ti}}$ = interest cost per share (periodic increase in PV of DB liabilities)
$\mathbf{ERPAPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V3 – This has the additional pension cost and return components that were included in model V2 and also has the disaggregated pension asset and pension liability terms, PAS and PLS, as shown below:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_{3A} PAS_{ti} + \beta_{3B} PLS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \beta_{4C} IntCostPS_{ti} + \beta_{4D} ERPAPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{PAS_{ti}}$ = fair market value of pension fund assets per share
$\mathbf{PLS_{ti}}$ = pension obligations – the actuarial present value of benefits - per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\mathbf{IntCostPS_{ti}}$ = interest cost per share (periodic increase in PV of DB liabilities)
$\mathbf{ERPAPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V4 – This is a more parsimonious form following removal of the IntCostPS and ERPAPS terms and the NPAS term is reinstated, as shown below:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V5 – This variation of the model is closer to the first variation of the Base Case, V1 but instead of reinstating the PensionEPS term one of the disaggregated components, namely the term ACTGLPS is retained as the sole pension cost / pension return term – this was found to be the best performing pension cost / pension return component in the other variations (see regression analysis section, below). The V5 model variation is summarised in the expression below:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Models with a gearing (long term debt) component

The second set of model variations V6 to V10 include an analysis of gearing by including a long term debt term 'LTDS', and in the case of the model variations V7 to V10 by disaggregating the core net book value figure, 'BVCS' into the measures of total net assets, 'TNAS' and long term debt, 'LTDS'. All the model variations V6 to V10 continue to include the standard corporation tax adjustment introduced in the model variations V1 to V5.

Model V6 – This retains the BVCS term and includes the long term debt term 'LTDS'. The full range of pension cost and pension return terms are included as may be seen below.

$$\mathbf{P_{ti} = \beta_0 + \beta_{1A} BVCS_{ti} + \beta_{1B} LTDS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \beta_{4C} IntCostPS_{ti} + \beta_{4D} ERPAPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{LTDS_{ti}}$ = long term debt per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\mathbf{IntCostPS_{ti}}$ = interest cost per share (periodic increase in PV of DB liabilities)
$\mathbf{ERPAPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V7 – This model variation disaggregates 'BVCS' into a total net assets term TNAS and the long term debt term 'LTDS'. As for V6, the full range of pension cost and pension return terms are included as may be seen below.

$$\mathbf{P_{ti} = \beta_0 + \beta_{1A}TNAS_{ti} + \beta_{1B}LTDS_{ti} + \beta_2CorebPSCEPS_{ti} + \beta_3NPAS_{ti} + \beta_{4A}ACTGLPS_{ti} + \beta_{4B}PSCPS_{ti} + \beta_{4C}IntCostPS_{ti} + \beta_{4D}ERPAPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{TNAS_{ti}}$ = total net assets per share
$\mathbf{LTDS_{ti}}$ = long term debt per share
$\mathbf{CorebPSCEPS_{ti}}$ = core earnings per share before pension services costs
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\mathbf{PSCPS_{ti}}$ = pension service costs per share
$\mathbf{IntCostPS_{ti}}$ = interest cost per share (periodic increase in PV of DB liabilities)
$\mathbf{ERPAPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Model V8 – This model variation is similar to V7 but goes further by disaggregating 'NPAS' into 'PAS' and 'PLS' similarly to model variation V3 (discussed earlier). As for V6 and V7, the full range of pension cost and pension return terms are included as may be seen below.

$$P_{ti} = \beta_0 + \beta_{1A}TNAS_{ti} + \beta_{1B}LTDS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_{3A}PAS_{ti} + \beta_{3B}PLS_{ti} + \beta_{4A}ACTGLPS_{ti} + \beta_{4B}PSCPS_{ti} + \beta_{4C}IntCostPS_{ti} + \beta_{4D}ERPAPS_{ti} + \varepsilon_{ti}$$

Where:
P_{ti} = market value of equity per share
$TNAS_{ti}$ = total net assets per share
$LTDS_{ti}$ = long term debt per share
$CorebPSCEPS_{ti}$ = core earnings per share before pension services costs
PAS_{ti} = fair market value of pension fund assets per share
PLS_{ti} = pension obligations – the actuarial present value of benefits - per share
$ACTGLPS_{ti}$ = actuarial gains and losses per share
$PSCPS_{ti}$ = pension service costs per share
$IntCostPS_{ti}$ = interest cost per share (periodic increase in PV of DB liabilities)
$ERPAPS_{ti}$ = actuarial gains and losses per share
ε_{ti} = a random error term

Model V9 – This is a more parsimonious form following removal of the IntCostPS and ERPAPS terms and the NPAS term is reinstated, as shown below:

$$P_{ti} = \beta_0 + \beta_{1A}TNAS_{ti} + \beta_{1B}LTDS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A}ACTGLPS_{ti} + \beta_{4B}PSCPS_{ti} + \varepsilon_{ti}$$

Where:
P_{ti} = market value of equity per share
$TNAS_{ti}$ = total net assets per share
$LTDS_{ti}$ = long term debt per share
$CorebPSCEPS_{ti}$ = core earnings per share before pension services costs
$NPAS_{ti}$ = book value of net pension assets per share
$ACTGLPS_{ti}$ = actuarial gains and losses per share
$PSCPS_{ti}$ = pension service costs per share
ε_{ti} = a random error term

Model V10 – This variation of the model is closer to the first variation of the Base Case, V1 and closer still to the further variation V5 discussed above. Instead of reinstating the PensionEPS term one of the disaggregated components, namely the term ACTGLPS is

retained as the sole pension cost / pension return term – this was found to be the best performing pension cost / pension return component in the other variations (see regression analysis section, below). The V10 model variation is summarised in the expression below:

$$\mathbf{P_{ti} = \beta_0 + \beta_{1A}TNAS_{ti} + \beta_{1B}LTDS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A}ACTGLPS_{ti} + \varepsilon_{ti}}$$

Where:
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{TNAS_{ti}}$ = total net assets per share
$\mathbf{LTDS_{ti}}$ = long term debt per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{ACTGLPS_{ti}}$ = actuarial gains and losses per share
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

An outline of the sources of data for testing these model variations and a summary of the regression analysis follows in the sections below.

4.5 Detailed regressions

4.5.1 Introduction – regressions, data and the choice of model

Data description and collection method

The quantitative data is extracted from the financial reports of a sample of FTSE 100 companies over the period 2006 to 2010 as explained in Chapter 3. All of the companies in the sample are represented in each of the five years over the period – they all remain in the FTSE 100 over the entire period. The financial statements of all the companies in the sample are prepared on the IFRS basis so that there is a requirement to apply IAS 19 in respect of pension schemes over this period which should ensure consistency and comparability. The sample contains 70 companies after excluding banks and other financial institutions as well as other companies that have been the subject of capital

restructuring or have been listed within the period or are very recent additions to the FTSE 100. The sample provides data for 350 firm years over the five year period 2006 to 2010.

Key features of the data collection method were outlined in Chapter 3 (Methodology) and for the purposes of this analysis may be summarised as follows:

- Principal sources of data are Thomson Analytics, Datastream and the publicly available annual reports of the companies in the FTSE 100 over the period 2006 to 2010.
- Most of the pension accounting data for a firm is contained in the specific pension note in the accounts. For that reason the data is hand picked from the financial statements and notes. This inevitably makes it more time consuming than some other types of value relevance studies (not on pensions) and this seems to be the only way of proceeding with sufficient precision consistent with the objectives of this PhD research.
- For value relevance analysis purposes accounting data of companies with accounting year-ends in October through to March are matched to price data in the following May; and, accounting data for companies with accounting year-ends in April through to September are matched to price data in the following November.

Regressions and choice of models

The regressions are carried out to assess the transparent model, the opaque model, taken as the 'Base Model' for the purpose of the regression analysis, and variations of the Base Model. The opaque model is considered to be better as the basis for the modelling as it has a better fit (albeit slightly better) and permits analysis of the pension cost components. Subsequent semi-structured interviews with analysts strongly suggest that significant use is made of information in the notes to the financial reports (consistent with the opaque model and the work of Coronado and Sharpe, 2003 and Coronado et al, 2008).

The Descriptive Statistics are shown in Figure 4.2 below.

Figure 4.2 Descriptive Statistics for Regression Analysis 2006-2010

Complete Period 5YR

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	350	0.50	59.90	10.22	9.112	1.997	5.364
BVCS	350	-0.16	31.89	4.88	5.482	2.106	4.406
NPAS	350	-2.62	0.71	-0.27	0.459	-2.454	7.500
CoreEPS	350	-6.81	11.60	0.83	1.597	1.095	11.481
PensionEPS	350	-1.85	0.70	-0.03	0.213	-2.802	19.415

Year 2006 Only

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	70	0.78	49.62	10.47	8.742	1.963	5.205
BVCS	70	0.07	22.97	4.38	5.145	1.994	3.398
NPAS	70	-1.20	0.28	-0.20	0.287	-1.650	2.515
CoreEPS	70	-0.51	7.50	1.10	1.483	2.244	5.340
PensionEPS	70	-0.59	0.68	0.04	0.132	0.331	14.352

Year 2007 Only

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	70	0.65	50.02	10.43	9.311	1.839	4.096
BVCS	70	-0.16	25.24	4.61	5.587	2.047	3.726
NPAS	70	-1.98	0.48	-0.12	0.343	-3.048	14.166
CoreEPS	70	-3.00	11.60	1.08	1.964	2.841	11.980
PensionEPS	70	-0.10	0.56	0.07	0.115	1.796	3.900

Year 2008 Only

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	70	0.53	43.97	8.04	7.366	2.302	7.637
BVCS	70	-0.10	23.95	4.61	4.821	2.128	5.107
NPAS	70	-2.04	0.46	-0.29	0.465	-2.269	5.409
CoreEPS	70	-6.81	4.22	0.37	1.904	-1.756	6.114
PensionEPS	70	-1.85	0.18	-0.16	0.306	-3.304	14.082

Year 2009 Only

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	70	0.80	59.90	10.27	9.690	2.482	9.209
BVCS	70	-0.04	24.98	5.07	5.451	2.040	3.844
NPAS	70	-2.62	0.00	-0.42	0.569	-2.116	4.743
CoreEPS	70	-4.10	5.26	0.61	1.044	0.105	10.486
PensionEPS	70	-0.85	0.70	-0.12	0.218	-0.706	4.657

Year 2010 Only

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	70	0.50	50.15	11.88	10.044	1.545	2.820
BVCS	70	0.32	31.89	5.75	6.339	2.204	5.047
NPAS	70	-2.55	0.71	-0.31	0.522	-2.235	6.527
CoreEPS	70	-1.15	7.40	0.98	1.301	2.938	10.820
PensionEPS	70	-0.42	0.54	0.01	0.121	0.370	7.731

Key assumptions in the use of linear regression models

The data is analysed to determine the appropriateness of the Gaussian model or classical linear regression model (developed by Gauss as early as 1821) that is based on ten key assumptions (Gujarati, 2003: p.66-75):

A1 Linear regression model – the regression model is linear in the parameters;

A2 'X values' (or values taken by the regressor X) are fixed in repeated sampling – this means that X is 'nonstochastic';

A3 Zero mean value of random disturbance term $\boldsymbol{\varepsilon_{ti}}$ (in the models shown in 4.5 above);

A4 Homoscedasticity or equal variance of $\boldsymbol{\varepsilon_{ti}}$;

A5 No autocorrelation between the disturbances;

A6 Zero covariance between $\boldsymbol{\varepsilon_{ti}}$ and $\mathbf{X_{ti}}$;

A7 The number of observations **n** must be greater than the number of parameters to be estimated;

A8 Variability in X values – or simply the X values in a given sample must not all be the same;

A9 The regression model is correctly specified - so there is no specification bias in the model used in empirical analysis – for example, no important variables are omitted from the model;

A10 There is no perfect multicollinearity (no perfect linear relationships among the explanatory variables).

Applicability of linear regression models

The first assumption A1 is that there is a linear regression model and this is the subject of various testing below. Assumption A2 is considered to be satisfied in that the input data for the 'X values' are obtained from published audited annual reports of the FTSE 100 sample companies and the 'Y values' are the share prices recorded by Thomson Analytics and Datastream. Assumption A3 is one of the more difficult of the assumptions to test - the Jarque-Bera Test of Normality for example, should not be used for smaller samples (Gujarati, 2003, p. 149) – this rules it out for this study for as pointed out 350 firm years derived from 70 firms constitutes a relatively small sample.

Assumption A4 of homoscedasticity or equal variance of the residual terms or is also potentially quite difficult to establish – it has been pointed out that the detection of heteroscedasticity (to refute homoscedasticity) may be a less than objective process: "…in most cases involving econometric investigations, heteroscedasticity may be a matter of intuition, educated guesswork, prior empirical experience, or sheer speculation." (Gujarati, 2003, p. 401). Assumption A5 – no autocorrelation between the disturbances – is tested using the Durbin-Watson Test to produce the Durbin-Watson statistic or 'd statistic'. One of the assumptions in producing the 'd statistic' is that the error term is normally distributed (Gujarati, 2003, p.467). It is observed that the d statistics shown in the regression analysis below are all quite close to 2 – the d statistic can vary between 0 and 4 and a value of 2 means the residuals are uncorrelated. Assumption A6 – zero variance between the disturbance terms 'u' and the 'X terms' – must necessarily follow from Assumptions A2 and A3 since 'X values' are fixed in repeated sampling but the residual 'u' values are random and stochastic.

Assumption A7 is relatively straightforward since the number of observations is clearly greater than the number of parameters to be tested. Assumption A8 – variability in 'X values' – is also satisfied by the sample used in this research study. Assumption A9 – the regression model is correctly specified – is necessary to ensure that there is no 'specification bias' or error in the model used in the empirical analysis. The question arises about the functional form of the model, or whether the model is linear in the parameters, the variables or both (Gujarati, 2003, p. 73).

Finally, assumption A10 requires that there is no perfect multicollinearity. There is no unique way of detecting multicollinearity or measuring its strength (Gujarati, 2003, p.359) although a convenient method is to look at the pair-wise correlations among the regressors. Figure 4.3 (below) shows the correlations between all the regressors used in the Coronado and Sharpe (2003) based Opaque and Transparent Models.

Figure 4.3 Correlation Matrix for Regressors used in the Principal Models

	P	BVCS	NPAS	CoreEPS	PensEPS
P	1.000	0.631	-0.340	0.490	-0.021
BVCS	0.631	1.000	-0.384	0.544	-0.126
NPAS	-0.340	-0.384	1.000	-0.280	0.461
CoreEPS	0.490	0.544	-0.280	1.000	-0.004
PensEPS	-0.021	-0.126	0.461	-0.004	1.000

It can be seen from Figure 4.3 that the condition of 'no perfect multicollinearity' is satisfied.

4.5.2 Comparison of Transparent and Opaque models from 2006 to 2010

In the first phase of the regression analysis the Transparent and Opaque Models are compared over the full 5 year period from 2006 to 2010 and then for each individual year to determine any patterns in the results. As explained in Chapter 3 (Research Methodology) this research study finds that the Opaque Model is the more appropriate of the two models and to that extent is in agreement with the earlier studies based on the US market undertaken by Coronado and Sharpe (2003) and Coronado et al (2008).

The Transparent Model (Model 1) may be expressed as follows:

$$P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \varepsilon_{ti} \quad (1)$$

Model 1 is modified by adding the current period pension earnings per share, 'PensionEPS' to the Model 1 regression equation to form 'Model 2' which is described as the Opaque Model (shown below).

The Opaque Model (Model 2) may be expressed as follows:

$$P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti} \quad (2)$$

It was also pointed out in Chapter 3 that this study goes further in examining the significance of components of pension cost and pension returns, the impact of tax assumptions and the significance of gearing in the value relevance of the pension accounting information. It will be recalled that the new models developed in this study owe much to the Ohlson (1995) form of valuation model and may be considered as variations of the opaque model. The first set of model variations described as 'V1' to 'V5' include more pension cost and pension return components and in case of V3 the NPAS term is decomposed into two pension balance sheet components. The second set of model variations 'V6' to 'V10' include an analysis of gearing by including a long term debt term 'LTDS', and in the case of the model variations V7 to V10 by disaggregating the core net book value figure, 'BVCS' into the measures of total net assets, 'TNAS' and long term debt, 'LTDS'. The model variations are summarised below.

As can be seen in Figure 4.4 and Figure 4.5 below the Opaque Model performs better in that it has a higher Adjusted R^2 of 0.44 compared to 0.432 for the Transparent Model. Both models show variations over the period and the pensions components are less significant than the non-pensions components. Even in the years 2009 and 2010 when the Adjusted R^2 is 0.542 and 0.593 for the Opaque Model the pension components of NPAS and PensionEPS are not significant at the 0.10 level. Caution needs to be exercised as there is a significant intercept term and the sample size even for the five year term (350 firm years) is relatively small.

The Transparent and Opaque Models are considered separately over the five year period 2006 to 2010 as well as for individual years and the non-pension components and pension components from both the balance sheet and income statement (and statement of comprehensive income for actuarial gains and losses) are considered below the detailed regression data in Figure 4.4 and Figure 4.5 below.

The Transparent Model (Model 1) tested below is as follows:

$$P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \varepsilon_{ti} \quad (1)$$

Figure 4.4

	Regressions Testing the Transparent Model					
	Regression Outcomes					
	5YR	2006	2007	2008	2009	2010
Independent Variable Coefficients						
BVCS (β_1)	**0.81*** ** (0.08)	**-0.04** (0.37)	**0.72*** ** (0.18)	**0.45** ** (0.19)	**1.18*** ** (0.17)	**0.84*** ** (0.20)
CoreEPS (β_2)	**1.13*** ** (0.27)	**3.14** ** (1.26)	**0.65** (0.47)	**0.81*** (0.45)	**2.38*** ** (0.84)	**2.08** ** (0.98)
NPAS (β_3)	**-1.95** ** (0.87)	**-6.81** ** (3.11)	**-8.33*** ** (2.68)	**-2.52** (1.96)	**1.67** (1.61)	**-0.98** (1.59)
PensionEPS (β_4)	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Intercept (β_0)	**4.82*** ** (0.50)	**5.85*** ** (1.23)	**5.45*** ** (1.04)	**4.93*** ** (1.09)	**3.52*** ** (1.11)	**4.68*** ** (1.06)
Durbin-Watson	**1.921**	**2.236**	**2.176**	**1.643**	**1.635**	**1.831**
Adjusted R^2	**0.432**	**0.312**	**0.489**	**0.238**	**0.547**	**0.596**

Notes: *Standard errors are shown in brackets*
*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

In the Transparent Model the net pension asset component 'NPAS' is significant at the 0.05 level but it shows a negative sign which seems rather perverse since this would imply that a positive figure for net pension assets would have a negative impact on the share price while the opposite would hold for net pension liabilities. This might be interpreted as meaning that there is low confidence in reported pension assets and liabilities on the part of investors – so that compensating adjustments are made in forecasting to discount the negative effect of pension liabilities (perhaps viewing them as very long term) and discount the positive effect of pension assets (viewing them perhaps as volatile and only of very indirect benefit to the sponsoring company).

The Opaque Model (Model 2) tested below is as follows:

$$P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti} \quad (2)$$

Figure 4.5

	Regressions Testing the Opaque Model					
	Regression Outcomes					
	5YR	2006	2007	2008	2009	2010
Independent Variable Coefficients						
BVCS (β_1)	**0.81***** (0.08)	**-0.04** (0.37)	**0.71***** (0.18)	**0.45**** (0.19)	**1.20***** (0.17)	**0.90***** (0.21)
CoreEPS (β_2)	**1.03***** (0.28)	**3.13**** (1.27)	**0.59** (0.48)	**0.82*** (0.45)	**2.46***** (0.86)	**1.89*** (1.01)
NPAS (β_3)	**-3.06***** (0.97)	**-6.77**** (3.23)	**-8.83***** (2.78)	**-4.03** (2.47)	**2.31** (2.04)	**-1.52** (1.74)
PensionEPS (β_4)	**4.82**** (1.96)	**0.32** (6.99)	**5.30** (7.27)	**3.46** (3.43)	**-2.40** (4.61)	**5.82** (7.51)
Intercept (β_0)	**4.73***** (0.50)	**5.85***** (1.24)	**5.14***** (1.13)	**5.03***** (1.10)	**3.40***** (1.14)	**4.31***** (1.17)
Durbin-Watson	**1.956**	**2.236**	**2.214**	**1.644**	**1.627**	**1.843**
Adjusted R^2	**0.440**	**0.301**	**0.486**	**0.238**	**0.542**	**0.593**

Notes: *Standard errors are shown in brackets*
*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

A number of comments have already been made about the significance of components over the full five year period and the somewhat different results when looking at the pension components particularly in the years 2009 and 2010. Over the full five year period 2006 to 2010 the non pension components and the net pension asset term NPAS are significant at the 0.01 level while the pension earnings component PensionEPS is significant at the 0.05 level. The pattern of increasing Adjusted R^2 to 0.542 in 2009 and 0.593 in 2010 is evident (from an Adjusted R^2 of only 0.238 in 2008) but the pension components of NPAS and PensionEPS are not significant at the 0.10 level in either of the years 2009 and 2010. This suggests that further analysis could be interesting to try to explain this – for example, it might be useful to look at the extent of exposure to defined benefit schemes and see

whether this might have an effect on the relationship between reported figures and the share prices of the sponsoring companies.

4.5.3 Comparison of the Models and DB Pension Exposure

It may be recalled that in Chapter 3 (Methodology) it was mentioned that part of the analysis involves examining the data from the financial reports of the sample of FTSE 100 companies on the basis of their exposure to defined benefit or 'DB' pension plans. The categories are determined on the basis of gross pension liabilities rather than net pension liabilities (that take pension assets into account) – the reason for this is that this gives a guide to the real potential exposure rather than relying on the net asset (or net liability) position that may conceal the extent of the liabilities especially when the pension asset values happen to be high. The DB pension exposure categories are as follows:

- Companies with very high exposure to DB schemes (VH PL)
- Companies with high exposure to DB schemes (H PL)
- Companies with medium exposure to DB schemes (Mod PL)
- Companies with low exposure to DB schemes (Low PL)
- Companies with very low exposure to DB schemes (VLow PL)

The sample of 70 companies is divided into quintiles by measuring DB exposure. This provides 14 companies in each DB pension exposure category and so there are 70 firm years for each category. The sample of companies is summarised by exposure over the five year period in Appendix 5. The descriptive statistics are shown in Figure 4.6 (below).

Figure 4.6 Descriptive Statistics: Overall Sample and DB pension Exposure Categories

All Firms in FTSE 100 Sample from 2006 to 2010

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	350	0.50	59.90	10.22	9.112	1.997	5.364
BVCS	350	-0.16	31.89	4.88	5.482	2.106	4.406
NPAS	350	-2.62	0.71	-0.27	0.459	-2.454	7.500
CoreEPS	350	-6.81	11.60	0.83	1.597	1.095	11.481
PensionEPS	350	-1.85	0.70	-0.03	0.213	-2.802	19.415

VH PL

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	70	0.87	22.70	7.64	5.275	1.405	1.374
BVCS	70	-0.16	7.37	1.77	1.381	2.062	5.854
NPAS	70	-1.29	0.48	-0.29	0.396	-0.304	-0.114
CoreEPS	70	-0.71	4.37	0.60	0.671	2.973	14.022
PensionEPS	70	-1.15	0.70	-0.02	0.286	-1.135	3.458

H PL

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	70	0.50	21.19	8.63	5.902	0.337	-1.163
BVCS	70	0.15	9.05	3.20	2.141	0.659	-0.412
NPAS	70	-2.55	0.28	-0.43	0.514	-2.005	5.068
CoreEPS	70	-0.05	2.78	0.60	0.537	1.298	2.546
PensionEPS	70	-0.85	0.33	-0.06	0.242	-1.387	2.147

Mod PL

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	70	1.78	50.02	13.33	11.297	1.100	0.513
BVCS	70	0.66	31.89	6.29	7.199	1.769	2.302
NPAS	70	-2.62	0.71	-0.43	0.668	-1.863	2.675
CoreEPS	70	-0.18	7.40	1.40	1.707	1.741	2.250
PensionEPS	70	-1.85	0.68	-0.04	0.282	-3.743	24.959

Low PL

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	70	1.37	49.62	11.58	9.775	1.469	2.415
BVCS	70	1.65	25.85	7.49	6.174	1.319	1.103
NPAS	70	-1.44	0.10	-0.18	0.264	-2.650	8.377
CoreEPS	70	-5.41	5.70	0.88	1.761	-0.102	3.250
PensionEPS	70	-0.42	0.08	-0.02	0.080	-3.684	16.801

VLow PL

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	70	1.16	59.90	9.91	10.627	2.869	9.780
BVCS	70	-0.10	22.97	5.65	5.781	1.340	0.980
NPAS	70	-0.19	0.02	-0.01	0.038	-3.183	10.192
CoreEPS	70	-6.81	11.60	0.66	2.382	0.855	8.702
PensionEPS	70	-0.06	0.04	0.00	0.012	-2.252	12.486

In Figure 4.7 and Figure 4.8 the Transparent and Opaque Models are analysed over the full 5 year period from 2006 to 2010 for the different DB exposure categories.

The Transparent Model (Model 1) tested for different DB pension exposure is as follows:

$$P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \varepsilon_{ti} \qquad (1)$$

Figure 4.7

	Regressions Testing the Transparent Model					
	Regression Outcomes					
	ALL	VH PL	H PL	Mod PL	Low PL	VLow PL
Independent Variable Coefficients						
BVCS (β_1)	**0.81*** ** (0.08)	**1.26*** ** (0.37)	**1.28*** ** (0.35)	**-0.15** (0.24)	**0.52** ** (0.22)	**1.13*** ** (0.20)
CoreEPS (β_2)	**1.13*** ** (0.27)	**4.31*** ** (0.74)	**5.14*** ** (1.06)	**5.19*** ** (0.99)	**1.73** ** (0.66)	**-0.24** (0.46)
NPAS (β_3)	**-1.95** ** (0.87)	**2.15** (1.32)	**0.55** (1.20)	**-2.75** (1.78)	**-4.37** (4.42)	**-11.65** (29.31)
PensionEPS (β_4)	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Intercept (β_0)	**4.82*** ** (0.50)	**3.42*** ** (0.91)	**1.68** ** (0.76)	**5.84*** ** (1.04)	**5.39*** ** (1.50)	**3.53** ** (1.44)
Durbin-Watson	**1.921**	**1.629**	**1.685**	**1.814**	**2.085**	**1.770**
Adjusted R^2	**0.432**	**0.443**	**0.663**	**0.666**	**0.350**	**0.349**

Notes: *Standard errors are shown in brackets*
*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

The overall analysis for the Transparent Model reveals that the non-pension components of BVCS and CoreEPS are significant at the 0.01 level while the pension (balance sheet) component, NPAS is significant at the 0.05 level. The NPAS component is negative and similar points may be made as in the previous section about a possible interpretation for this seemingly perverse result. Looking across the DB pension exposure categories it can be seen that the highest adjusted R^2 is seen for the 'H PL' category at 0.663 and the 'Mod PL' at 0.666 with the very high exposure 'VH PL' category having a lower adjusted R^2 of 0.443. The analysis suggests anomalous results for the BVCS component in the Mod PL category and there are significant (at least at 0.05 level) intercept terms for all categories.

The Opaque Model (Model 2) tested for different DB pension exposure is as follows:

$$P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti} \quad (2)$$

The regression analysis for the Opaque Model is shown in Figure 4.8 (below).

Figure 4.8

	Regressions Testing the Opaque Model					
	Regression Outcomes					
	ALL	VH PL	H PL	Mod PL	Low PL	VLow PL
Independent Variable Coefficients						
BVCS (β_1)	**0.81***** (0.08)	**1.27***** (0.37)	**1.27***** (0.35)	**-0.12** (0.24)	**0.52**** (0.22)	**1.13***** (0.20)
CoreEPS (β_2)	**1.03***** (0.28)	**4.28***** (0.75)	**4.92***** (1.09)	**4.69***** (1.02)	**1.58**** (0.75)	**-0.32** (0.48)
NPAS (β_3)	**-3.06***** (0.97)	**2.02** (1.39)	**0.06** (1.32)	**-4.78**** (2.13)	**-6.20** (6.10)	**-31.70** (42.04)
PensionEPS (β_4)	**4.82**** (1.96)	**0.56** (1.82)	**1.73** (1.98)	**5.89*** (3.49)	**8.40** (19.17)	**85.98** (125.75)
Intercept (β_0)	**4.73***** (0.50)	**3.39***** (0.92)	**1.74**** (0.76)	**5.74***** (1.03)	**5.40***** (1.51)	**3.56**** (1.45)
Durbin-Watson	**1.956**	**1.635**	**1.750**	**1.863**	**2.115**	**1.793**
Adjusted R^2	**0.440**	**0.435**	**0.662**	**0.675**	**0.342**	**0.344**

Notes: *Standard errors are shown in brackets*
*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

The overall analysis for the Opaque Model reveals that the non-pension components of BVCS and CoreEPS and the balance sheet pension component NPAS are significant at the 0.01 level while the pension (income statement/other comprehensive income) component, PensionEPS is significant at the 0.05 level. Similar comments may be made as for the Transparent Model in that the coefficient for the NPAS component is negative and this may be consistent with the perceived need for counter adjustments or even low confidence of

relevance by investors and analysts. Looking across the DB pension exposure categories it can be seen that the highest adjusted R^2 is seen for the 'H PL' category at 0.662 and the 'Mod PL' at 0.675 with the very high exposure 'VH PL' category having a lower adjusted R^2 of 0.440.

As with the previous analysis of the Transparent Model, the analysis of the Opaque Model suggests anomalous results for the coefficient for the BVCS component in the Mod PL category and there are significant (at least at the 0.05 level) intercepts for all categories.

4.5.4 More pension cost and return terms and considering tax effects

An extension of the analysis seems justified, particularly if this permits an examination of the possible effects of tax and perhaps more importantly, a consideration of individual pension cost components. The analysis of individual pension cost components has been considered in previous literature, particularly in Barth, Beaver and Landsman (1992) and the idea of extending this further to combine balance sheet and income measures draws from the Ohlson (1995) model that was discussed in Chapters 2 and 3. The tax adjustment entails applying a standard corporation tax rate appropriate to the year under analysis rather than the actual tax rate since non-standard effective tax rates may be transitory and perhaps subject to reversals.

The more detailed analysis seems pertinent in view of the complex nature of the pension accounting with cost or pension return components that appear at various stages in the financial reporting for example, pension service cost per share (PSCPS) that is treated as part of payroll costs, interest cost (IntCostPS) and expected return on pension assets (ERPAPS) that appear as part of finance cost or finance income in the income statement and finally actuarial gains and losses (ACTGLPS) that appears in the statement of other comprehensive income. This accounting treatment is in accordance with the version of IAS 19 before it was revised in the form of new IAS 19 issued in June 2011 (but only mandatory for annual reporting periods beginning on or after 1 January, 2013). The new IAS 19 incorporates a number of new terms that replace the earlier forms but this clearly does not affect the current research that relates to accounting years no later than those

ending on 31 March, 2011. Analysis of the effects of the new IAS 19 would be an interesting post doctoral research topic (see Chapter 7).

The descriptive statistics for the extended models V1 to V10 are shown in Figure 4.9 (below). Correlation matrices are displayed in Figures 4.10 and 4.11.

Figure 4.9 Descriptive Statistics: Analysis of Pension Components and Gearing

All Firms in FTSE 100 Sample from 2006 to 2010

	Firm Years	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
P	350	0.50	59.90	10.22	9.112	1.997	5.364
BVCS	350	-0.16	31.89	4.88	5.482	2.106	4.406
TNAS	350	0.15	51.38	7.69	8.247	2.216	5.494
LTDS	350	-30.10	0.00	-2.81	3.870	-3.185	13.361
CoreEPS	350	-5.06	8.24	0.82	1.406	1.276	7.005
CorebPSCEPS	350	-5.06	8.25	0.84	1.415	1.279	6.886
NPAS	350	-2.62	0.71	-0.27	0.459	-2.454	7.500
PAS	350	0.00	12.77	1.90	2.265	1.684	3.136
PLS	350	-14.75	0.00	-2.17	2.553	-1.616	2.616
PensEPS	350	-2.56	0.81	-0.03	0.221	-4.891	50.719
ACTGLPS	350	-2.73	0.68	-0.04	0.221	-5.868	64.147
PSCPS	350	-0.25	0.27	-0.02	0.040	-0.704	14.577
IntCostPS	350	-0.41	0.00	-0.08	0.095	-1.451	1.373
ERPAPS	350	0.00	0.57	0.08	0.101	1.713	3.209

The correlation matrices for the models with more pension components and the gearing element are shown on the following page.

Figure 4.10 Correlation Matrix for Regressors used in Models with More Pension Components

	P	BVCS	PAS	PLS	NPAS	CorebPSCEPS	PSCPS	IntCostPS	ACTGLPS	ERPAPS
P	1.000	0.631	0.245	-0.279	-0.340	0.545	-0.189	-0.241	-0.028	0.221
BVCS	0.631	1.000	0.252	-0.292	-0.384	0.608	-0.266	-0.273	-0.139	0.250
PAS	0.245	0.252	1.000	-0.989	-0.566	0.371	-0.455	-0.955	-0.138	0.958
PLS	-0.279	-0.292	-0.989	1.000	0.682	-0.390	0.442	0.970	0.207	-0.953
NPAS	-0.340	-0.384	-0.566	0.682	1.000	-0.342	0.215	0.679	0.472	-0.569
CorebPSCEPS	0.545	0.608	0.371	-0.390	-0.342	1.000	-0.249	-0.366	-0.089	0.376
PSCPS	-0.189	-0.266	-0.455	0.442	0.215	-0.249	1.000	0.422	0.064	-0.466
IntCostPS	-0.241	-0.273	-0.955	0.970	0.679	-0.366	0.422	1.000	0.303	-0.976
ACTGLPS	-0.028	-0.139	-0.138	0.207	0.472	-0.089	0.064	0.303	1.000	-0.301
ERPAPS	0.221	0.250	0.958	-0.953	-0.569	0.376	-0.466	-0.976	-0.301	1.000

Figure 4.11 Correlation Matrix for Regressors used in Models analysing Gearing

	P	TNAS	LTDS	PAS	PLS	NPAS	CorebPSCEPS	PSCPS	IntCostPS	ACTGLPS	ERPAPS
P	1.000	0.573	-0.326	0.245	-0.279	-0.340	0.545	-0.189	-0.241	-0.028	0.221
TNAS	0.573	1.000	-0.829	0.292	-0.337	-0.434	0.505	-0.255	-0.313	-0.145	0.278
LTDS	-0.326	-0.829	1.000	-0.265	0.304	0.381	-0.215	0.166	0.280	0.112	-0.237
PAS	0.245	0.292	-0.265	1.000	-0.989	-0.566	0.371	-0.455	-0.955	-0.138	0.958
PLS	-0.279	-0.337	0.304	-0.989	1.000	0.682	-0.390	0.442	0.970	0.207	-0.953
NPAS	-0.340	-0.434	0.381	-0.566	0.682	1.000	-0.342	0.215	0.679	0.472	-0.569
CorebPSCEPS	0.545	0.505	-0.215	0.371	-0.390	-0.342	1.000	-0.249	-0.366	-0.089	0.376
PSCPS	-0.189	-0.255	0.166	-0.455	0.442	0.215	-0.249	1.000	0.422	0.064	-0.466
IntCostPS	-0.241	-0.313	0.280	-0.955	0.970	0.679	-0.366	0.422	1.000	0.303	-0.976
ACTGLPS	-0.028	-0.145	0.112	-0.138	0.207	0.472	-0.089	0.064	0.303	1.000	-0.301
ERPAPS	0.221	0.278	-0.237	0.958	-0.953	-0.569	0.376	-0.466	-0.976	-0.301	1.000

The pension cost component, PSCPS may be considered as part of payroll costs and not really a relevant pension cost for the purposes of the analysis so there are two alternative treatments: the core earnings may be considered either after deduction of the PSC cost with core earnings expressed as 'CoreEPS', or alternatively, core earnings may be taken before deduction of PSC with the relevant term in Figure 4.12 (below) expressed as 'CorebPSCEPS'. There are some reservations about this analysis for as shown in Figures 4.10 and 4.11 some of the regressors are highly correlated and this challenges the condition of 'no perfect multicollinearity'. For example, there is a high correlation between PAS and PLS – this may of course be expected in view of the need for the sponsoring employer company to top up pension assets if there is a deficit. There is also a high correlation between PAS and PLS and the return component ERPAPS and the interest cost component IntCostPS – again this might have been anticipated but there could be analytical problems that may require caution to be exercised in interpreting the results of the regressions.

The Base Case Model in Figure 4.12 is the Opaque Model with the actual tax rate. The first relevant comparison is between the Base Case and the first variation of the Base Case, 'Variation 1' or 'V1'. It may be seen in Figure 4.15 that V1 has an adjusted R^2 of 0.452 that is therefore higher than the Base Case adjusted R^2 of 0.440. V1 is used as the basis for the remaining variations 'V2' to 'V10'. The second variation 'V2' contains the decomposed pension cost or pension income/gain items, ACTGLPS, PSCPS, IntCostPS and ERPAPS. It may be seen in Figure 4.15 that the only pension cost/return component that is significant at the 0.01 level is ACTGLPS and in fact, none of the other pension cost / return items are significant at levels beyond even the 0.10 level. The other components, BVCS, CorebPSCPS, NPAS and the intercept term are all significant at the 0.01 level for V2 which has an adjusted R^2 of 0.450.

The models tested below are as follows and the results are summarised in Figure 4.12

Base Case : $P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti}$ **(2)**

Model V1 : $P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti}$

Model V2 : $P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \beta_{4C} IntCostPS_{ti} + \beta_{4D} ERPAPS_{ti} + \varepsilon_{ti}$

Model V3 : $P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_{3A} PAS_{ti} + \beta_{3B} PLS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \beta_{4C} IntCostPS_{ti} + \beta_{4D} ERPAPS_{ti} + \varepsilon_{ti}$

Model V4 : $P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \varepsilon_{ti}$

Model V5 : $P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \varepsilon_{ti}$

The results are summarised in Table 4.12 on the following page.

Figure 4.12

	Regressions with more pension components					
	Regression Outcomes					
	Base	V1	V2	V3	V4	V5
Independent Variable Coefficients						
BVCS (β_1)	**0.81***** (0.08)	**0.75***** (0.08)	**0.75***** (0.09)	**0.75***** (0.09)	**0.75***** (0.09)	**0.75***** (0.08)
CoreEPS (β_2)	**1.03***** (0.28)	**1.47***** (0.33)	**-** -	**-** -	**-** -	**1.50***** (0.33)
CorebPSCEPS (β_2)	**-** -	**-** -	**1.48***** (0.34)	**1.48***** (0.34)	**1.50***** (0.33)	**-** -
NPAS (β_3)	**-3.06***** (0.97)	**-3.08***** (1.00)	**-4.72***** (1.61)	**-** -	**-2.94***** (0.98)	**-2.92***** (0.97)
PAS (β_{3A})	**-** -	**-** -	**-** -	**-4.12**** (1.88)	**-** -	**-** -
PLS (β_{3B})	**-** -	**-** -	**-** -	**-4.59***** (1.62)	**-** -	**-** -
PensionEPS (β_4)	**4.82**** (1.96)	**5.32***** (1.91)	**-** -	**-** -	**-** -	**-** -
ACTGLPS (β_{4A})	**-** -	**-** -	**5.91***** (2.01)	**5.01**** (2.48)	**5.14***** (1.86)	**5.13***** (1.86)
PSCPS (β_{4B})	**-** -	**-** -	**2.27** (10.79)	**2.50** (10.81)	**3.04** (9.61)	**-** -
IntCostPS (β_{4C})	**-** -	**-** -	**32.06** (26.44)	**35.56** (27.05)	**-** -	**-** -
ERPAPS (β_{4D})	**-** -	**-** -	**23.71** (23.04)	**16.59** (25.72)	**-** -	**-** -
Intercept (β_0)	**4.73***** (0.50)	**4.70***** (0.49)	**4.96***** (0.55)	**4.96***** (0.55)	**4.75***** (0.51)	**4.73***** (0.49)
Durbin-Watson	**1.956**	**1.932**	**1.924**	**1.921**	**1.937**	**1.935**
Adjusted R^2	**0.440**	**0.452**	**0.450**	**0.449**	**0.450**	**0.452**

Notes: *Standard errors are shown in brackets*
*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

It has been pointed out earlier that the negative coefficient for NPAS that was seen in the earlier analysis of the Transparent Model and the Opaque Model and is also seen in the variations of the Base Case, V1 and V2, raises questions about this component and the

reliability of the coefficients from an analytical point of view. The variation 'V3' replaces the term NPAS with the separate pension asset and pension liability components described as 'PAS' and 'PLS'. Both coefficients are negative as may be seen in Figure 4.12 (above) and this is consistent with the seemingly perverse outcome already observed in respect of the coefficient for NPAS in the previous versions of the models.

The most likely interpretation remains that there is a negative adjustment process based on a lack of confidence in the reliability of this measure of pension assets or liabilities – it is difficult to prove this perspective by means other than qualitative research methods (see the discussions of Qualitative Research Evidence below). The coefficient for PAS is significant at the 0.05 level, the coefficient for PLS is significant at the 0.01 level and the coefficient for ACTGLPS is significant at the 0.05 level and none of the coefficients for the other pension cost / return terms are significant even at the 0.10 level.

The variations 'V4' and 'V5' involve reducing the model to more parsimonious forms with fewer pension cost / return terms. In the case of V4 the IntCostPS and ERPAPS terms are removed and this results in an adjusted R^2 of 0.450 which is slightly higher than V3, equal to that of V2 and slightly lower than V1 – the coefficient for ACTGLPS is significant at the 0.01 level and the coefficient for the PSCPS component is not significant even at the 0.10 level (see Figure 4.12).

In the case of V5 the only pension cost / return term is ACTGLPS for which the coefficient is found to be significant at the 0.01 level and the adjusted R^2 rises to 0.452, and as may be recalled, that is the same as for V1 which had a similar size of coefficient with a similar significance at the 0.01 level for the PensionEPS term. This seems to confirm that the most significant, indeed the only significant pension cost / return term is ACTGLPS. This may be considered to be a little surprising if there are concerns about the theoretical or even arbitrary nature of the valuation of pension liabilities. However, it makes more sense if we consider the potentially major influence that ACTGL – actuarial gains and losses – may have on the net pension assets or net pension liabilities figure in the balance sheet. If we consider this matter further we soon realise that when there is a significant net pension

liability or ‘deficit on the pension plan’ this has a direct impact on anticipated cash flows. This is the outcome of legal and commercial imperatives to restore the pension fund balance to a positive or near-positive position – a process that has been described as ‘deficit repair’ (a term used by informant ‘A7’ during a semi-structured interview –see below). This may be expected to require additional funding sourced through either cash flows from operations or external funding (for example, increasing gearing). Gearing is considered in the model variations summarised in Figure 4.13 (below).

4.5.5 Considering the effects of debt levels using regression analysis

Deficit repair requirements have a real impact on the cash flows and forecast liquidity position of a SponsorCo of a DB pension plan. If there are very large pension fund deficits then this may have a significant impact on the funding position of the SponsorCo and could even cause the company to have to borrow funds to repair the pension fund deficit. This can result in the somewhat bizarre situation that the SponsorCo has to increase its gearing with a potential impact on investor perception and future cost of capital in order to ensure that its pension scheme deficit is not too large. In the worst situation a SponsorCo might have to starve its operating business of important funding sources in order to manage the purely financial body of a ring-fenced pension fund. This pension fund is unlikely ever to benefit the SponsorCo directly and yet failure to keep a pension fund deficit within an acceptable limit (whatever that might be considered to be) could conceivably have a major impact on investor and wider stakeholder perception.

In the section discussing the model variations it was explained how the second set of models introduced a term for long term debt (shown as LTDS or long term debt per share in Figure 4.13 (below) in order to try to assess the effect of gearing on the market value of SponsorCo. Initially the core book value term is retained and then another term for total net assets described as ‘TNAS’ which incorporates short term debt but not long term debt, is introduced. It may also be recalled from the earlier discussion that BVCS may be decomposed to its separate components of TNAS and LTDS.

In Figure 4.13 (shown below) there is a summary of the regression results for all the different model variations that incorporate the long term debt term.
The models tested and summarised in Figure 4.13 are as follows:

Model V1 : $P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti}$

Model V6 : $P_{ti} = \beta_0 + \beta_{1A} BVCS_{ti} + \beta_{1B} LTDS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \beta_{4C} IntCostPS_{ti} + \beta_{4D} ERPAPS_{ti} + \varepsilon_{ti}$

Model V7 : $P_{ti} = \beta_0 + \beta_{1A} TNAS_{ti} + \beta_{1B} LTDS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \beta_{4C} IntCostPS_{ti} + \beta_{4D} ERPAPS_{ti} + \varepsilon_{ti}$

Model V8 : $P_{ti} = \beta_0 + \beta_{1A} TNAS_{ti} + \beta_{1B} LTDS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_{3A} PAS_{ti} + \beta_{3B} PLS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \beta_{4C} IntCostPS_{ti} + \beta_{4D} ERPAPS_{ti} + \varepsilon_{ti}$

Model V9 : $P_{ti} = \beta_0 + \beta_{1A} TNAS_{ti} + \beta_{1B} LTDS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \beta_{4B} PSCPS_{ti} + \varepsilon_{ti}$

Model V10 : $P_{ti} = \beta_0 + \beta_{1A} TNAS_{ti} + \beta_{1B} LTDS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_{4A} ACTGLPS_{ti} + \varepsilon_{ti}$

The results are summarised in Table 4.13 on the next page.

Figure 4.13

	Regressions with gearing and pension components					
	Regression Outcomes					
	V1	V6	V7	V8	V9	V10
Independent Variable Coefficients						
BVCS (β_1)	**0.75*** **	**0.76*** **	**-**	**-**	**-**	**-**
	(0.08)	(0.10)	-	-	-	-
TNAS (β_{1A})	**-**	**-**	**0.76*** **	**0.76*** **	**0.77*** **	**0.77*** **
	-	-	(0.10)	(0.10)	(0.10)	(0.10)
LTDS (β_{1B})	**-**	**0.03**	**0.79*** **	**0.80*** **	**0.81*** **	**0.81*** **
	-	(0.12)	(0.19)	(0.19)	(0.19)	(0.19)
CoreEPS (β_2)	**1.47*** **	**-**	**-**	**-**	**-**	**1.47*** **
	(0.33)	-	-	-	-	(0.33)
CorebPSCEPS (β_2)	**-**	**1.46*** **	**1.46*** **	**1.46*** **	**1.48*** **	**-**
	-	(0.35)	(0.35)	(0.35)	(0.33)	-
NPAS (β_3)	**-3.08*** **	**-4.77*** **	**-4.77*** **	**-**	**-3.03*** **	**-3.01*** **
	(1.00)	(1.62)	(1.62)	-	(1.01)	(1.01)
PAS (β_{3A})	**-**	**-**	**-**	**-4.15****	**-**	**-**
	-	-	-	(1.88)	-	-
PLS (β_{3B})	**-**	**-**	**-**	**-4.64*** **	**-**	**-**
	-	-	-	(1.64)	-	-
PensionEPS (β_4)	**5.32*** **	**-**	**-**	**-**	**-**	**-**
	(1.91)	-	-	-	-	-
ACTGLPS (β_{4A})	**-**	**5.95*** **	**5.95*** **	**5.02****	**5.19*** **	**5.18*** **
	-	(2.02)	(2.02)	(2.48)	(1.87)	(1.87)
PSCPS (β_{4B})	**-**	**2.30**	**2.30**	**2.55**	**2.98**	**-**
	-	(10.81)	(10.81)	(10.82)	(9.63)	-
IntCostPS (β_{4C})	**-**	**31.93**	**31.93**	**35.57**	**-**	**-**
	-	(26.48)	(26.48)	(27.09)	-	-
ERPAPS (β_{4D})	**-**	**23.69**	**23.69**	**16.22**	**-**	**-**
	-	(23.07)	(23.07)	(25.78)	-	-
Intercept (β_0)	**4.70*** **	**4.98*** **	**4.98*** **	**4.99*** **	**4.78*** **	**4.76*** **
	(0.49)	(0.55)	(0.55)	(0.55)	(0.52)	(0.50)
Durbin-Watson	**1.932**	**1.930**	**1.930**	**1.929**	**1.946**	**1.944**
Adjusted R^2	**0.452**	**0.448**	**0.448**	**0.448**	**0.449**	**0.450**

Notes: *Standard errors are shown in brackets*
*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

In Model V6 the coefficient for BVCS that is designated as β_{1A} is shown as 0.76 while the coefficient for LTDS that is designated as β_{1B} is only 0.03 – virtually zero - and is not significant even at the 0.10 level. This reflects the fact that the long term debt represented by the LTDS term is incorporated within BVCS so that LTDS is effectively redundant where BVCS is in the model. In V7 by contrast the coefficient for TNAS that is designated as β_{1A} is 0.76 and the coefficient for LTDS designated as β_{1B} is 0.79 and both of these coefficients are significant at the 0.01 level. Similar results are observed in model variations V8, V9 and V10 with coefficients for TNAS in a narrow range of 0.76 to 0.77 and coefficients for LTDS in the similarly narrow range of 0.80 to 0,81.

The pension cost and pension return terms are analysed for this second set of model variations and results are similar to those for the first set in that only ACTGLPS is found to have real significance. In V7 the coefficient for ACTGLPS designated as β_{4A} is found to be 5.95 and is significant at the 0.1 level – the other pension cost and pension return terms are not significant even at the 0.10 level. In V8 which decomposes BVCS into PAS and PLS terms, the coefficient for ACTGLPS designated as β_{4A} is found to be 5.02 and is significant at the 0.5 level (not the 0.01 level shown for V7). In V9 and V10 the coefficient for ACTGLPS is 5.19 and 5.18 respectively and in both cases it is significant at the 0.01 level. For all the model variation cases V6 to V10 there are very similar values for adjusted R^2 of around 0.450 which is also very similar to the results for cases V1 to V5.

In conclusion the regression results suggest that the level of debt is significant for value relevance analysis which is considered to be important in view of the potential impact of deficit repair obligations mentioned earlier.

4.6 Overall results of the regressions

There are a number of broad conclusions that may be made on the basis of the analysis. Based on the analysis using the multivariate regression models there is evidence that pension accounting information is value relevant although it is less value relevant than other accounting information. The performance of both forms of the model – transparent

and opaque – varies over the period the five years from 2006 to 2010 and across the five different DB pension exposure categories – from 'very low' up to 'very high'. The opaque models perform better than the transparent models but the difference is not as significant as suggested by the studies of Coronado and Sharpe (2003) and Coronado et al (2008).

The principal models that may also be termed parsimonious models perform better than the models that decompose the pension earnings per share PensionEPS into separate components. The performance of the model in terms of adjusted R^2 as well as standard errors with respect to the coefficients for independent variables is weakest for the year 2008 that is recognised as a year characterised by considerable equity market turbulence and serious credit uncertainty. The regression model performs best for the years 2009 and 2010 and for the 'moderate PL/BVC' and 'high PL/BVC' DB exposure categories. When the full five year period from 2006 to 2010 is analysed the conclusion is that the hypothesis of value relevance is not rejected either for the income statement components (and statement of other comprehensive income components) or balance sheet pension components due to the results of adjusted R^2 and the significance levels of the independent variable coefficients albeit there is some uncertainty about the applicability of the linear regression model and caution should be exercised due to the relatively small sample size. It is also observed that the relationship between the pension earnings and share price of the sponsoring company is not as 'clear cut' (based on this study of a sample of listed FTSE 100 companies) as it appears to be in some earlier studies, particularly those of Coronado and Sharpe (2003) and Coronado et al (2008) in their study of US listed firms. Analysis performed for separate years from 2006 to 2010 or for different levels of DB pension exposure also raises some questions about the extent of value relevance and it is conceded that caution must be exercised when interpreting the results as the samples taken for individual years and DB pension exposure categories are even smaller (70 firm years) than the relatively small overall sample (350 firm years).

4.7 Summary and conclusions

The quantitative analysis is performed using regression models using data obtained from the audited financial statements over the period 2006 to 2010 for a sample of 70 companies from the FTSE 100 and share price data obtained from Thomson Analytics. The analysis is based on 350 firm year observations. Referring to Research Question 1, there is evidence that pension accounting information is value relevant but the results suggest that in answer to Research Question 2 there is evidence that pension accounting information is less value relevant than other accounting information. It is found that over the five year period of this research study from 2006 to 2010 the regression coefficients are significant at the 0.01 level for all independent variables except for the coefficient for pension earnings per share 'PensionEPS' which is significant at the 0.05 level. Over the five year period there is an adjusted R^2 of 0.440. There is a noticeable decline in the significance of the pension accounting components NPAS and PensionEPS in the years from 2008 onwards even though there is a higher adjusted R^2 of 0.542 and 0.593 in the years 2009 and 2010 respectively. There is a particularly low value relevance result in respect of the accounting year 2008 when the adjusted R^2 reached its lowest point for the period of 0.238. The principal parsimonious models, 'Model 2' and 'Model V1' that have the independent variables BVCS, CoreEPS, NPAS and PensionEPS perform better than the models than decompose the pension variables into the separate components. The presence of relatively large intercept terms though a common feature in much of the value relevance research literature suggest that the results need to be treated with some caution and supports the view that a mixed methodology is a helpful contribution to the research literature.

Chapter 5

Analysts' perception of decision usefulness of pension accounting information

5.1 Introduction

This chapter addresses two of the research questions that were introduced in Chapter 1: Research Question 3 – "Is pension accounting information perceived to be decision useful?" and Research Question 4 – "Is pension accounting information perceived to be more or less decision useful than other accounting information?" The qualitative research that is undertaken with a view to answering these research questions takes the form of semi-structured interviews. The decision to use semi-structured interviews is considered and explained before proceeding to consider the detailed findings in the form of the responses by the informants. In this chapter the analysis of the informants' responses follows the sequence of themes in the questionnaire that was carefully designed to permit such a process. The themes fall into three broad areas: general themes to consider the perception of decision usefulness of financial reports; specific themes to determine the perception of decision usefulness and perception of relative usefulness of pension accounting information; and, the perceptions of audit and the role of auditors in the decision usefulness of pension accounting information and other accounting information. The findings from the semi-structured interviews provide another perspective that adds to the quantitative analysis in Chapter 4 and helps to provide insight into the matter of causality even where a relationship is found between the accounting numbers and equity market values.

5.2 Qualitative evidence – the use of semi-structured interviews

The role of investment managers and analysts and the need for investment decisions to be as far as possible 'rational' and 'well informed' has been outlined in the Myners Report (2001) – this policy concern coincides with a number of matters in this study of value relevance and the perception of decision usefulness of pension accounting information:

> "…it is a legitimate issue of policy concern to establish the extent to which institutions' approaches to investment decisions are: rational; well informed; subject to correct incentives; and as far as possible, undistorted."
> (Myners Report, 2001, p.4)

The qualitative evidence for this research is obtained from eight semi-structured interviews (see Appendix 5 for detailed notes). The decision to use semi-structured interviews is driven by the objective to benefit from the comparability and analytical potential of structured interviews as well as the potential insights from more open-ended or unstructured interviewing. In some respects semi-structured interviews may achieve the benefits of both structured interviews and more qualitative or unstructured interviews with the important feature of allowing probing of views and opinions "to explore subjective meanings that respondents ascribe to concepts or events" (Gray, 2009, p.373) as discussed in Chapter 3. The complex nature of pension accounting (an observation of all of the informants) seems to confirm the validity of the semi-structured interview as a research method. The feature of complexity and scope for the different interpretation of pension accounting items is also a justification for the careful selection of suitable 'key informants' (Tremblay, 1957) and therefore, all the interviewees in the sample are or have been in financial analytical roles.

The semi-structured interviews are undertaken by reference to a number of themes that are represented by quite broad questions in order to allow the informants to provide commentaries and reflections based on their experience in their own analytical roles. The themes are included in the questionnaire (see Appendix 4) which also acts like a broad agenda for the discussions in the semi-structured interviews. There are three broad areas covered: general themes; specific pension accounting matters; and, audit and the role of auditors as an aspect of the perception of decision usefulness. Studying the responses and discussions permits the development of a picture that helps to answer both Research Question 3 and Research Question 4. The questions and the responses and reflections of the informants are now discussed under these three broad headings.

5.3 General themes

5.3.1 Background to the 'general themes' and purpose of this analysis

The analysis in this and the following sections of this chapter is based very closely on discussions prompted by the Questionnaire for the semi-structured interviews (reproduced in Appendix 4). Discussions of the general themes with the key informants (or 'semi-structured interviewees') are designed to assess the general view of financial reporting and to highlight any concerns that may raise questions over the decision usefulness of that information – in short, this part of the investigation is to find out more about the 'perception of decision usefulness'. Ultimately the study is seeking to understand the extent of any relationship between numbers in financial reports and the share prices of the reporting entities in the face of many issues of measurement and causality.

The questions cover matters beyond the general nature of financial reporting such as the problems of complexity and the need for transparency, the extent and appropriateness of disclosures, the extent of possible supplementary information and how it is used and the analytical techniques that are applied to financial statements. It is also important to use the semi-structured interviews to try to assess how likely it is that analysts and investors would identify practices that could reduce value relevance such as earnings management and inadequate financial accounting information.

5.3.2 General usefulness of financial reports to investors/analysts

The first general theme concerns the general usefulness of financial reports to investors and analysts (see the Questionnaire in Appendix 4). The overall view expressed by the informants is that financial reports are very important. The feature of an independent audit report is a strong point in favour of financial reports which are the basis of analyst forecasting. There are some concerns that financial reports have become too 'standard' in format when it is the substance of the information that is of most interest to the users.

Informant A1 for example, expresses the view that financial reports permit a form of direct research when confidence has been adversely affected by a series of corporate scandals and market uncertainties since 2007:

"In the post-Lehman environment there is the view that it is important to undertake direct research rather than relying on other information such as that produced by for example, the credit rating agencies. Financial statements are a key starting point in the analysis". (Informant A1)

This view is supported by comments by other informants with further examples of comments as follows:

"Financial reports are the top of the list of information used, certainly from a corporate finance perspective, as they are the basis for valuing a company." (Informant A6)

"Financial reports are generally important to many analysts and investment professionals…" (Informant A7)

One aspect of the general usefulness theme concerns the degree of reliance that might be placed on formal financial reports. The danger of an uncritical approach was summarised by Informant A3 as follows:

"There is perhaps a false sense of security arising from published accounts – a bit like "seat belt danger" or thinking "I feel secure but should I be more critical?" – I would expect good analysts to understand this danger and strip away emotions." (Informant A3)

Analysts use financial reports for forecasting and identifying trends as explained for example, by Informant A4:

"Financial reports are very important for trend lines. This means using the statements as well as the notes and the overall reports……the detailed wording is boiler-plate and I doubt whether many analysts read through the report from front to back." (Informant A4)

This study concentrates on large listed companies from the FTSE 100 but one of the interviewed informants draws an interesting distinction between financial reporting by listed and unlisted companies:

*"Financial reports are generally useful …there are what might be called normal concerns, for example, although listed companies may have more standardised accounting this may not be the case with accounts for (unlisted companies or parts of listed groups)." (*Informant A5)

The overall conclusion in relation to the matter of general decision usefulness is that financial reports are indeed perceived to be decision useful on the whole by the sample of analysts.

5.3.3 Complexity, clarity and transparency of accounting information

The second of the general themes concerns the issue of complexity and considers the perception of clarity and transparency of the accounting information (see Questionnaire in Appendix 4). The general view is that complexity and clarity are not major problems on the whole but some sectors such as banking and insurance and items relating to pension accounting have inherent complexities and specialist assistance may have to be sought for analysis purposes. One of the messages coming across from the study is that the increasing the volume of disclosures does not necessarily increase transparency – this is succinctly expressed by one of the informants as follows:

"Fundamentally, transparency is good although there can be a large number of pages of detail – for example, five pages or more may cover the fundamentals (and) this may be confusing to some readers" (Informant A4)

On the matter of general usefulness of financial reports as distinct from the element of pension accounting, the following comment seemed to reflect the general mood of the informants:

"Accounting information is generally clear but in the case of pension accounting information it is too complicated." (Informant A5)

In concluding the discussion of this theme it seems that the objective of clarity and transparency might be more easily achieved in some areas of accounting than others, for example pension accounting that is specifically mentioned as a complicated matter.

5.3.4 Disclosures – extent and appropriateness

The third general theme considers the extent and quality of disclosures that are expected to have a major impact on the perception of decision usefulness (see Questionnaire in Appendix 4). The impression is that most of the informants would like to see more disclosure. The comments by the informants also suggest that concerns are not merely about the extent of information and the quality or clarity of the information in the disclosures could be improved. Informant A1 suggests that:

"….companies often hide behind the concept of commercial sensitivity of information based on the argument that they do not believe it is fair to be forced to reveal too much information to their competitors! This creates a tension between the interests of companies versus the needs of investors". (Informant A1)

The appropriateness of disclosures is challenged by some informants who see the disclosures as rather general and more concerned with mere compliance with standard accounting practice than information, for example:

"I would describe much of the disclosures as 'boilerplate' – the notes are in standard form and seem to be included simply because they have to be made in line with standard practice". (Informant A3)

"…there are some issues there [with fears of inadequate disclosure] and it is useful to supplement the information obtained from the financial reports." (Informant A6)

"There are different levels of disclosure and in a number of areas it is not terribly transparent." (Informant A7)

At a more specific level, the importance of information about cash flow and its determinants is highlighted by a number of informants and is summed up in the following identification of an important question:

"The key question is 'what is driving cash flow?' ". (Informant A2)

A number of informants raise the issue of the frequency of reporting and some question the usefulness of proposals to have more frequent reporting, for example informant A1 states that:

"Quarterly reports are not necessarily a good thing especially if it introduces too much volatility". (Informant A1)

In the midst of criticism about the extent and appropriateness of disclosures there is also acknowledgement that there have been some improvements over recent years and as one informant thoughtfully comments:

"There are more disclosures than in the past and certainly much more detail – Terry Smith in his book 'Accounting for Growth' referred to the problems in the past but transparency is much better now or at least the methodology is explained now." (Informant A4).

The overall conclusion from the discussions about accounting disclosures is that there is certainly room for improvement but there are also positive comments about the extent of improvement in transparency and explanations over the years.

5.3.5 Unpublished material and other supplementary information

If there are concerns about the extent and quality of financial reporting a question might arise whether this could be expected to increase the demand for unpublished material to supplement or even replace the financial reports. This is therefore, the subject of the fourth general theme for discussion (see Questionnaire in Appendix 4). The existence of private financial information will not necessarily mean that it will be used or that it will affect the level of trading and share prices. All the analysts included in this study agree that financial reports represent the most important form of information primarily because of the independent audit – as informant A1 puts it:

"…(financial reports are the most important form of information) because financial reports are audited and therefore, are considered to be reasonably unbiased and factual rather than reflecting too much sentiment of the company directors". (Informant A1)

Even though financial reports are widely acknowledged to be very important and perhaps the most important source of financial information, most of the informants say that information other than financial reports could be useful and is always sought – an example is information compiled from analysts' meetings as informant A1 says:

"…supplementary information is also collected from directors' presentations to analysts and further meetings and discussions and this helps to provide a picture of what is going on." (Informant A1)

This viewpoint is supported by the comments of several other analysts as follows:

"Supplementary information is usually obtained in presentations to analysts. There are also meetings with management. Sometimes these meetings reveal very little but on occasions they (the meetings) may be significant." (Informant A2)

"Supplementary information is necessary to try to work out what is in the heads of the CEO, CFO and the rest of the Board. Considering where the business is going is a bit like a police investigation. The process involves building on traditional analysis using ratios and determining creditor days and so on. So you have to do the (ratio) analysis and then dig holes." (Informant A3)

"A major part of the supplementary information results from direct discussions with the chairman and other board directors - a compliance officer will sit in the meetings with analysts. Transparency has to be balanced with the compliance restriction. The challenge for analysts is that they have to be more inductive than deductive and this is increasingly the case so that the judgement of analysts is more important than before." (Informant A4)

".....most public companies have analysts' reports that are directionally useful. It is also useful to look at key contracts and information that is contained in circulars that companies are required to issue to shareholders. Press comment is also in the list of information but it may only be directionally useful." (Informant A6)

The conclusion from the discussion of the theme relating to supplementary information is that financial accounting information is perceived to be very important and most important source but supplementary information derived for example from discussions with management is also considered to be useful and is very often sought on the basis of the discussions with the sample of analysts.

5.3.6 Analytical techniques applied to financial statements

The fifth of the general themes relating to the perception of decision usefulness of financial accounting information seeks to identify and aid discussion of the most useful analytical techniques applied to financial statements in the view of the informants (see Questionnaire in Appendix 4). This potentially offers a valuable insight into the way analysts actually use the information. The interviews indicate that a wide range of different metrics are used by different fund managers even within the same firm although there are a number of core techniques that seem to be universally employed. Specific measures include DCF, EV over sales, dividend yield and analysis of EBIT. Informant A1 comments that there is no one "magic bullet" and "…whatever analytical techniques are used it is always necessary to read the nuances".

The discussions with the informants reveal that a wide range of metrics and methodologies are used in the analysis of financial statements and more specific analysis may be required for pension accounting information (a point made for example, by Informant A7). The comments reveal an expected use of what might be termed 'classic' business school metrics with an increasing emphasis on cash flow (a sample of detailed comments is provided below):

"It is important to put in a decent amount of track record – I would suggest 10 years of report and accounts. The focus is on cash flow, net debt, operating cash flow, free cash flow, net assets, share capital, provisions and pensions. I look carefully at the relationship between the income statement and the balance sheet – for example, how does CAPEX relate to depreciation? I usually use a rolling 4 year basis for the analysis. I also perform tax analysis and concentrate on the cash payments of tax." (Informant A2)

"It is necessary to look at the company in the context of other companies in the sector. The first layer (historic) contains ratios and multiples – the usual ones – and comparables in the sector and the second layer contains forward looking financials constructed to forecast one year in the future, 2 to 3 years in the future and beyond with less weight beyond 3 to 5

years. Different sectors need different analysis. Ultimately cash flow is key – the business has got to be cash generative."
(Informant A3)

"The most important analytical techniques are concerned with the capital structure, cash flow and profitability. In the first place it is important to determine whether corporate gearing is appropriate. "Leverage" has become a pejorative term so loans are described more specifically and now "senior secured debt" sounds less dangerous! Going back to analytical techniques, P/E ratios are used while cash flow analysis will be performed before profit and loss analysis – profitability analysis is also performed but cash flow is more important." (Informant A4)

"The key analytical techniques are: P/E analysis; scrutiny of historic information; and, cash flow analysis primarily – the latter being the most important aspect of the analysis especially when it comes to forecasting." (Informant A5)

".....the main ones are P/E methods, EBITDA multiples of free cash flow and LBO analysis of the "target company" to assess its possible value and based on the forecasts and what it might be worth." (Informant A6)

In conclusion the discussion of the theme of analytical techniques reveal that familiar business school metrics including forecasts of income and balance sheets are widely used but there is an increasing emphasis on cash flow forecasting and a corresponding demand for specific cash flow information in the published audited financial statements leading to the observation that there is a deficiency of such information under existing international accounting standards applicable for the FTSE 100 companies.

This discussion of general themes is particularly useful in emphasising the rigorous approach of experienced analysts and the concern over a number of deficiencies in current financial reporting. Having said that the view that audited financial accounting information is perceived to be very important and in all probability the most important source of

information appears to support some previous views (Hines, 1982) and findings (Barker, 1998; Glaum and Friedrich, 2006) that financial reports are the most important source of information for investors. A major perceived deficiency however, is the inadequate levels of information on cash flow under existing financial reporting formats. The general themes are in evidence in the particular area of analysis of pension accounting information and this is addressed now in the next section.

5.4 Specific pension accounting matters

5.4.1 Background to the specific pension accounting themes

The discussion of the general themes is a very useful basis for the specific analysis of the perceived decision usefulness of pension accounting. The value of having a discussion of general themes first is that it provides a means of comparison and provides an understanding of the manner of analysis of such information by the key informants.

5.4.2 A comparison of the decision usefulness of pension accounting information and other accounting information

The first theme or question involves asking the informants to compare the decision usefulness of pension accounting information and other accounting information (see Questionnaire in Appendix 4). It is therefore, a direct means of providing information to answer Research Question 4. It also opens the way to discussing the specific features of pension accounting information that are necessary to understand the perception of decision usefulness and thereby help to answer Research Question 3. The common view by informants is that pension accounting information is less useful than other types of accounting information. This is a matter where comparison with the quantitative research conclusions may be useful. Value relevance appears to be less for certain types of pension accounting information so it is interesting if there is a corresponding signal from the qualitative research that suggests that the pension accounting information is also perceived to be less decision usefulness than other accounting information.

There is a major problem of confidence in the reported pension accounting figures and as informant A1 says:

"….there is a pseudo-accuracy introduced – this is most apparent in the emphasis on 'snap shots' when what is needed is a sense of the volatility – this is a major shortcoming of IAS 19". (Informant A1)

There are also concerns that pension accounting may be misleading for users of financial reports:

"There is a lot of information on pensions but the current pension disclosure is not really that helpful for estimating future cash commitments. Balance sheet information can be misleading or is not really meaningful enough."
(Informant A2)

"Pensions information is a lot worse (than general accounting information). In short it is a hidden minefield but it seems to be getting a lot more attention now (from the accounting profession / standard setters)."
(Informant A3)

"In the specific case of pensions it is harder to assess risk – it is a 'finger in the air job'. The complexity of pensions finance and accounting is an illustration of how a little information is more dangerous than none!"
(Informant A5)

"Yes (pension accounting information) is worse or at least, I would say that it is a particularly complex area of financial reporting. The (defined benefit) pension liability is quite different as it can't be looked at in the same way as debt which is usually presented with a breakdown between long-term and short-term debt and so on. There is even the feeling that only the pension trustees have the most relevant information and know what is going on!" (Informant A6)

"Pension accounting is immediately less relevant! Pension accounting is very confusing. Trustees, for example, consider many factors such as covenant assessment that is, the value of the sponsor (company) and the ability of the sponsor given its underlying capacity to support the scheme. The information provided for these purposes is not useful in fact it is misleading."
(Informant A7)

"Pension accounting information is definitely worse than other accounting information. In the majority of cases accounting information is definitive – it exists! Pension accounting is different – perhaps even a fantasy! Pension accounting brings companies into our (financial analysts') world which is about estimating the future."
(Informant A8)

There are also some interesting comments about the history of problems with pension accounting that might explain some of the scepticism about reported figures:

"There has been so much change in pension regulation. Regulations guide the reporting in the form of the numbers. Looking back over the years I found the so called "pension holidays" worrying intuitively."
(Informant A4)

A number of informants refer to a major problem of confusion over determining the most appropriate approach to valuation of liabilities which is highlighted by multiple (probably three) views of how to measure pension liabilities: the 'accounting view', the 'actuarial view' and the 'insurance view'. Informant A1 summarised the position very clearly and succinctly as follows:

"….the accounting view is based on the IAS 19 approach; the actuarial view differs from this and is presented in the tri-annual actuarial report and reflected in the pension fund accounts – but this information is not always made available to analysts; and finally, the

insurance view is in the form of a current buy-out value that may be negotiated between an insurance company and the pension scheme sponsoring company". (Informant A1)

There is general support for the need to clarify the approach to accounting for pension liabilities to help comparability and confidence.

In conclusion there is clear evidence from the semi-structured interviews with the sample of analysts that pension accounting information is perceived to be less decision useful than other accounting information. There are even reservations about whether pension accounting information may be described as decision useful at all – some analysts even describe aspects of it as 'misleading' or 'very confusing'. The discussion of the other themes in this section might help to determine whether some specific pension accounting information is perceived as decision useful in spite of the overall reservations.

5.4.2 Usefulness of balance sheet information compared to profit and loss information

The next theme looks at the relative usefulness of pension accounting information in the income statement and the balance sheet (see Questionnaire in Appendix 4). This discussion is directly pertinent to Research Question 3 as it considers the perception of decision usefulness of specific pension accounting information. The responses in the semi-structured interviews reveal interesting viewpoints on the relative importance of information presented in each of the financial statements or the notes. All of the informants emphasise the importance of cash flow information about DB pensions however in most cases they also indicate that such cash flow information is not always sufficiently clear or comprehensive. The overall view of the ranking of importance of information in the financial statements is cash flow then income statement (and statement of other comprehensive information) and in last place balance sheet. A selection of comments by informants is as follows:

"Balance sheet information is less useful than profit and loss information and indeed, the key information is really the cash flow but unfortunately this is not really clear under the current IAS 19 form of pension accounting".
(Informant A1)

"I have some issues with both balance sheet and profit and loss accounts – the balance sheet as mentioned may be misleading or lacks usefulness (due to volatility issue) – it is dependent on actuarial assumptions at the time such as interest rates used as a basis for discounting and other economic inputs. In terms of the profit and loss, there could be more information on the pension service charge – this would possibly provide more economic reality."
(Informant A2)

".....there is information about the position at a particular time (balance sheet) but it is also necessary to try to make sense of the information that might tell us about the ability of the company to generate cash flow to cover pension obligations in the future. This is the wider problem. This is exactly the same problem discussed earlier when we talked about financial reporting in general (so cash flow is key yet the information provided in the financial reports seems very rudimentary)."
(Informant A3)

"The balance sheet gives a 'quantum' of the position but doesn't tell you where it is going....."
(Informant A4)

"The tendency is to look at the liability to a large extent particularly when a buy-out of the fund is required as part of an acquisition (this is usually the case now).....After balance sheet analysis cash flow is more useful than the profit and loss."
(Informant A5)

"When valuing companies both are relevant. The balance sheet information helps to assess the liabilities and is very important when there are unfunded schemes. Balance sheet information is sensitive to input assumptions and some of these are understood to be subjective e.g. discount rates…..Cash flow is also very important and probably the most important consideration."
(Informant A6)

"There are major problems with balance sheet and P/L information. The balance sheet (information) is usually materially flattering while the P/L (income statements) includes returns on pension assets that are entirely fictional."
(Informant A7)

A number of informants also indicate their concern about the scope for earnings management or creative accounting – relevant studies covered in the literature include Kiosse et al, 2009; and Breton and Taffler, 1995.

Informant A1 sums up how the theoretical nature of aspects of pension accounting provides potential for manipulation and may diminish investor confidence especially in balance sheet figures:

"The balance sheet information is largely theoretical – for example choice of discount rate - and there is a real risk that it is distorted in an effort to make it consistent with the information in the income statement and the cash flow statement – these are like the corners of a carpet which are very difficult and in fact impossible, to pin down simultaneously so that when you pin two down the third springs up!"
(Informant A1)

"Looking at the B/S a key problem is that for the purposes of pensions accounting a common discount rate (the AA bond rate) is recommended yet this common rate is inappropriate if anything. The circumstances normally require a discount rate that is lower and normally a long way away from being a AA bond rate. Looking beyond the

balance sheet and profit and loss account the information that is required to assess cash flow needs to be sought and this requires looking carefully at the details (notes)."
(Informant A7)

One of the biggest concerns about pension accounting is the matter of pension liabilities and perhaps to a lesser extent the valuation of pension assets (since these may suffer from volatility). Informant A1 sees an interesting parallel in the valuation of property investment companies:

"There is something of an analogy in the accounts of property investment companies in which the property values in the balance sheet have to be taken with a pinch of salt – the balance sheet figures for pensions have to be viewed with great caution – actually this means there is far less use made of balance sheet figures than other information for analysis purposes in an effort to identify cash flow effects".
(Informant A1)

To conclude the discussion of this theme it appears that balance sheet information is considered to be the least useful and there is considerable need for analysis and interpretation (probably with adjustments and restatement of figures). In spite of the negative comments about the decision usefulness of pension accounting information there is the hint that some of the information may be used as 'raw material' data inputs for useful analysis – nevertheless, there are clear misgivings about the current form of pension accounting information.

5.4.3 The usefulness of notes to accounts and possible improvements

The third specific pension accounting theme concerns the usefulness of notes to the accounts (see Questionnaire in Appendix 4). The extent and quality of accounting including disclosures has been the subject to numerous studies in the literature for example, in the context of analysts' reaction to accounting information.

Most of the informants express the view that the notes to the accounts could be improved for example, by providing more cash flow information about pensions.
Some specific comments are as follows:

"Basic assumptions are indicated but it still requires significant interpretation."
(Informant A2)

"The pension note contains quite a lot of information but it (the IAS 19 format) doesn't deliver clarity. You would need the CFO to explain. There is a relatively simple presentation but there is a high degree of complexity behind it. There is a danger in implied simplicity that isn't really there. A subject like pensions accounting lends itself to probabilistic analysis and perhaps needs algorithms to answer questions about inter-relationships."
(Informant A3)

"I'm not sure how important the narrative is. The important question is what is the quantum of the liabilities and what is the effect on the (sponsoring) company. It is important to determine the cash flow impact…"
(Informant A4)

"Deficit repair is a cash flow item – you can get the cash flow information but often you can't get the length of the recovery plan as details are not in the accounts – so this is a problem (if you want to perform a more detailed analysis of the pension funding and obligations going forward)."
(Informant A7)

"In their present form the pension accounting notes are not useful enough. They are not comprehensive and detailed information – as inputs – is severely lacking. What needs to be there is: information on the allocation (and detail) of pension assets; the assumptions

beyond the basic actuarial assumptions; and, a summary in the form of a specific pension accounting financial report."
(Informant A8)

The conclusion to the discussion about notes for pension accounting information is that current information levels could be improved particularly regarding information about cash flow effects of DB pensions.

5.4.4 The most useful analytical techniques for pensions accounting information

The fourth theme considers analytical techniques at the level of specific pension accounting information – rather than at the general level of financial statements discussed earlier (see Questionnaire in Appendix 4). Some informants appear to produce their own financial models for pensions with the assistance of an actuary. Other informants indicate that the main objective is to identify operating performance as distinct from purely financial aspects such as pensions. Another point that emerges is that forecasting the cash flow implications of DB pensions seems to be considered to be more important than analysing the balance sheet pension accounting figures. The following comments present a picture of the approach to analysis of pension schemes:

"There isn't an attempt to model pensions per se – the approach is to look at sensitivity in the financial reports and also try to separate operating EPS. It is considered necessary to de-compose the assets and liabilities for example to find out how big are the liabilities as a percentage of market value".
(Informant A1)

"I use ratio analysis for example, gross liabilities to market capitalisation. I try to work out Free Cash Flow and work out EV (enterprise value) to reflect th pension liability – for EV purposes I tend to use the most recently reported deficit figures (PA – PL)."
(Informant A2)

"In view of the constraints of the information (discussed earlier) I seek to look at the information that the trustees have got and as far as possible try to see how the actuaries are viewing the growth of the asset pool and other matters affecting the liabilities, particularly life expectancies. It is necessary to look behind the statements."
(Informant A3)

"....metrics used include P/E analysis, EBITDA multiples of free cash flow and LBO analysis – all of these will include adjustments to take account of the cost and net liabilities associated with pensions."
(Informant A6)

"The most useful analysis is the process of looking at the valuation to derive 'enterprise value'. Just like analysts adjust for debt, the pension fund is just another creditor of the company so it needs to be deducted from the real underlying value to produce a net position."
(Informant A7)

"Specific techniques need to be used for companies with significant current or potential pension exposures: a detailed breakdown of investments; maturity profile of the pension liability; and, some sense of the duration of the liability."
(Informant A8)

To conclude the discussion of the analytical techniques used for pension accounting information it is interesting that in nearly all cases the analysts make use of the available information – in one case there is the suggestion of using information used by the trustees – so that there is the expectation that analysis may be performed through adjustment of assumptions if necessary. There is therefore, the indication that information may be decision useful even if it is not entirely appreciated by analysts who (probably with justification) point out that there are defects in the existing levels of disclosure and transparency. Perhaps there is an indication that pension accounting information is perceived to be decision useful even if it is less decision useful that other accounting

information. A major concern however, is that there is the potential for confusion when trying to interpret pension accounting information in the present form and presentation of pension accounting information (i.e. under the requirements of IAS 19).

5.4.5 The major problems with pension accounting and financial reporting

The fifth pension accounting theme amounts to a question posed to the informants to suggest the major problems that they have identified with the use pension accounting information (see Questionnaire in Appendix 4). The major problems identified by the informants (on the basis of the request) are as follows:

- Firstly, there is very poor information about real cash flows;
- Secondly, there is a gap (or difference) between the actuarial, accounting and insurance / buy-out measures – put another way there is potential and real confusion about the measurement of pension liabilities; and,
- Thirdly, there is the use of the notional interest charge and its impact on the EPS figure and the danger that it has an influence on decisions.

One of the major areas of uncertainty or confusion seems to be in the selection of the discount rate and this has a major bearing on the analysis of current and possible future liabilities. A number of comments are made by informants about the volatility of pension measures and the desire to try to assess the likely cash flow impact on the companies that have to sponsor DB pension schemes – especially when these are schemes with potentially large exposures relative to the size of the sponsoring companies. The requirement for interpretation and analytical subjectivity with all its undesirable aspects is a concern articulated by several informants in this study.

5.4.6 The extent of use by analysts of the services of a qualified actuary, either in house or external

In view of the technical nature of pension accounting information it was considered that there might be extensive use made of the services of qualified actuaries. This question

forms the sixth theme for discussion in the specific pension accounting section (see Questionnaire in Appendix 4). Perhaps a little surprisingly, given the complex nature of the topic and the observation that accounting practices are in some ways inadequate in most cases informants reveal that there is no actuary or similar specialist in their teams. It appears that actuaries would only be required in exceptional circumstances for example, when there is a need for a valuation during a corporate takeover. The largest firms may have in-house actuaries but it is more likely that actuarial services would be obtained on short term contracts rather than employed full time. If there is ever a need for the advice of an actuary or similar specialist on a very technical matter, such services are most likely to be sought on a consultancy basis probably by the hour.

5.4.7 Use of actuarial reports and other specific actuarial information

The final theme in the specific pension accounting area concerns the use of actuarial reports by analysts (see Questionnaire in Appendix 4). In general informants indicate that there is no use or very little use made of actuarial reports or other actuarial information and the audited accounting information in the financial reports is the main (or only) information. The exception seems to be where there is mergers and acquisitions activity (including private equity deals) when there is the strong likelihood of a buy-out or transfer of the entire defined benefit pension scheme requiring the involvement of at least one team of actuaries and probably two actuarial advisers (buy-side and sell-side) along with an insurance buy-out or buy-in department undertaking due diligence.

5.5 Audit environment and auditors

5.5.1 Background to audit environment and auditors

In view of the importance of the research into the relative importance of the preferred sources of pension accounting information the question of audit forms the third broad area of decision usefulness research in this PhD. It is considered important to try to assess the role of the audit opinion in securing the position of financial reporting information –

specifically the annual report – as the most important source of information for the analyst. The role of the auditor and possible issues in relation to the specific problems of pension accounting information is also discussed.

5.5.2 General audit environment

The first theme concerns the general audit environment and informants are given time to express their views on the role and importance of audit in terms of their perception of the decision usefulness of financial reporting information (see Questionnaire in Appendix 4). Informants do not appear to be cynical about auditors or the role of the auditor but there are indications that overall confidence has decreased as a consequence of the financial crises following 2007. A number of informants also reveal concerns about the problems of ensuring auditor independence and the potential for "consultancy bias". Several particularly pertinent comments are made on this topic with examples as follows:

"Following the banking crisis the view is that you have to be a bit wary as it appears that there is scope for (auditor) independence to be compromised…The extent of client fees for audit and other services such as tax consultancy is considered to be a potential problem and even a conflict".

(Informant A1)

"I have some concerns about whether auditors challenge subjective valuations – associated with possible overstatement of profits……I also have concerns about 'overly aggressive' results by companies - again there is a question mark over whether auditors challenge client company management."

(Informant A2)

"There is a lot of 'stretch' when it comes to being more or less critical of a company – by this I mean that it seems possible to be in compliance with the rules and yet the financial reports still do not necessarily give users all the information they need."

(Informant A3)

"I am not that concerned generally but I feel that major conflicts of interest would be concerns for investors and analysts. I do suspect there is a problem. I have identified some confusion between the accounting standards and the intended outcomes."
(Informant A4)

"I have what I expect might today be called "normal concerns" with some aspects of standardised accounting. In fact when in comes to private companies as distinct from large listed companies there won't necessarily be standardised accounting so that there is more need for discussions to clarify certain items in the financial reports."
(Informant A5)

"I feel comfortable relying on audited accounts in normal circumstances – only in circumstances when for example, the auditor is small relative to the client would there be a possible cause for concern."
(Informant A6)

"The potential lack of audit independence or bias is only a concern if the audit doesn't come up to standard. In reality fraud is difficult to spot. Creative accounting is another matter – again it may be difficult to identify but fundamental analysis aims at achieving a greater understanding. The process may be complicated as auditors are all part of the creation! There are only rare cases of auditors contesting creative accounting."
(Informant A8)

In conclusion the general view of the audit and auditors is relatively favourable and there is a lack of cynicism in spite of the years 2006 to 2010 coinciding with a very turbulent financial environment with greater risk exposure for auditors.

5.5.3 Specific pension audit environment

In each semi-structured interview the informant is asked if there are concerns about the audit of pension information and disclosures and (if there are) whether these concerns are greater than in the general case (see Questionnaire in Appendix 4). Not all informants feel

able to express a view on the audit of pension accounting information either at the level of the sponsoring company or the pension fund. Some informants do indicate that given the concerns about auditor independence and the complexity of pension accounting information, there could be additional problems associated with the reliability of audited accounts and the tendency for investors to place reliance on such information.

Informant A1 expresses a particularly interesting viewpoint on this matter:

"Pension accounting is problematic but probably not the major issue – or any worse than the general concerns about auditing. Nevertheless, it has been observed that companies are under pressure to reduce deficits and they can do that by 'fair means or foul' – there is scope for subjective analysis for example in the choice of discount rates and it is not clear how such inputs are audited".
(Informant A1)

Further useful comments about concerns about the audit of pension accounting information (including disclosures are as follows:

"Although there are some concerns about pensions accounting……it is appreciated that pensions are very long term……..I believe that there should be more of a focus on converting profits into cash – auditing should reflect this important area of accounting."
(Informant A2)

"It would provide more comfort to users if there were more references to specific pension information – rather than imply that the user of the accounts should look at the actuarial reports as a separate exercise…….Accounting for pensions is a key area of financial reporting of (sponsoring) companies and this specific matter underlines the need for greater risk reporting in financial reports."
(Informant A3)

I would expect auditors to defer to their experts for there are specialist in-house divisions in big firms such as Deloittes……I wouldn't expect auditors to have specific in-depth knowledge of very specialist technical subjects – such as pensions or financial instruments. A key problem concerns the valuation of assets or liabilities which don't have a natural market. As a general remark it may be said that people don't think about pensions unless they have to! The problem is not going to go away.
(Informant A4)

"The concerns are even greater when it comes to pensions accounting given the greater complexity and apparent scope for subjective arguments in measurement."
(Informant A5)

"….(defined benefit) pensions are more complicated so I would expect that the auditor also has to rely on specialist input and actuarial conclusions as the basis for the report."
(Informant A6)

"The big firms have specialised pension departments with actuaries involved so they should be well aware of the reporting and auditing obligations."
(Informant A7)

"In the case of the pension accounting the auditor is really beholden to the scheme actuary. The likelihood is that audit work is based more on compliance with the relevant law and applicable accounting standards than any extensive questioning of measurement or valuation. "
(Informant A8)

In conclusion there are indications that the analysts perceive auditors as having a greater challenge when it comes to pension accounting than other accounting information. As such the confidence in pension accounting information is lower even though the unqualified audit opinion is still a strong feature in the perceived reliability of the annual report as an information source.

5.6 Summary and conclusions

The qualitative analysis based on semi-structured interviews with analysts provides evidence that pension accounting information is used by analysts and is perceived to be decision useful albeit with reservations. On this basis the answer to Research Question 3 is that pension accounting information is perceived to be decision useful although this is qualified by saying that there could be improvements in clarity and transparency. Decision usefulness may be implied through use of the pension accounting information and yet the comments of the analysts also suggest that pension accounting disclosures are neither comprehensive nor comprehensible enough in the view of some analysts. On the basis of the evidence provided in the semi-structured interviews with analysts in the sample the answer to Research Question 4 is that pension accounting information is perceived to be less decision useful than other accounting information.

Chapter 6

Value relevance and the perception of decision usefulness of pension accounting information: A comparison of findings

6.1 Introduction

The value relevance and the perception of decision usefulness of accounting information are two aspects of accounting that may be considered separately – as in the academic literature to date – or together as in this PhD thesis to investigate whether value relevance and perception of decision usefulness are related. If the perception of decision usefulness is the behavioural aspect of value relevance then a comparison of findings relating to both aspects might be expected to reveal convergence and consistency in the results. This chapter summarises the findings from both the quantitative analysis of value relevance (from Chapter 4) and the qualitative analysis of the perception of decision usefulness (from Chapter 5).

The mixed methodology research strategy that is adopted in this PhD relies very much on the concept of triangulation – hence the name given to it is EAT or extended adapted triangulation strategy. Triangulation is a critical part of the process as it involves comparing the quantitative and qualitative databases to determine whether there is convergence or differences and contradictions or indeed, some combination of these outcomes. The EAT strategy is an extension and adaptation of the 'concurrent triangulation strategy'. The databases are assembled over an extended period of around a year and the process has perhaps more in common with the concurrent strategy since it does not occur merely in two phases. On the other hand it may be seen as an extended sequential process or a lengthened concurrent data collection procedure. In practice there is scope for the quantitative analysis and the qualitative analysis to be adapted in response to evidence and further questions arising in the other form of analysis.

6.2 The findings

6.2.1 Application of the EAT (extended adapted triangulation) strategy

It is appropriate to consider the findings for the research questions in accordance with the triangulation strategy or 'EAT'. Therefore, the findings for Research Question 1 ("Is pension accounting information value relevant") should be considered along with the findings for Research Question 3 ("Is pension accounting information perceived to be decision useful?"). On a similar basis there is an expected association between the other research questions. Therefore, the findings for Research Question 2 ("Is pension accounting information more or less value relevant than other accounting information?") should be considered along with the findings for Research Question 4 ("Is pension accounting information perceived to be more or less decision useful than other accounting information?"). The EAT process is considered in detail in the following sections.

6.2.2 Findings in relation to Research Question 1 and Research Question 3 (pension accounting information)

This research provides evidence that pension accounting information is value relevant on the basis of the quantitative analysis. Value relevance is suggested in the first place on the basis of the regression analysis with an adjusted R^2 of 0.440 for the 'Base Case' model (see Table 6.1 below) over the period 2006 to 2010 that demonstrates a slightly stronger association than the recent US study by Werner (2011) with an adjusted R^2 in the range of 0.342 to 0.343 for an 'equity model' but a weaker result than Hann et al (2007) who find an adjusted R^2 in the range of 0.551 to 0.573. It is a much weaker level of value relevance than that found in the study by Coronado et al (2008) which shows an adjusted R^2 in the range of 0.922 to 0.934.

The coefficients for balance sheet items for DB pensions whether NPAS (net pension asset per share) or decomposed items, PAS (pension asset per share) and PLS (pension liabilities per share) are significant over the five year period but there are mixed results for individual years – see the points on difficult market circumstances made earlier. It is noted that the coefficients are negative which at first sight may seem perverse but an alternative

interpretation is that such an outcome is consistent with compensating investor analysis so that investors make adjustments to the accounting numbers to reflect their own risk analysis. This is supported by the qualitative research that suggests quite a good understanding of pension accounting. There is also the possibility of distortion in market prices due to the turbulent economic and market circumstances over the period of the analysis. The 'Base Case' model results are summarised in Table 6.1 below.

Table 6.1

	Regressions Testing the Opaque Model					
	Regression Outcomes					
	5YR	2006	2007	2008	2009	2010
Independent Variable Coefficients						
BVCS (β_1)	**0.81***** (0.08)	**-0.04** (0.37)	**0.71***** (0.18)	**0.45**** (0.19)	**1.20***** (0.17)	**0.90***** (0.21)
CoreEPS (β_2)	**1.03***** (0.28)	**3.13**** (1.27)	**0.59** (0.48)	**0.82*** (0.45)	**2.46***** (0.86)	**1.89*** (1.01)
NPAS (β_3)	**-3.06***** (0.97)	**-6.77**** (3.23)	**-8.83***** (2.78)	**-4.03** (2.47)	**2.31** (2.04)	**-1.52** (1.74)
PensionEPS (β_4)	**4.82**** (1.96)	**0.32** (6.99)	**5.30** (7.27)	**3.46** (3.43)	**-2.40** (4.61)	**5.82** (7.51)
Intercept (β_0)	**4.73***** (0.50)	**5.85***** (1.24)	**5.14***** (1.13)	**5.03***** (1.10)	**3.40***** (1.14)	**4.31***** (1.17)
Durbin-Watson	**1.956**	**2.236**	**2.214**	**1.644**	**1.627**	**1.843**
Adjusted R^2	**0.440**	**0.301**	**0.486**	**0.238**	**0.542**	**0.593**

Notes: *Standard errors are shown in brackets*
*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

Value relevance is indicated for core and pension assets and liabilities and core and pension costs and returns in the overall five year period regressions. Looking at individual years, regressions performed for 2006 and 2008 have poorer results than the other years. The level of pension exposure has an impact on the regression analysis with higher adjusted R^2 for the samples with 'moderate' and 'high' DB pension liability exposure. The adjusted R^2 is somewhat lower for the samples with low or very low DB pension liability exposure and perhaps a little strangely, the sample with very high DB pension liability exposure – this is discussed in detail in Chapter 4. Some caution needs to be exercised in interpreting the

results as there are 350 firm years in the five year sample but clearly quite small samples of 70 firm years for the individual years and exposure categories. Further regression analysis of pension cost and return components suggests that the ACTGLPS term (actuarial gains and losses) is the most significant of all the pension cost and return terms. ACTGLPS is considered to be a proxy for cash flow information. On the basis that the ACTGLPS figure has a significant impact on deficit repair obligations this is consistent with the conclusion of the qualitative research that cash flow effects of DB pensions are the most important signals and the information is decision useful for analysts and investors (see Chapter 5). Cash flow information is in general not considered to be adequate by the informants in the semi-structured interviews.

It is necessary to exercise caution in the interpretation of the statistical results due to the sample size constraint and this is also an issue with many of the prominent pension accounting value relevance studies such as Daley (1984), Landsman (1986), Dhaliwal (1986), Barth et al (1993) and Choi et al (1997). There are also relatively large intercept terms that is again a common issue with many studies including the recent major pension accounting value relevance studies such as Hann et al (2007), Coronado et al (2008) and Werner (2011).

Unlike the other value relevance studies however, this research seeks to overcome the shortcomings of the purely quantitative methodology by extending the research using a mixed methodology approach. There is the potential for value relevance analysis to imply less decision usefulness than is strictly the case – for example, if there is significant further processing by analysts and investors of the reported numbers which is described as the processing of raw accounting data (Barker, 1998). This also underlines the importance of Research Question 3 relating to the perception of decision usefulness. The semi-structured interviews reveal that pension accounting information is perceived to be decision useful but there are reservations. The perception revealed by a number of informants is that the pension accounting information is too complex and it is too difficult to extract the most important decision useful information about cash flows. Several informants comment that a significant amount of the important pension accounting information is embedded in

lengthy disclosures. There is also evidence that pension accounting information is perceived to be decision useful although the latter point needs to be qualified since the semi-structured interviews reveal serious misgivings on the part of the informants about the difficulty of extracting the relevant information. The qualitative analysis provides evidence of a good level of understanding by analysts suggesting that there is a high chance that analysts are able to assess the impact of important specific assumptions in particular discount rates. Particular concerns are revealed about the form of pension accounting and relate to complexity and the lack of sufficient information about cash flows although useful information could still be extracted with some effort. This is consistent with the view that accounting has a role in providing information as an input to users' analyses and decision models rather than providing a 'decisive valuation' (Whittington, 2010).

There is an example of convergence on the matter of cash flow information. In particular, in the semi-structured interviews greater significance is given to cash flow information than accounting information in either the balance sheet or the income statement. Overall it can be concluded that most of the informants feel that further cash flow information about DB pensions should be disclosed in the financial reports. As already indicated the ACTGLPS term is the most significant term in the regression analysis (or the most easily interpreted as a relevant term) which seems consistent with the conclusion that cash flow is important. Again, to confirm some of the viewpoints expressed in section 5.3, this may be interpreted as meaning that the market views ACTGLPS as 'directionally useful' information, for example high actuarial gains in any accounting year reduce the pressure for large contributions by the sponsoring company into the pension fund. Alternatively, large actuarial losses in a particular year may significantly increase a pension fund deficit requiring 'deficit repair' contributions by the sponsoring company into the pension fund. Therefore, ACTGLPS that may prima facie be considered to arise from quite theoretical assumptions that are in some cases arbitrary (or subsequently proved to be wrong) has the potential to have major cash flow implications. This leads us to conclude that certain information may be perceived to be decision useful even if it subsequently proves to be inaccurate or simply wrong! The problem is that we really don't know under current pension measurement and accounting.

There is further convergence in the research in the sense that the responses to relevant questions in the semi-structured interviews and the regression analyses all strongly suggest that extensive use is made of the detailed disclosures of pension accounting information in the audited financial reports. This perception of decision usefulness is associated with the expectation that it is necessary to probe into the detail of the notes – consistent with the comments of several of the informants - to try to ascertain the relevant cash flow information. There is also convergence in the matter of perceived complexity and the confusing nature of some of the pension accounting information particularly when there are very turbulent periods. As indicated in Chapter 5 the overall period 2006 to 2010 witnessed turbulence in equity markets and that may have contributed to the lower significance of coefficients for certain pension accounting terms and lower adjusted R^2 in the years 2006 and 2008. The coefficients for the main terms are significant over a five year period.

An example of an unusual or even anomalous result is in the case of the regression results for pension accounting items in the balance sheet. It is found that NPAS and in another case the coefficients of the decomposed versions PAS and PLS are significant at the 0.05 and 0.01 levels respectively but the coefficients are negative. The negative coefficients initially may seem counter-intuitive – as they suggest that the higher the PAS or NPAS the lower the share price and conversely, the higher the PLS or lower the NPAS (including negative figure or net liabilities) the higher the share price. This may also be seen to indicate that the market effectively re-assesses the reported financial accounting information particularly in volatile market conditions and takes the opposite view – effectively, concluding that high pension assets don't benefit the sponsoring company very much and high pension liabilities don't harm the sponsoring company very much. Part of the reason for this compensating investor analysis might also be that the figures are not viewed as being very persistent in volatile markets and have little significance in the short term. In the market conditions of 2008/09 for example, there are relatively high and wide ranging discount rates across the sample of FTSE 100 companies.

6.2.3 Findings in relation to Research Question 2 and Research Question 4 (relative value relevance and perception of decision usefulness)

The quantitative analysis reveals that (in reference to Research Question 2) there is evidence that pension accounting information is less value relevant than other accounting information. It is found that over the five year period of this research study from 2006 to 2010 the regression coefficients are significant at the 0.01 level for all independent variables except for the coefficient for pension earnings per share 'PensionEPS' which is significant at the 0.05 level. The coefficient for the book value of core net assets per share that is significant at the 0.01 also has the expected positive sign so there is no negative sign anomaly like the one that that arises with the regression coefficient for the net pension assets per share. Over the five year period there is an adjusted R^2 of 0.440 on the basis of the preferred regression model.

The qualitative analysis in the form of semi-structured interviews reveals that (in reference to Research Question 4) pension accounting information is perceived to be less decision useful than other accounting information. There is therefore convergence in respect of the quantitative findings from the regression analysis and the findings in the semi-structured interviews. The importance of audited financial reports especially for non pension information is emphasised in the semi-structured interviews. Indeed, in the view of most informants, financial reports are considered to be the most useful part of information for the analyst or investor. It is necessary to exercise caution in the interpretation of the statistical results for the same reasons as outlined earlier, in particular there are large intercept terms in the regression results. In view of the lack of conclusiveness in the quantitative findings it is useful to be able to consider the outcomes of the qualitative research findings. As mentioned most informants believe that financial reports are the most useful part of information for the analyst or investor but the informants have far less confidence in pension information in the financial reports. Having said that, a distinction may be made between the perception of decision usefulness and actual use made of the information (Barker, 1998). It is found that informants believe that the pension accounting information is important and is used even if it is not perceived to be as decision useful as other accounting information.

6.3 Summary and conclusions

The discussion in this chapter has shown that there is considerably more evidence of convergence than contradictions or differences between the outcomes of the quantitative and qualitative analysis. The mixed methodology research provides evidence that pension accounting information is value relevant and it is also perceived to be decision useful although the latter point needs to be qualified since the semi-structured interviews reveal serious misgivings on the part of the informants about the difficulty of extracting the relevant information. The important feature is that by using a mixed methodology approach the evidence of the perception of decision usefulness supports the evidence of value relevance through a process of triangulation that appears more robust than other studies in the value relevance research literature.

The research also provides evidence that while pension accounting information is value relevant it is less value relevant than other accounting information. The research also provides evidence that while pension accounting information is perceived to be decision useful it is not perceived to be as decision useful as other accounting information. There are also some policy implications of the decision relevance research in this PhD. On the basis of the semi-structured interviews with the informants there is an indication that pension accounting standards need further reform to address identified shortcomings. Even though IAS 19 has already been amended and a revised IAS 19 has been issued in June 2011, it is very apparent that further financial reporting improvements are necessary. Judging by the comments made in the semi-structured interviews the content as well as disclosure and presentation of pension accounting information needs to be improved if users' concerns are to be addressed. More specifically, the qualitative research in this PhD study reveals particular concerns about the complexity of the notes on DB pension schemes and the lack of sufficient information about cash flows. Some informants in the semi-structured interviews acknowledge that useful information could still be extracted but only with significant effort.

Chapter 7

Summary, conclusions, limitations and further research

7.1 Summary

The objective of this research is to contribute to knowledge of pension accounting value relevance and the perception of decision usefulness. The main aim of the research is to achieve a better understanding of the impact on the share prices of listed companies of accounting information about DB pension schemes recognised and disclosed in the audited financial statements. A further aim is to assess the perception of decision usefulness of pension accounting information as this is considered to be linked to the value relevance question.

Even though value relevance and the perception of decision usefulness are linked the literature review confirms that these aspects have only been researched separately. This seems to arise because the analysis of value relevance is quantitative while the analysis of perceived decision usefulness is a qualitative exercise as it requires an understanding of the viewpoints and insights of decision takers. For this reason in this research a mixed methodological 'extended adapted triangulation' approach has been used with two databases: one quantitative and one qualitative. The quantitative data is obtained for a sample of FTSE 100 companies over a period of five years using financial reports for 2006 to 2010 and equity market data from the period November 2006 to May 2011. The qualitative data is obtained from semi-structured interviews with a sample of selected key informants who have significant financial expertise in the analysis of corporate financial reports.

The findings provide evidence that pension accounting information is value relevant and that it is also perceived to be decision useful. The findings also provide evidence that pension accounting information is not as value relevant as other accounting information nor is it perceived to be as decision useful as other accounting information.

7.2 Contribution

This study provides evidence of value relevance and the perception of decision usefulness of pension accounting information. The major contribution is the insight into the way analysts and investors might be expected to use pension accounting information in published financial reports. In that respect it is believed that this PhD goes beyond previous studies in the literature certainly in a UK context.

It is the qualitative aspect of the mixed methodology study that has enabled the conclusion to be reached that analysts are most probably looking for the cash flow effects for companies of the DB pension schemes that they sponsor. This is particularly the case if pension fund deficits become very large. There is an apparent mismatch between the information provided in the financial reports and the information that users such as analysts and investors really want or need. The analysts and investors have to process the pension accounting information provided because it is really like the 'raw material' rather than the 'finished product'. Pension accounting information is a crude and at worst misleading form of information and there is evidence that analysts regard it as decision useful but only up to a point. When it comes to analysing pension accounting information analysts have to probe into notes that are intended to provide information about the balance sheet and income statement (accrued basis) pension terms. There is far less information about the cash flow impact. Analysts and investors need cash flow information and actuarial inputs to produce their own forecasts – that has not been addressed in the academic literature or if it has it is not sufficiently obvious!

Finally, this research is believed to be the first of its kind to use a mixed research methodology for a study of pension accounting value relevance and decision usefulness perception applied to UK listed companies and stakeholders. The study has used qualitative methods in the form of interviews to support quantitative analysis. The research is also believed to be particularly well timed as it includes the critical analysis of data from a period of changed accounting practices and increased economic volatility.

7.3 Conclusions from the detailed analysis

The value relevance literature has so far concentrated on the identification of associations between reported accounting numbers and share prices or returns. The findings and conclusions in this PhD go beyond the mere identification of value relevance – they suggest why there is value relevance and how value relevance could be affected by the perception of decision usefulness. This is achieved by adopting a mixed methodology approach in the form of an Extended Adapted Triangulation Strategy. One example of triangulation is in finding that pension accounting information is value relevant and also perceived by the key informant analysts to be decision useful. The other example of triangulation is in finding that pension accounting information is less value relevant than other accounting information and also perceived by the key informant analysts to be less decision useful than other accounting information. At a more detailed level the semi-structured interviews provide insight into some of the perceived inadequacies and confusion of pension accounting information as currently presented and disclosed under IAS 19. As discussed in the next section there are some findings and further outcomes beyond the four main research questions.

7.4 Further outcomes and analysis beyond the research questions

The quantitative analysis reveals that the regression coefficients for the main components in the models are significant over a five year period. The analysis may be hampered by the difficult market circumstances throughout most of the period under review. There are indications that the regressions may perform better in relatively stable markets – this is perhaps one of the key differences between this study and many earlier studies of value relevance that analyse periods before 2006. The adjusted R^2 is only 0.238 in 2008 compared to 0.440 over the five year period 2006 to 2010 for the preferred regression model.

There is some further analysis to consider the robustness of the regression analysis by considering whether the extent of exposure to DB pension schemes affects the results. Five

separate samples of companies are selected from the FTSE 100 companies according to their DB pension exposure measured as total DB pension liabilities with categories designated ‘very high’, ‘high’, ‘moderate’, ‘low’ and ‘very low’ (on the basis that even if there is no pension deficit in any particular year the potential volatility of pension fund asset values means that potentially large pension fund deficits may emerge quite quickly). The level of pension exposure seems to have an impact on the regression analysis with greater value relevance shown for the samples with ‘moderate’ or ‘high’ DB pension liability exposure than the samples with ‘low’ or ‘very low’ DB pension liability exposure. Unusually there is lower value relevance displayed by the regression results for the sample with ‘very high’ DB pension liability exposure than for either of the samples with ‘high’ or ‘moderate’ DB pension exposure. The anomalous findings from some of the quantitative analyses discussed here is a reminder that the results are not conclusive – indeed, this is one of the reasons for pursuing a mixed methodology approach.

7.5 Possible limitations of the research and conclusions

7.5.1 Quantitative research

The quantitative research relies on a sample of 70 companies selected from the FTSE 100 and uses data from the published annual reports for the accounting years 2006 to 2010. The data is therefore based on 350 firm years and it could be argued that the results may be affected by the limitations of sample size – this is not an uncommon reservation about research papers in the literature. The sample size is determined by the intention to base the research on broadly comparable large listed companies (hence FTSE 100) that remain in the FTSE 100 over the full five year period of the study and to use companies that report in accordance with the IFRS regime and particularly IAS 19. Finally, financial companies such as banks and insurance companies are excluded as it is hard to achieve sufficient comparability in view of their particular accounting reporting systems.

A possible response to limitations of sample size might be to expand the analysis into the future and perhaps to include large FTSE 250 companies on the basis that they may be

comparable. This is a future research objective. Nevertheless, the (relatively) small sample size is not necessarily a problem and it is considered that useful conclusions emerge from this research study.

The quantitative research based on regression analysis is not always very conclusive but this appears to be quite a common problem in the value relevance literature even where there are very large sample sizes and long studies carried out by teams of several researchers! The mixed methodology approach in this study helps to overcome the problem of lack of clarity or behavioural uncertainty (perception) that is a feature of purely quantitative studies. Nevertheless, it has to be said that qualitative studies also have some limitations as discussed in the next section.

7.5.2 Qualitative research

The main strength of the qualitative approach is that it gives some indication of the thought processes of the participants in the market – analysts and investors in this study. The main potential limitations are sample size and a risk that the researcher's own 'theoretical lens' could influence both the choice of the sample informants and the interpretation of their comments.

It is considered that the advantages significantly outweigh the acknowledged potential limitations. The sample of eight very experienced market analysts (some of whom are also investors or advisers) could actually be considered to be quite large in view of the nature of the individuals' roles and the workings of the equity markets. In a number of cases the analysts are (or have been) the heads of teams of analysts (so they may speak for a reasonably large group of analysts). In other cases the comments reflect a merging of opinions of a multitude of market players due to the working of the market.

The effect of the researcher's theoretical lens may be more difficult to defend. That it is a common problem is insufficient as a response. The researcher has tried to be as independent as possible and it is hoped his own experience in a professional capacity helps

in making objective decisions. That said personal bias can probably never be completely removed so steps have to be taken to minimise the risk of subjectivity impairing the research. Such steps include critical review of the work and discussion with supervisors in an attempt to identify any bias.

7.6 Relevance of research to the practical and professional world

Pension accounting is often described as a complex area of accounting in the semi-structured interviews in this study. This research provides evidence that there are perceived shortcomings in pension accounting information from a decision usefulness perspective. The relevance of pension accounting studies has also been emphasised in the complexities confronted by the IASB in their efforts to update IAS 19 for example, by issuing a revised IAS 19 in June 2011 in response to much criticism from accounting, actuarial and other professionals and other interested parties (PAAinE, 2008 and 2009).

The latest version of IAS 19 with its updated presentation and removal of the smoothing option is not expected to solve all of the problems that have been identified over the years and discussed in this study. There are still many issues for the standard setters and the accounting profession to address including problems of measurement of liabilities and the need to increase transparency reflecting the users' expressed need for more cash flow information and forward-looking analyses.

The revised IAS 19 marks the beginning of a new phase in accounting standard setting that will require the input of more research studies as well as collaboration or at least, cooperation between the key interested professions of the accountants and the actuaries. Further academic research could help to inform the development of standards by the professional bodies. It is believed that the mixed methodology approach used in this study could help in reaching a greater understanding of the needs of users of financial reports in the area of pension accounting information.

7.7 Post-doctoral research possibilities – an overview

Perhaps the most obvious post-doctoral research opportunity is to carry out research on the value relevance and perception of decision usefulness of pension accounting information following the introduction and application of the revised IAS 19 issued in June 2011 (but not mandatory until companies report annual results for periods commencing on or after 1 January, 2013).

Another potential post-PhD research project is to extend the mixed methodology study of this PhD to more companies (including FTSE 250 companies) and increase the number of interviewees to provide more depth and investigate any differences or developments should these emerge. The dynamic nature of accounting and finance keeps many research questions fresh as circumstances and even economic systems change over time.

There appears to be potential for comparative studies with countries such as the USA. There are also interesting prospects for other comparative studies with certain countries in the European Union and beyond such as Japan that provide the base for many companies with large exposures to defined benefit pension liabilities.

Finally, the problem of analysing the value relevance of financial reporting information for companies in turbulent equity markets is worthy of study since it remains a major problem for many academic research studies covering the past five or six years. Pension accounting value relevance research projects such as this PhD may provide a stimulus for the development of analytical techniques that are applicable in other areas of financial reporting research.

7.8 An outline of any ethical, health and safety or risk issues associated with the research

This section has been inserted here as it is required procedure to consider any ethical, health and safety or risk issues associated with the research and to indicate how any such issues will be addressed (Bournemouth University "Codes of Practice for research degrees" September 2008). It is believed that there are no significant issues requiring any special procedures. Certain individuals and groups of pension scheme members, pensioners and their advisers have expressed concerns that changes in pension accounting arising from accounting standards such as FRS 17 in the UK and IAS 19, the international accounting standard have resulted in higher reported pension fund obligations and may therefore have contributed to the trend by sponsoring companies to curtail or even close defined benefit schemes. Some have even gone so far as to blame accounting for the demise of the defined benefit schemes. The reduction in the number of active defined benefit schemes in the UK is regrettable but it is by no means clear that this trend is due to financial reporting issues. Whatever its conclusions this study will not have any short term impact on pensions strategy of listed UK companies although it is hoped that in the longer term it will help to shed light on matters that are currently shrouded in considerable uncertainty. More reliable accounting is ultimately more likely to be helpful than harmful!

GLOSSARY

Decision usefulness when applied to accounting information is a central objective of general purpose external financial reporting which is to provide information that is useful to users including present and potential investors and creditors and others in making investment, credit and similar resource allocation decisions (see reference to IASB/FASB conceptual framework in IASB, 2006 and 2008; as well as Staubus, 1959 and Lennard, 2006).

Defined benefit (DB) schemes (or 'defined benefit plans') are usually funded by contributions made by the employer and in many cases (and increasingly) by the employee – unlike defined contribution schemes the post retirement benefits (which may have a health care as well as the pension element) are agreed in advance. In the case of defined benefit pensions the amount of pension paid is dependent on the number of years of pensionable service and the level of salary in the last few years or (traditionally) the last year of service (hence the alternative term 'final salary scheme'). These schemes have been the subject of much debate and have been declining in number (see Purple Book by TPR/PPF 2011) but not in size (or value) In ***IAS 19*** (2005, Section 7) '*defined benefit plans'* are defined as 'post-employment benefit plans other than defined contribution plans'.

Defined contribution (DC) schemes (or 'defined contribution plans') are usually funded by contributions made by both the employer entity and the employee – the ultimate 'pension pot' results from the amount of contributions made over the period of employment and the pensions payable are therefore dependent on the funds available – there is no obligation by the employer beyond those contributions that have already been made unless there are specific additional risk sharing terms (so called 'hybrid schemes') that have elements similar to 'defined benefit' schemes. In ***IAS 19*** (2005, section 7) '*defined contribution plans'* are defined as "post-employment benefit plans under which an entity pays fixed contributions into a separate entity (a fund) and will have no legal or

constructive obligation to pay further contributions if the fund does not hold sufficient assets to pay all employee benefits relating to employee service in the current and prior periods".

Interest cost is the increase during a period in the present value of a defined benefit obligation which arises because the benefits are one period closer to settlement (IAS 19, 2005 section 7).

Longevity / mortality refers to life expectancy of pension scheme members and is a subject of major importance and not surprisingly a key element in actuarial projections used in the measurement of the liabilities arising from defined benefit pension schemes. In the UK information is generated by the Government Actuary's Department ('GAD') and the National Statistics Office ('NSO') has the responsibility of publishing 'life tables' (these are tables that show summaries of the life expectancy of males and females at various ages from 60 years upwards). The study of longevity is complex. Uncertainty may arise for a number of reasons including the risks of incorrect modelling of probability distributions, problems of obtaining sufficient data, trend changes associated with wealth or health factors (alternative expert views about the physiological limits of aging) and random chance variations (as outlined by Kirkpatrick, 2007).

Past service cost is the change in the present value of the defined benefit obligation for employee service in prior periods, resulting in the current period from the introduction of, or changes to, post-employment benefits or other long-term employee benefits. Past service cost may be either positive (when benefits are introduced or changed so that the present value of the defined benefit obligation increases) or negative (when existing benefits are changed so that the present value of the defined benefit obligation decreases) (IAS 19, as amended May 2008, section 7).

Pension accounting refers to all aspects of accounting for pension schemes in the financial statements, notes and directors' reports contained within the financial reports of companies that sponsor such schemes or the schemes themselves – in this PhD the focus is on defined

benefit schemes and financial reporting in the form of published audited accounting information rather than the precise measurement or detailed calculations that underlie the information finally published in the financial reports (see Appendix 4 also).

Pension fund – although the term 'pension fund' is sometimes used interchangeably with the terms 'pension scheme' or 'pension plan' the 'pension fund' strictly refers to the underlying assets and the trust arrangement and its trustees. The pension fund therefore is central to the mechanism for making investments with the intention of ensuring that the present and future obligations under the pension scheme are met. The fund will usually have a portfolio of assets ranging from cash or current accounts required for very short term needs to medium and potentially long term investments including shares, bonds and real estate. Pension funds are in some cases very large and may be significant investors in listed companies to the extent that they may exercise considerable leverage when it comes to issues of corporate governance – in some circumstances this might concern management strategy and board appointments.

Pension Protection Fund (PPF) is a body established by the Pension Act 2004 to pay compensation to members of defined benefit (DB) schemes in the event of the qualifying insolvency of an employer in a situation in which the pension scheme assets are insufficient to cover PPF levels of compensation (Kirkpatrick, 2007). The counterpart in the USA is the Pension Benefit Guaranty Corporation or 'PBGC'.

Pension scheme / or **Pension plan** in terms of an employer administered scheme is the contractual arrangement in place between employer (as the 'sponsor' of the scheme) and employee (as the 'member' of the scheme) including rights and obligations (for example, contributions by the employee and funding by employer). In the UK pension schemes are ring fenced as trusts and managed for the benefit of the members (including deferred members who are no longer employed by the sponsoring company but have not yet reached retirement age) as beneficiaries – there is the added feature that the sponsoring companies are guarantors of the scheme so that they are required to finance any shortfall should the scheme obligations exceed the scheme assets.

Projected Unit Credit Method is an accrued benefits valuation method (referred to in IAS (2004) para 64) in which the scheme liabilities make allowance for projected earnings. An 'accrued benefits' method involves allocating an amount representing a share of the eventual undiscounted cost to each period. The liability arising from the costs to date is then discounted and the discount unwinds over the employee's service life. This means that the cost will be higher at the end of the employee's service life than at the beginning as the discounting effect will reduce as the employee approaches retirement.

Smoothing refers to the process of reducing volatility in pension fund gains and losses by only recognising changes greater than an agreed proportion of the starting position – the threshold level is 10% in the case of IAS 19 (2004) and the mechanism is described as the 'corridor' reflecting the allowance for upward or downward valuation changes.

The Pensions Regulator (TPR) is the regulating body established under the Pensions Act (2004) with two major objectives of protecting the benefits of pension scheme members and reducing the risk of situations leading to PPF compensation claims (Kirkpatrick, 2007).

Value relevance refers to the relationship that may also be a causal relationship, between published accounting data and the market value of the reporting business entity (in the case of stock exchange listed companies the market value may be determined from the prevailing share price).

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APPENDIX 1

The Key Informants (for the purposes of the qualitative evidence and analysis – see Chapter 5)

All are currently involved in or have been involved in specialist financial analysis of financial reports for investment or corporate finance advisory purposes.

References in the text are made to responses by the analysts (named below) but to preserve a degree of anonymity references such as A1, A2, A3 etc are assigned in no particular order.

Geoff Austin – Managing Director Corporate Finance, Moelis & Co. Ltd (formerly Global Co-Head of Media Finance Group at Deutsche Bank)
MA (Oxon) Chemistry, MBA

Nicholas Badman - Partner, Penfida Partners (formerly a Director at Citigroup)
MA (Oxon) PPE

Adrian Friend – formerly Director at Merrill Lynch International Bank
(before that bond trader and equities analyst)
BSc (LSE) Economics, MBA (LSE)

Peter Jacobs – Managing Director, Primary Capital Ltd
MA (Cantab) Engineering and Management Studies

Andrew Lyddon – UK Equity Fund Manager, Schroders Investment Management
BSc (Bath) Chemistry, MSc (Queen Mary Coll, London Univ) Intellectual Property Law), CFA

Dominic Neary – Investment Manager, Baillie Gifford (formerly Director of International Equities, Insight Investment).
MA (Oxon) Maths, MSc (Oxon) Statistics, PhD (Reading) Statistics, Diploma Investment Analysis (Stirling)

Giles Vardey – formerly analyst in Salomon Brothers then Managing Director at Swiss Bank Corporation and Chief Exec of Greig Middleton
MA (Oxon) PPE

Guy Walker – UK Equity Research Analyst – Schroders Investment Management
BSc (Exeter) Engineering, MA (Exeter) Finance and Investment, MBA (London Business School)

APPENDIX 2

Value Relevance Models

Appendix 2.1 The Daley Model

$$V_i = EBPEN_i (1 - T_i) / R_F - PEN_i (1 - T_i) / R_F - bR_{im}SD_i / R_F + G_i$$

Where:
V_i = market value of equity of company "i"
$EBPEN_i$ = pretax permanent earnings before pension costs for firm "I"
PEN_i = pretax permanent pension costs
T_i = the marginal tax rate for company "i"
R_F = the risk-free rate in the economy
b = the marginal rate of return per unit of nondiversifiable standard deviation (constant for all "i" in the economy)
R_{im} = correlation coefficient between the expected return to equity of the "ith term" and the expected return on the market portfolio.
SD_i = standard deviation of the permanent earnings of company "i".
G_i = a growth term (itself a function of pre-tax "permanent" earnings for the company).

It may be observed how the above equation includes a risk term and a growth term. Daley develops the equation (shown above) into two versions of an empirical model. One form of the model constrains the risk and growth coefficients and the other (shown below) does not. This is as follows:

$$V_i / A_i = \alpha / A_i + \beta_1 EBPC_i / A_i + \beta_2 PC_i / A_i + \beta_3 R_{im} SD_i / A_i + \beta_4 G_i / A_i + u_i$$

Where:
V_i = market value of equity of company "i"
$EBPC_i$ = earnings (after tax) before pension cost
PC_i = pension cost (after tax)
R_{im} = correlation coefficient between the expected return to equity of the "ith term" and the expected return on the market portfolio.
SD_i = standard deviation of the permanent earnings of company "i"
G_i = a growth term (itself a function of pre-tax "permanent" earnings for the company).
A_i = the end of period book value of assets for the company "i"
u_i = a disturbance term where the variance of "u" is assumed to be constant across all firms

Note: The term A_i is included to deal with possible problems related to heteroscedasticity – Daley (1984) refers to Goldfield-Quandt (1965) tests which used such a total assets scalar.

Appendix 2.2 Barth, Beaver and Landsman Model

In the following formulae the total asset scaling term has not been included so that the other terms may be more easily seen. The subscripts “i” and “t” that identify the firm and year have also been removed to simplify the presentation in all the formulae that follow.

$$\mathbf{V = \alpha + \beta_1 EBPC + \beta_2 SC + \beta_3 INT + \beta_4 RPA + \beta_5 Other\ PC + \varepsilon}$$

Where:
V = company’s market value of equity
EBPC = earnings before pension cost
SC = service cost
INT = interest cost
RPA= return on pension fund assets
OtherPC = other pension costs
ε = a random error term

Appendix 2.3 Landsman Model

$V = \alpha + \beta_1 NPA + \beta_2 NPL + \beta_3 PA + \beta_4 PL + \varepsilon$

Where:
V = company's market value of equity
PA = pension assets
PL = pension liabilities
NPA = non-pension assets
NPL = non-pension liabilities
ε = a random error term

Appendix 2.4 Combined or "Ohlson" Models

These models take the following form:

$P_t = Y_t + \alpha_1 X_t + \alpha_2 V_t$

P_t = market value or price of company's equity at time "t"

Y_t = current book value

X_t = abnormal earnings for company at time "t"

V_t = information other than abnormal earnings for company at time "t"

Many of the empirical models developed since 1995 have been influenced by the Ohlson model and while they may differ in detail they are all broadly of the following structure (subscripts for time and firm removed):

$V = \alpha + \beta_1 OEPL + \beta_2 EBPC + \beta_3 PA + \beta_4 PL + \beta_5 PC + \varepsilon$

Where:
V = company's market value of equity
OEPL = company's owners' equity plus net pension liabilities
EBPC = earnings before pension costs
PA = pension assets
PL = pension liabilities
PC = pension costs
ε = a random error term

Appendix 2.5 Hann et al Standard Model

The model is structured as follows (note that subscripts for time "t" and firm "i" have been removed):

The standard model (before development) used by Hann et al (2007) is structured as follows:

$$P = \alpha + \beta_1 BV + \beta_2 NI + \beta_3 EMP + \beta_4 R\&D + IT + \varepsilon$$

Where:
P = share price
BV = book value of equity
NI = income from continuing operations
EMP = number of employees
R & D = research and development expenses
IT = an intercept term composed of the sum of intercepts for each year for the particular firm
ε = a random error term

Hann et al expand the above model by purging the BV and NI terms of their respective pension components and also decompose the pension expenses into recurring expenses and gain/loss components as shown below:

$$P = \alpha + \beta_1 BVXP + \beta_2 NIBPC + \beta_3 NPA + \beta_4 PPX + \beta_5 G\&L + \beta_6 EMP + \beta_4 R\&D + IT + \varepsilon$$

Where additional terms are as shown below:
BVXP = book value of equity excluding net pension assets
NIBPC = income from continuing operations before pension costs
NPA = net pension assets
PPX = recurring component of pension expenses
G&L = gain / loss component of pension expenses

Appendix 2.6 Coronado and Sharpe Models

Models used by Coronado and Sharpe, 2003 and Coronado et al, 2008:

The Transparent Model may be expressed as follows:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \varepsilon_{ti}}$$

The Transparent Model is modified by adding the current period pension earnings, "PensionEPS" to form the Opaque Model (shown below).

The Opaque Model may be expressed as follows:

$$\mathbf{P_{ti} = \beta_0 + \beta_1 BVCS_{ti} + \beta_2 CoreEPS_{ti} + \beta_3 NPAS_{ti} + \beta_4 PensionEPS_{ti} + \varepsilon_{ti}}$$

Where (in all cases for company "i" at time "t" or period ending "t" as appropriate):
$\mathbf{P_{ti}}$ = market value of equity per share
$\mathbf{BVCS_{ti}}$ = core book value per share
$\mathbf{CoreEPS_{ti}}$ = core earnings per share
$\mathbf{NPAS_{ti}}$ = book value of net pension assets per share
$\mathbf{PensionEPS_{ti}}$ = pension earnings per share (pension return or pension costs other than service cost)
$\boldsymbol{\varepsilon_{ti}}$ = a random error term

Appendix 2.7 New Model (Greater detail of pension fund assets)

The proposed model is structured as follows:

$$P_{ti} = \beta_0 + \beta_{1A}TNAS_{ti} + \beta_{1B}LTDS_{ti} + \beta_2 CorebPSCEPS_{ti} + \beta_{3A}PAS_{ti} + \beta_{3B}PLS_{ti} + \beta_{4A}ACTGLPS_{ti} + \beta_{4B}PSCPS_{ti} + \beta_{4C}IntCostPS_{ti} + \beta_{4D}ERPAPS_{ti} + \varepsilon_{ti}$$

Where (in all cases for company "i" at time "t" or period ending "t" as appropriate):
P_{ti} = market value of equity per share
$TNAS_{ti}$ = total net assets per share
$LTDS_{ti}$ = long term debt per share
$CorebPSCEPS_{ti}$ = core earnings (before pension service cost) per share
PAS_{ti} = book value of pension assets per share
PLS_{ti} = reported value of pension liabilities per share
$ACTGLPS_{ti}$ = net actuarial gains or losses per share
$PSCPS_{ti}$ = pension service cost per share
$IntCostPS_{ti}$ = interest cost (relating to pension liabilities) per share
$ERPAPS_{ti}$ = expected return on pension assets per share
ε_{ti} = a random error term

This is model reference 'V8' as discussed in Chapter 4 and is one of the main models of a similar format used to perform the quantitative analysis (see Chapters 3 and 4 for further explanation and discussion).

Appendix 3 - An outline of standard accounting practice under IAS 19

A3.1 Introduction

This is an outline the accounting practice recommended under International Accounting Standard 19 (IAS 19), the accounting standard that is relevant to listed UK companies under the Companies Act 2006 and which applies to the companies used in the sample used for the quantitative analysis. This refers to current accounting practice at the time of writing the PhD – it does not therefore incorporate changes introduced in the revised IAS 19 (issued in June 2011) which becomes mandatory for companies subject to IFRS for annual accounting periods starting on or after 1 January, 2013.

A3.2 Presentation of items in the financial statements

A3.2.1 Introduction – the financial statements

Items relating to DB pension schemes may appear in the group income statement, the group statement of comprehensive income, the group balance sheet and in the group cash flow statement as well as in the notes to the financial statements.

A3.2.2 The group income statement

There may be specific reference to pensions and other post-retirement benefits as 'net finance expense (income) relating to pensions and other post-retirement benefits' following the standard 'finance costs' item. This is a single line item without further detail but there will be a numerical reference to a note. The components of pension costs may be identified in the note to the financial statements (see below) as items charged to 'profit before interest and taxation'. Therefore, the components of pension costs (see below under notes to the financial statements) are not specified in the group income statement itself.

A3.2.3 The group statement of comprehensive income

There may be specific reference to an ‘actuarial loss (gain) relating to pensions and other post-retirement benefits’ as a single line item with a reference to a note for analysis of the components (see section on notes below). The statement of comprehensive income is more concerned with financial items rather than operating activities that are the focus of the income statement – for example, the statement of comprehensive income includes items such as currency translation differences and movements in the value of financial instruments including available-for-sale financial instruments and cash flow hedges marked to market. The taxation effects are also summarised in the statement of comprehensive income – more detail is made available in a referenced note that may reveal for example, the tax implications of actuarial losses or actuarial gains relating to pensions and other post-retirement benefits.

A3.2.4 The group balance sheet

If a DB scheme are in operation or have been operated there may be an item described as ‘defined benefit pension plan surpluses’ or ‘defined benefit pension plan deficits’ – in some cases both surpluses and deficits may appear in the balance sheet if there is more than one DB pension plan and at least one plan in surplus and one plan in deficit. The item may also indicate that it relates to ‘other post-retirement benefits’, particularly if the group has operations in the USA. The items in the balance sheet will be single line items that are referenced to a note containing further details (see discussion under the section on “notes” below).

A3.2.5 The group cash flow statement

If a DB pension plan is sponsored by a group there will be items in the cash flow statement due to the fact that DB pension costs comprise items that affect the profit before taxation but do not necessarily involve the movement of funds. For example, one single line item described as ‘net finance expense (income) relating to pensions and other post-retirement

benefits' may correspond to a particular item in the income statement. Another single line item may be composed of separate costs items that are not identified specifically in the income statement but are available in the specific pensions note to the financial statements – this item may be described in the cash flow statement as 'net operating charge for pensions and other post-retirement benefits, less contributions and benefit payments for unfunded plans'. If they are to understand these items more clearly users of the financial statements will need to analyse the relevant note to the accounts (see section on 'notes' below).

A3.3 Explaining the pension accounting policies

A3.3.1 Overview of policies

In section **A3.2** (above) it was explained that items relating to DB pension schemes may appear in the group income statement, the group statement of comprehensive income, the group balance sheet and in the group cash flow statement. As the information in the financial statements is only a summary (single line items) it is important to try to explain and clarify the figures in the financial statement by providing further information in the notes. In the first place a reference to pension accounting policies will be included in note 1 - usually described as 'significant accounting policies' – while a further note will include *inter alia* details of the components of pension costs and movements on the balances of DB pension assets and liabilities (obligations under pension plans).

The section dealing with pensions in the "significant accounting policies" note will typically cover the following matters:

- Current service cost
- Past service cost adjustments
- Finance income or expense – pension element
- Actuarial gains and losses
- Balance sheet items
- Defined contribution schemes

- Other post-retirement benefits

Each of these elements will now be discussed by incorporating the explanations that may be expected to appear in a typical note to the financial statements of listed UK companies (that are the subject of analysis in this thesis).

A3.3.2 Current service cost

Groups such as the listed UK companies may sponsor several different DB pension plans as well as DC pension plans (that have become more popular over time) and 'hybrid' schemes that have elements of DB and DC plans. The cost of providing benefits under DB plans is determined separately for each plan using the 'projected unit credit method' which attributes entitlement to benefits to the current period (to determine current service cost) and to the current and prior periods (to determine the present value of the defined benefit obligation).

A3.3.3 Past service cost adjustments

Past service costs are recognised immediately when the company becomes committed to a change in pension plan design. For the purposes of this discussion a 'settlement' eliminates all obligations for benefits already accrued and a 'curtailment' reduces future obligations as a result of a material reduction in the scheme membership or a reduction in future entitlement. When a settlement or a curtailment occurs, the obligation and related plan assets are re-measured using current actuarial assumptions and the resultant gain or loss is recognised in the income statement during the period in which the settlement or curtailment occurs.

A3.3.4 Finance income or expense – related to pension plans

The interest element of the DB pension plan cost represents the change in the present value of scheme obligations resulting from the passage of time and is determined by applying the

discount rate to the opening present value of the benefit obligation taking into account material changes in the obligation during the year. The expected return on pension plan assets is based on an assessment made at the beginning of the year of long-term market returns on pension plan assets, adjusted for the effect on the fair value of plan assets of contributions received and benefits paid during the year. The difference between the expected return on pension plan assets and the interest cost is recognised in the income statement as 'other finance cost or expense'.

A3.3.5 Actuarial gains and losses – proposals to change the 'Corridor' system

The actuarial gain or loss is usually composed of the following items:

- the difference between the actual return and the expected return on pension plan assets
- changes in assumptions underlying the PV of the pension plan liabilities
- experience gains and losses arising on the pension plan liabilities

IAS 19 permits two approaches for the recognition of actuarial gains or losses in the financial statements – an entity may adopt a policy of recognising gains and losses in the period in which they occur in which case it may recognise them in "other comprehensive" income (IAS 19 paragraphs 93A to 93D) or an entity may use the 'Corridor' method (explained in IAS 19 paragraphs 92 and 93 as reproduced below – the term 'corridor' appears in IAS 19 paragraph 95).

IAS 19 paragraph 92 states the following: (this is from IAS 19 version – page A519 - with IFRS amendments up to 31 December 2009):

"In measuring its defined benefit liability in accordance with paragraph 54, an entity shall, subject to paragraph 58A, recognise a portion (as specified in paragraph 93) of its actuarial gains and losses as income or expense if the net cumulative unrecognised actuarial gains and losses at the end of the previous reporting period exceeded the greater of:

(a) 10% of the present value of the defined benefit obligation at that date (before deducting plan assets); and
(b) 10% of the fair value of any plan assets at that date.

These limits shall be calculated and applied separately for each defined benefit plan."

Note: IAS 19 para 54 is considered in the section (immediately below) entitled "Balance sheet items" and IAS 19 para 58A limits the recognition of gains in certain cases. IAS 19 paragraph 93 will be considered below.

IAS 19 paragraph 93 states the following: (this is also extracted from the IAS 19 – page A519 - version with IFRS amendments up to 31 December 2009):

"The portion of actuarial gains and losses to be recognised for each defined benefit plan is the excess determined in accordance with paragraph 92, divided by the expected average remaining working lives of the employees participating in that plan. However, an entity may adopt any systematic method that results in faster recognition of actuarial gains and losses, provided that the same basis is applied to both gains and losses and the basis is applied consistently from period to period. An entity may apply such systematic methods to actuarial gains and losses even if they are within the limits specified in paragraph 92."

The 'Corridor Method' has been a controversial feature of IAS 19 and in response the IASB issued an Exposure Draft in April 2010 proposing removal of the Corridor Method – this was followed by the issue of an amended IAS 19 in June 2011. The IAS 19 ED 2010 also proposed a new presentation approach that would "clearly distinguish" between the different components of the cost of employee benefits and disclosure of "clearer information about the risks arising from defined benefit plans" (this was summarised in the IASB press release "IASB proposes improvements to defined benefit pensions accounting" dated 29 April 2010). The amended IAS 19 issued in June 2011 is only mandatory for

accounting years starting on or after 1 January 2013 and this will not affect the sample of financial reports for FTSE 100 companies used in this study (see Chapters 3 and 4).

A3.3.6 Balance sheet items

The DB pension plan surplus or deficit in the balance sheet comprises the total for each plan of the present value of the DB obligation (using a discount rate based on high quality corporate bonds – in accordance with the recommendations of IAS 19), less the fair value of pension plan assets out of which the obligations are to be settled directly. Fair value is based on market price information and, in the case of quoted securities, is the published bid price.

IAS 19 paragraph 54 * states the following (references have been added with explanations below):

"The amount recognised as a defined benefit liability shall be the net total of the following amounts:

(a) the present value of the defined benefit obligation at the end of the reporting period (see paragraph 64 **);
(b) plus any actuarial gains (less any actuarial losses) not recognised because of the treatment set out in paragraphs 92 and 93 ***;
(c) minus any past service cost not yet recognised (see paragraph 96);
(d) minus the fair value at the end of the reporting period of plan assets (if any) out of which the obligations are to be settled directly (see paragraphs 102-104 ****)."

** see IAS 19 (para 54) version including amendments resulting from IFRSs issued up to 31 December 2009.*

*** IAS 19 para 64 states that "an entity shall use the Projected Unit Credit Method to determine the present value of its defined benefit obligations and the related current service cost and, where applicable, past service cost.*

**** actuarial gains and losses and this reference to IAS 19 paragraphs 92 and 93 were discussed in the previous section.*

***** the fair value of plan assets and estimation under certain circumstances is considered in IAS 19 para 102-104.*

A3.3.7 Defined contribution schemes

Contributions to defined contribution schemes are recognised in the period in which they become payable.

A3.3.8 Pensions and other post-retirement benefits

There will usually be a section within the note that outlines the different types of pension plans – DB or DC – and where there are international activities there will be a reference to the that all or most group companies have pension plans, the forms and benefits of which vary with conditions and practices in the countries concerned.

There will be an explanation in the note that (in an international group) DB pension plans may be externally funded or unfunded. The assets of funded plans are generally held in separately administered trusts – in particular, in the UK the primary pension arrangement is a funded 'final salary' pension plan under which retired employees draw the majority of their benefit as an annuity.

Many groups have closed their DB pension plans (or final salary schemes) to new members – for example, during 2009 BP announced that its UK DB pension plan would be closed to new joiners with effect from 1 April 2010 – the plan was to remain open to employees who joined BP on or before 31 March 2010 (see BP Annual Report for the year ended 31 December 2009).

A3.4 Items in the 'pensions' note to the financial statements

This section looks more closely at the information that appears in the typical pensions note where accounts prepared in accordance with IFRS.

A3.4.1 Items relevant to the group income statement

In section **A3.2** it was explained that there may be specific reference to pensions and other post-retirement benefits as 'net finance expense (income) relating to pensions and other post-retirement benefits' following the standard 'finance costs' item. Inspection of the note should reveal the composition of the single figure for 'finance income' or 'finance expense' along the following lines:

Analysis of the amount credited (charged) to other finance expense

	£ million
Expected return on plan assets	XXXX
Interest on plan liabilities	(YYYY)
Other finance income (expense)	ZZZZ

If there are a number of separate pension plans and other post-retirement benefit plans (as well as pensions if for example, the group has US schemes) the information may be more complicated and will usually be presented in tabular form.

Other pension cost components are not evident at the level of the income statement and may only be identified in the note to the financial statements as items charged to 'profit before interest and taxation'. These components of pension costs may appear in the pension note as follows:

Analysis of the amount charged to profit before interest and taxation

	£ million
Current service cost	VVVV
Past service cost	WWW
Settlement, curtailment and special termination benefits	XXXX
Payments to defined contribution plans	YYYY
Total operating charge	ZZZZ

A3.4.2 The group statement of comprehensive income

In section **A3.2** it was explained that there may be specific reference to an 'actuarial loss (gain) relating to pensions and other post-retirement benefits' as a single line item with a reference to a note for analysis of the components.

The components of the figure presented in the statement may be as follows:

Analysis of the amount recognized in other comprehensive income

	£ million
Actual return less expected return on pension plan assets	VVVV
Change in assumptions underlying the present value of plan liabilities	(WWW)
Experience gains and losses arising on the plan liabilities	YYYY
Actuarial (loss) gain recognized in OCI	ZZZZ

Note: OCI is 'Other Comprehensive Income'

As explained in section **A3.2** the statement of comprehensive income is more concerned with financial items rather than operating activities that are the focus of the income statement – in the case of pensions there may in fact be three levels identified:

- Items relating to employee compensation for the period – basically the 'current service cost' of DB schemes (and the cost of DC schemes)
- Items that relate to maintaining the DB pension plan – for example, the interest on plan liabilities
- Items that reflect changes in actuarial assumptions and differences between expected and actual outcomes – this is reflected in 'actuarial gains and losses'.

The first two items (listed above) are handled at the level of the income statement – and under IAS 19 are by implication considered to be closer to operating expense items. There is nevertheless, a critical distinction between the two that leads some researchers – particularly Coronado and Sharpe (2003) to treat only the first as tantamount to ongoing payroll costs so that the items in the second group may be viewed as having features peculiar to DB schemes (rather than periodic employee compensation akin to DC schemes).

The critical feature might be summed up in whether there is a significant balance sheet impact arising from the 'cost or income component'.

A3.4.3 The group balance sheet

As stated in section **A3.2** there may be an item in the balance sheet described as 'defined benefit pension plan surpluses' or 'defined benefit pension plan deficits' – and, in some cases both surpluses and deficits may appear in the balance sheet if there is more than one DB pension plan and at least one plan in surplus and one plan in deficit. The item may also indicate that it relates to 'other post-retirement benefits', particularly if the group has operations in the USA.

The items in the balance sheet will be single line items that are referenced to a note containing further details. The note will normally have details of items affecting the

liabilities – or benefit obligations – and the fair value of pension plan assets – summaries of opening and closing balances and the items affecting the balances will be included.

DB pension plan liabilities (or 'benefit obligations') may be affected by some or all of the following items (not an exhaustive list):

- Current service cost
- Past service cost
- Interest cost
- Curtailment
- Settlement
- Special termination benefits
- Exchange adjustments
- Contributions by plan participants
- Benefit payments (funded and unfunded plans)
- Disposals
- Actuarial (gain) loss on obligation

DB pension plan assets may be affected by some or all of the following items (not an exhaustive list):

- Actuarial gain (loss) on plan assets
- Benefit payments
- Contributions by plan participants
- Contributions by employers
- Disposals
- Exchange adjustments
- Expected return on plan assets

The position of the defined benefit pension plan should be summarised along the following lines:

Defined Benefit Pension Plan Surplus (Deficit)

	£ million
Benefit obligation at 31 December	(XXXX)
Fair value of plan assets at 31 December	YYYY
Surplus (deficit) at 31 December	(ZZZZ)

If there are a number of separate DB pension plans then one or more may be in surplus and one or more may be in deficit – if so, the balance sheet will contain the asset and liability as items in 'non-current assets' and non-current liabilities respectively and this will be indicated in a section of the note. The note should also contain information about the extent to which pension plans are 'funded' or 'unfunded'.

A3.4.4 The group cash flow statement

It was explained in Section **A3.2** explained how the cash flow statement may need to include DB pension plan items that affect the profit before taxation but do not necessarily involve the movement of funds.

In terms of the operating charge there is a major difference between DB pension plans and DC pension plans – the DB cost components are reflected in the profit before interest and tax but need to be added back to determine the cash flow whereas by contrast the payment to DC pension plans is also the expense for the purposes of the income statement. The major cash outflows for DB schemes are contributions by employers (for funded pension plans) and benefit payments for unfunded plans (benefit payments by funded plans are outflows from the pension fund and not direct payments from the sponsoring firm).

The position may be summarised as follows:

The DC pension plan is shown to highlight the distinction from DB schemes.

	Income Statement	Cash flow Statement
Operating charge		
DC payment	√	√
DB		
Current service cost	√	
Past service cost	√	
Settlement	√	
Curtailment	√	
Special termination benefits	√	
DB Other finance income (expense)	√	
DB Contributions by employers (funded plans)		√
Benefit payments (unfunded plans)		√

As mentioned earlier (in section 3.2) the technical nature of DB pension plans puts an onus on users of the financial statements to analyse the information in the relevant note to the accounts. The complexity of the information suggests a need for greater transparency and clarity of expression which is a problem that has been discussed in the literature (Hines, 1982 and Jin et al, 2006).

A3.5 The 'Taxation' note and pensions

There is reference to the tax significance of pensions in Chapter 2 (Literature Review). In particular, there is a potential 'tax benefit' arising from employer firms' contributions to pension plans. The extent and immediacy of the tax benefit depends on the profitability of the sponsoring firm. The existence of a DB pension plan deficit implies the need to make future contributions that will have a future tax benefit – this is reflected in a deferred tax asset. On the other hand a DB pension plan surplus has the opposite effect in that it reduces the (expected) future contributions and at the same time reduces the beneficial tax

deductibility effect of future pension contributions – therefore, the deferred tax asset will be reduced or a deferred tax liability will arise. The taxation note will normally have sections summarising current tax and deferred tax in which there will be reference to any items relating to the pension plans – for example, showing a line described as 'pension plan and other post-retirement benefits'.

Tax is a potentially complicated and confusing subject for investors and even analysts – when combined with pension accounting this might be expected to lead to further confusion. This is considered in this research study and the semi-structured interviews provide an opportunity to assess the general level of comprehension of analysts (albeit a relatively small sample).

Appendix 4 – Questionnaire

SEMI-STRUCTURED INTERVIEWS

Date: INSERT HERE:

Analyst Name: INSERT HERE:
(note: BRIEF CV details to be included at the end of these interview notes)

General themes

General usefulness of financial reports to investors/analysts

Complexity / clarity / transparency of accounting information

Disclosures – extent and appropriateness

Supplementary information used – unpublished material?

What are the most useful analytical techniques applied to financial statements?

Specific pensions accounting matters (answers to include comments/reflections)

Is pensions info better / worse than general / other accounting info?

Is B/S info more/less useful than P/L info?

Are notes to accounts useful enough / how could they be improved?

What are the most useful analytical techniques for pensions accounting info?

What are the major problems (say 3) with pension accounting / financial reporting

Do you use the services of a qualified actuary – in house or external?

How much use is made of actuarial reports / specific actuarial info

Audit / auditors

General audit environment -
Do you or other analysts (in your view) have any particular concerns about the auditing environment e.g. in relation to independence or potential consultancy bias?

Specific pension audit environment -
Are there concerns about audit of pensions information and disclosures (and are these concerns greater than the general case)?

Appendix 5

EXPOSURE TO DB SCHEMES using PL / BVC												
Firm Ref	2006	2007	2008	2009	2010	AVE	**GROUP**	**A**	**B**	**C**	**D**	**E**
Co 1	287%	147%	128%	129%	113%	160.85%	A	A				
Co 2	19%	15%	12%	13%	9%	13.55%	D				D	
Co 3	1%	1%	1%	1%	1%	0.80%	E					E
Co 4	61%	65%	46%	44%	40%	51.22%	C			C		
Co 5	0%	0%	0%	0%	0%	0.00%	E					E
Co 6	257%	223%	164%	212%	236%	218.11%	A	A				
Co 7	10%	11%	6%	7%	6%	7.83%	D				D	
Co 8	9%	7%	6%	5%	4%	6.26%	D				D	
Co 9	49%	46%	35%	36%	41%	41.31%	C			C		
Co 10	63%	62%	64%	66%	59%	62.85%	C			C		
Co 11	1%	1%	2%	2%	2%	1.68%	E					E
Co 12	0%	0%	0%	0%	0%	0.00%	E					E
Co 13	838%	1318%	810%	830%	1040%	967.30%	A	A				
Co 14	45%	50%	38%	39%	37%	41.54%	C			C		
Co 15	10%	0%	0%	0%	0%	2.03%	E					E
Co 16	137%	115%	28%	97%	89%	93.18%	B		B			
Co 17	0%	0%	0%	0%	0%	0.00%	E					E
Co 18	133%	148%	107%	123%	129%	128.04%	A	A				
Co 19	1%	1%	3%	3%	0%	1.55%	E					E
Co 20	175%	100%	62%	86%	76%	99.72%	B		B			
Co 21	60%	54%	51%	53%	51%	53.90%	C			C		
Co 22	65%	65%	67%	65%	59%	64.21%	B		B			
Co 23	103%	124%	143%	130%	126%	125.03%	B		B			
Co 24	49%	50%	35%	38%	34%	41.39%	C			C		
Co 25	120%	113%	83%	96%	90%	100.34%	B		B			
Co 26	99%	105%	112%	105%	128%	110.02%	B		B			
Co 27	1%	9%	2%	2%	2%	3.30%	D				D	
Co 28	20%	17%	20%	24%	28%	21.77%	D				D	
Co 29	499%	332%	45%	49%	48%	194.60%	A	A				
Co 30	10%	11%	7%	10%	9%	9.65%	D				D	
Co 31	53%	578%	1025%	243%	156%	411.06%	A	A				
Co 32	10%	10%	8%	8%	9%	9.06%	D				D	
Co 33	65%	43%	30%	27%	22%	37.39%	C			C		
Co 34	1616%	830%	573%	597%	557%	834.53%	A	A				
Co 35	89%	79%	70%	86%	83%	81.34%	B		B			
Co 36	32%	30%	30%	33%	31%	31.20%	D				D	
Co 37	1%	1%	2%	3%	2%	1.91%	E					E
Co 38	13%	8%	0%	0%	0%	4.22%	D				D	
Co 39	286%	310%	182%	210%	209%	239.20%	A	A				
Co 40	48%	45%	44%	43%	42%	44.33%	C			C		
Co 41	321%	290%	270%	305%	198%	276.96%	A	A				
Co 42	181%	-1297%	188%	263%	256%	-81.66%	A	A				
Co 43	51%	51%	35%	44%	37%	43.51%	C			C		
Co 44	0%	0%	0%	0%	0%	0.00%	E					E
Co 45	0%	0%	0%	0%	0%	0.00%	E					E
Co 46	51%	41%	28%	27%	27%	34.78%	C			C		
Co 47	137%	102%	231%	168%	174%	162.22%	A	A				
Co 48	161%	127%	114%	106%	111%	123.65%	B		B			
Co 49	35%	69%	53%	36%	28%	44.12%	C			C		
Co 50	186%	192%	214%	178%	188%	191.47%	A	A				
Co 51	65%	62%	40%	46%	41%	50.78%	C			C		
Co 52	13%	43%	3%	3%	2%	12.96%	D				D	
Co 53	1%	2%	2%	2%	2%	1.64%	E					E
Co 54	99%	83%	77%	86%	86%	86.26%	B		B			
Co 55	82%	70%	63%	78%	53%	69.50%	B		B			
Co 56	4%	4%	6%	7%	7%	5.39%	D				D	
Co 57	237%	232%	168%	177%	165%	195.76%	A	A				
Co 58	118%	110%	111%	135%	127%	120.14%	B		B			
Co 59	45%	61%	50%	47%	40%	48.57%	C			C		
Co 60	223%	436%	320%	260%	239%	295.71%	A	A				
Co 61	43%	39%	34%	40%	39%	39.03%	C			C		
Co 62	0%	0%	0%	0%	0%	0.00%	E					E
Co 63	142%	136%	113%	80%	109%	116.05%	B		B			
Co 64	99%	59%	55%	68%	102%	76.64%	B		B			
Co 65	2%	2%	2%	1%	2%	1.76%	E					E
Co 66	2%	2%	2%	2%	2%	1.76%	E					E
Co 67	124%	108%	98%	111%	101%	108.74%	B		B			
Co 68	28%	23%	25%	26%	33%	26.97%	D				D	
Co 69	16%	16%	14%	14%	13%	14.46%	D				D	
Co 70	15%	13%	10%	9%	8%	10.99%	D				D	

Appendix 6 – Semi-structured Interviews

Reference – Informant A1

General themes

General usefulness of financial reports to investors/analysts

Financial reports are very important clearly! In the post-Lehmann environment there is the view that it is important to undertake direct research rather than relying on other information such as that produced by for example, the credit rating agencies. Financial statements are a key starting point in the analysis.

Complexity / clarity / transparency of accounting information

The matters of complexity and clarity are not generally considered to be a problems but it really depends on the sector. Analysts may often be able to bypass specialists but certain sectors have inherent complexity – in particular, banking is very complex.

Disclosures – extent and appropriateness

There are some concerns about the extent of disclosure – companies often hide behind the concept of commercial sensitivity of information based on the argument that they do not believe it is fair to be forced to reveal too much information to their competitors! This creates a tension between the interests of companies versus the needs of investors.

A related point concerns the frequency of reporting – is it a good idea to have quarterly reporting as well as a greater amount of information? Quarterly reports are not necessarily a good thing especially if it introduces too much volatility.

Supplementary information used – unpublished material?

Financial reports represent the most important form of information – this is because financial reports are audited and therefore, are considered to be reasonably unbiased and factual rather than reflecting too much sentiment of the company directors. Supplementary information is also collected from directors' presentations to analysts and further meetings and discussions and this helps to provide a picture of what is going on.

What are the most useful analytical techniques applied to financial statements?

Different metrics are used by different fund managers even within the same firm so these comments have to be viewed as the coming from one particular individual. An overall comment is that there is no one "magic bullet" and whatever analytical techniques are used it is always necessary to read the nuances. Specific measures include DCF, EV over sales,

dividend yield and analysis of EBIT. Tax and gearing analysis is performed (in response to question).

Note: In the above discussion, EV = enterprise value

Specific pensions accounting matters

Is pensions info better / worse than general / other accounting info?

The accounting profession doesn't do itself any favours when it comes to pensions accounting! The first point is that there is a pseudo-accuracy introduced – this is most apparent in the emphasis on "snap shots" when what is needed is a sense of the volatility – this is a major shortcoming of IAS 19.

A further issue is that there are really three views of pensions and three different measures of the pension liabilities: the "accounting view", the "actuarial view" and the "insurance view". The accounting view is based on the IAS 19 approach; the actuarial view differs from this and is presented in the tri-annual actuarial report and reflected in the pension fund accounts – but this information is not always made available to analysts; and finally, the insurance view is in the form of a current buy-out value that may be negotiated between an insurance company and the pension scheme sponsoring company. The prevalence of three approaches is a potential source of confusion and requires clarification in any discussions about pension liabilities.

Is B/S info more/less useful than P/L info?

Balance sheet information is less useful than profit and loss information and indeed, the key information is really the cash flow but unfortunately this is not really clear under the current IAS 19 form of pension accounting. The balance sheet information is largely theoretical – for example choice of discount rate - and there is a real risk that it is distorted in an effort to make it consistent with the information in the income statement and the cash flow statement – these are like the corners of a carpet which are very difficult and in fact impossible, to pin down simultaneously so that when you pin two down the third springs up!

There is something of an analogy in the accounts of property investment companies in which the property values in the balance sheet have to be taken with a pinch of salt – the balance sheet figures for pensions have to viewed with great caution – actually this means there is far less use made of balance sheet figures than other information for analysis purposes in an effort to identify cash flow effects.

Are notes to accounts useful enough / how could they be improved?

The notes could be improved by providing more cash flow information about pensions – as said earlier there is considerable scepticism about the balance sheet – I feel my position is sceptical but not cynical..

What are the most useful analytical techniques for pensions accounting info?

There isn't an attempt to model pensions per se – the approach is to look at sensitivity in the financial reports and also try to separate operating EPS. It is considered necessary to de-compose the assets and liabilities for example to find out how big are the liabilities as a percentage of market value?

[Note: this point about the analysis of liabilities is also interesting in view of earlier comments about the balance sheet information that might have been interpreted as meaning there is very little analysis of balance sheet figures and disclosures – discussion point?]

What are the major problems (up to 3) with pension accounting / financial reporting?

Firstly, there is very poor information about real cash flows;
Secondly, there is a gap (or difference) between the actuarial, accounting and insurance / buy-out measures; and,
Thirdly, the use of the notional interest charge and its impact on the EPS figure and the danger that it has an influence on decisions.

Do you use the services of a qualified actuary – in house or external?

No – there is no actuary or similar specialist in the team.

As a theoretical point, if there was a need for the advice of an actuary or similar specialist on a very technical matter, such services would only be sought on a consultancy basis for say, one to two hours.

How much use is made of actuarial reports / specific actuarial info?

No use (or very little use) is made of actuarial reports or other actuarial information and the audited accounting information in the financial reports is the main (or only) information.

Audit / auditors

General audit environment -
Do you or other analysts (in your view) have any particular concerns about the auditing environment e.g. in relation to independence or potential consultancy bias?

Following the banking crisis the view is that you have to be a bit wary as it appears that there is scope for (auditor) independence to be compromised.

The extent of client fees for audit and other services such as tax consultancy is considered to be a potential problem and even a conflict.

Specific pension audit environment -
Are there concerns about audit of pensions information and disclosures (and are these concerns greater than the general case)?

Pensions accounting is problematic but probably not the major issue – or any worse than the general concerns about auditing. Nevertheless, it has been observed that companies are under pressure to reduce deficits and they can do that by "fair means or foul" – there is scope for subjective analysis for example in the choice of discount rates and it is not clear how such inputs are audited.

Reference – Informant A2

General themes

General usefulness of financial reports to investors/analysts

Financial reports are generally useful – but not necessarily. Problems arise with cross referencing and disclosure. Sometimes information is hard to find – it should be said that it is not impossible to find so this is more about the convenience of information from a research point of view.

Complexity / clarity / transparency of accounting information

Financial reporting is certainly not always clear enough – good examples of problematic areas are pensions, financial instruments and intangible assets. In the case of pensions it would be better to know the actuarial basis of valuation (the "trustee valuation") as this drives the cash. Financial instruments and intangible assets could be better presented.

Disclosures – extent and appropriateness

It would be good to see more disclosures – this is probably a likely response from an analyst's perspective. The key question is what is driving cash flow?

Supplementary information used – unpublished material?

Supplementary information is usually obtained in presentations to analysts. There are also meetings with management. Sometimes these meetings reveal very little but on occasions they (the meetings) may be significant.

What are the most useful analytical techniques applied to financial statements?

It is important to put in a decent amount of track record – I would suggest 10 years of report and accounts. The focus is on cash flow, net debt, operating cash flow, free cash flow, net assets, share capital, provisions and pensions.

I look carefully at the relationship between the income statement and the balance sheet – for example, how does CAPEX relate to depreciation? I usually use a rolling 4 year basis for the analysis. I also perform tax analysis and concentrate on the cash payments of tax.

Specific pensions accounting matters

Is pensions info better / worse than general / other accounting info?

There is a lot of information on pensions but the current pension disclosure is not really that helpful for estimating future cash commitments. Balance sheet information can be misleading or is not really meaningful enough.

Is B/S info more/less useful than P/L info?

I have some issues with both balance sheet and profit and loss accounts – the balance sheet as mentioned may be misleading or lacks usefulness (due to volatility issue) – it is dependent on actuarial assumptions at the time such as interest rates used as a basis for discounting and other economic inputs. In terms of the profit and loss, there could be more information on the pension service charge – this would possibly provide more economic reality.

Are notes to accounts useful enough / how could they be improved?

There could be more clarity – although there is quite a lot of information and there is probably enough information to permit analysts to work out how much cash is going in and establish what is normal. Basic assumptions are indicated but it still requires significant interpretation.

What are the most useful analytical techniques for pensions accounting info?

I use ratio analysis for example, gross liabilities to market capitalisation. I try to work out Free Cash Flow and work out EV (enterprise value) to reflect th pension liability – for EV purposes I tend to use the most recently reported deficit figures (PA – PL).

What are the major problems (up to 3) with pension accounting / financial reporting?

Firstly, volatility of deficits i.e. PA versus PL.
Secondly, trustee valuation versus accounting valuation – why is there a gap?
Thirdly, lack of information about the pension service charge.

Do you use the services of a qualified actuary – in house or external?

No.

How much use is made of actuarial reports / specific actuarial info?

I tend to rely on the notes in the financial reports – so actuarial reports are not sought. It may be possible to conceive of a situation when further information may be sought but that would really depend on whether or not the information on the financial report was useful enough or clear enough.

Audit / auditors

General audit environment -
Do you or other analysts (in your view) have any particular concerns about the auditing environment e.g. in relation to independence or potential consultancy bias?

I have some concerns about whether auditors challenge subjective valuations – associated with possible overstatement of profits.

I also have concerns about "overly aggressive" results by companies (again there is a question mark over whether auditors challenge client company management.

Specific pension audit environment -
Are there concerns about audit of pensions information and disclosures (and are these concerns greater than the general case)?

Although there are some concerns about pensions accounting – expressed above – it is appreciated that pensions are very long term.

Concerns are greater in other areas of accounting i.e. other than pensions accounting. I believe that there should be more of a focus on converting profits into cash – auditing should reflect this important area of accounting.

Other Points

Accounting under IAS 19 is understood to require that the pension service charge (PSC) is included in operating costs while the interest charge includes the amount calculated from the unwinding of the discount rate for the year plus the expected return on plan asset (ERPA). However, there is a problem with comparability since for some companies the "interest" items (for DB pensions) are contained within EBIT (earnings before interest and tax)_ rather than in the Financial Income or Expense item in the income statement.

Reference – Informant A3

General themes

General usefulness of financial reports to investors/analysts

A distinction may be made between private and public companies. There seems to be more rigour and standardisation in public accounts in terms of base information. There is perhaps a false sense of security arising from published accounts – a bit like "seat belt danger" or thinking "I feel secure but should I be more critical?" I would expect good analysts to understand this danger and strip away emotions.

Complexity / clarity / transparency of accounting information

If I wear the "hat" of an angel investor or a private equity investor acquiring a business then I can be very critical. A lot of the information in published accounts is taken up by the profit and loss statement and the balance sheet and notes but I really need to know about cash flow. Unfortunately the cash flow statements are very rudimentary. It has to be remembered that an event on one day can bankrupt a company – this is very topical in the environment of 2011 !

Disclosures – extent and appropriateness

I would describe much of the disclosures as "boilerplate" – the notes are in standard form and seem to be included simply because they have to be made in line with standard practice. There can be problems understanding who owns shares – the use of nominees makes ownership less clear. It may also be argued that a decent analyst will be able to understand the key issues.

Supplementary information used – unpublished material?

Supplementary information is necessary to try to work out what is in the heads of the CEO, CFO and the rest of the Board. Considering where the business is going is a bit like a police investigation. The process involves building on traditional analysis using ratios and determining creditor days and so on. So you have to do the (ratio) analysis and then dig holes.

What are the most useful analytical techniques applied to financial statements?

It is necessary to look at the company in the context of other companies in the sector. The first layer (historic) contains ratios and multiples – the usual ones – and comparables in the sector and the second layer contains forward looking financials constructed to forecast one year in the future, 2 to 3 years in the future and beyond with less weight beyond 3 to 5 years. Different sectors need different analysis. Ultimately cash flow is key – the business

has got to be cash generative. Tax and gearing is factored into the analysis – particularly the cash flow analysis.

Specific pensions accounting matters

Is pensions info better / worse than general / other accounting info?

Pensions information is a lot worse! In short it is a hidden minefield but it seems to be getting a lot more attention now (from the accounting profession / standard setters).

Is B/S info more/less useful than P/L info?

There are different compartments of information for pensions [actuarial inputs such as discount rates and other key input assumptions] – there is information about the position at a particular time (balance sheet) but it is also necessary to try to make sense of the information that might tell us about the ability of the company to generate cashflow to cover pension obligations in the future. This is the wider problem. This is exactly the same problem discussed earlier when we talked about financial reporting in general (so cashflow is key yet the information provided in the financial reports seems very rudimentary). [Note: the implication seems to be that P/L information is potentially more useful than B/S information but cashflow information would be more useful still].

Are notes to accounts useful enough / how could they be improved?

The pension note contains quite a lot of information but it (the IAS 19 format) doesn't deliver clarity. You would need the CFO to explain. There is a relatively simple presentation but there is a high degree of complexity behind it. There is a danger in implied simplicity that isn't really there. A subject like pensions accounting lends itself to probabilistic analysis and perhaps needs algorithms to answer questions about inter-relationships.

What are the most useful analytical techniques for pensions accounting info?

In view of the constraints of the information (discussed earlier) I seek to look at the information that the trustees have got and as far as possible try to see how the actuaries are viewing the growth of the asset pool and other matters affecting the liabilities, particularly life expectancies. It is necessary to look behind the statements.

What are the major problems (up to 3) with pension accounting / financial reporting?

Firstly, there are incentives (for preparers of financial reports) to mitigate bad points and enhance good points without this being sufficiently clear to the user.
Secondly, there is insufficient attention paid to the linkage between the company accounts and the pension scheme as the pension may be viewed as one huge client with the potential to cause problems to the company itself.

Thirdly, there needs to be more information about creditors' covenants to permit an assessment to be made of the potential effects of the pension scheme obligations on the loan covenants (and the dangers of defaults).

Do you use the services of a qualified actuary – in house or external?

No.

How much use is made of actuarial reports / specific actuarial info?

I would expect many analysts to seek further information in the form of actuarial reports especially where it is a large or complicated scheme.

Audit / auditors

General audit environment -
Do you or other analysts (in your view) have any particular concerns about the auditing environment e.g. in relation to independence or potential consultancy bias?

A standard set of rules seems to guide the audit approach. There is a lot of "stretch" when it comes to being more or less critical of a company – by this I mean that it seems possible to be in compliance with the rules and yet the financial reports still do not necessarily give users all the information they need. I feel that big companies must generate a significant proportion of audit fees – even for the big accountancy firms – so I wonder whether it may be appropriate to have legislation similar to the Glass Stiegel Act for auditors.

Specific pension audit environment -
Are there concerns about audit of pensions information and disclosures (and are these concerns greater than the general case)?

With pensions there is the potential for even greater damage (than that described for the general reporting environment). There is an "actuarial jungle" with the questions over discount rates and various valuation issues. It would provide more comfort to users if there were more references to specific pensions information – rather than imply that the user of the accounts should look at the actuarial reports as a separate exercise.

Other Points

Accounting for pensions is a key area of financial reporting of (sponsoring) companies and this specific matter underlines the need for greater risk reporting in financial reports. Analysts need to consider the extent of insurance against declines in the value of the company particularly where a large proportion of the pension fund assets may be represented by investments in FTSE 100 companies.

Reference – Informant A4

General themes

General usefulness of financial reports to investors/analysts

Financial reports are very important for trend lines. This means using the statements as well as the notes and the overall reports. I am not interested purely in what the chairman says. It is particularly important to examine the revenue line, the profit from continuing operations and the dividend policy. The detailed wording is boiler-plate and I doubt whether many analysts read through the report from front to back.

Complexity / clarity / transparency of accounting information

Fundamentally transparency is good although there can be a large number of pages of detail – for example, 5 pages or more may cover the fundamentals – this may be confusing to some readers. Analysis involves trying to get to the core number, hence the use of EBITDA although that measure is a bit naughty! An area where there is much more detail now is directors' remuneration with details of bonuses and pensions and other items of remuneration.

Disclosures – extent and appropriateness

There are more disclosures than in the past and certainly much more detail – Terry Smith in his book "Accounting for Growth" referred to the problems in the past but transparency is much better now or at least the methodology is explained now. It is not all good news however, because it is only okay if you know what you are looking for otherwise it is a bit like three steps forward two steps back. In terms of analysts' capacity there is a much greater range of ability than in the past.

Supplementary information used – unpublished material?

A major part of the supplementary information results from direct discussions with the chairman and other board directors - a compliance officer will sit in the meetings with analysts. Transparency has to be balanced with the compliance restriction. The challenge for analysts is that they have to be more inductive than deductive and this is increasingly the case so that the judgement of analysts is more important than before. A practical example is in respect of the typical powerpoint presentations to analysts that are usually more about form over substance so that the analysts have to work it out for themselves.

What are the most useful analytical techniques applied to financial statements?

The most important analytical techniques are concerned with the capital structure, cashflow and profitability. In the first place it is important to determine whether corporate gearing is appropriate. "Leverage" has become a pejorative term so loans are described more

specifically and now "senior secured debt" sounds less dangerous! Going back to analytical techniques, P/E ratios are used while cashflow analysis will be performed before profit and loss analysis – profitability analysis is also performed but cashflow is more important. In trying to make sense of the future it is important to think strategically to decide what are the real questions. A criticism of financial reports is that they don't help you to address the big questions – I would say that this is because financial reports are provided by accountants on a boiler plate basis with auditors concerned primarily with what is said and how it is said. Tax is also important and should be analysed as part of cashflow (in response to question).

Specific pensions accounting matters

Is pensions info better / worse than general / other accounting info?

It is hard to say – in fact, I don't know! There has been so much change in pension regulation. Regulations guide the reporting in the form of the numbers. Looking back over the years I found the so called "pension holidays" worrying intuitively.

Is B/S info more/less useful than P/L info?

The balance sheet gives a "quantum" of the position but doesn't tell you where it is going [it is subject to a number of assumed and not easily verifiable inputs such as "the" discount rate]. Pension information is probably uncorrelated with the rest of the information (in the financial reports).

Are notes to accounts useful enough / how could they be improved?

I'm not sure how important the narrative is. The important question is what is the quantum of the liabilities and what is the effect on the (sponsoring) company. It is important to determine the cashflow impact – the information is probably okay from that point of view.

What are the most useful analytical techniques for pensions accounting info?

Pension accounting analysis may require similar analytical techniques to those outlined for the general analysis of financial reports. There will be an analysis of the impact of pensions on the capital and gearing position and an assessment of the amount for which the company or group is on the hook in respect of pension liabilities.

What are the major problems (up to 3) with pension accounting / financial reporting?

Firstly, there are problems of estimating more accurately the effect of the pension scheme on the company or group.
Secondly, it is not clear how on the basis of the current form of the accounting information you may forecast pension liabilities and changes in pension liabilities.
Thirdly, there are problems in assessing the reinvestment risk of assets in the PF – as a side note ZCBs would be a good product for pension funds [note: this is an interesting aspect

and highlights the importance of the pension assets side as well as the estimated pension liabilities].

Do you use the services of a qualified actuary – in house or external?

External actuary is used (if needed) to determine and analyse the actuarial profiles

How much use is made of actuarial reports / specific actuarial info?

The actuarial reports will perhaps not be used at the level of the analyst who is really only interested in what the impact of the pension fund is on the company itself.

Audit / auditors

General audit environment -
Do you or other analysts (in your view) have any particular concerns about the auditing environment e.g. in relation to independence or potential consultancy bias?

I am not that concerned generally but I feel that major conflicts of interest would be concerns for investors and analysts. I do suspect there is a problem. I have identified some confusion between the accounting standards and the intended outcomes.

Specific pension audit environment -
Are there concerns about audit of pensions information and disclosures (and are these concerns greater than the general case)?

I would expect auditors to defer to their experts for there are specialist in-house divisions in big firms such as Deloittes. This not really a problem and I wouldn't expect auditors to have specific in-depth knowledge of very specialist technical subjects – such as pensions or financial instruments.

Other Points

A key problem concerns the valuation of assets or liabilities which don't have a natural market.
As a general remark it may be said that people don't think about pensions unless they have to! The problem is not going to go away. Children born now are going to live to 100 so are we going to be able to shift the retirement age to 85?!

Reference – Informant A5

General themes

General usefulness of financial reports to investors/analysts

Financial reports are generally useful. There are some concerns that might be called "normal concerns" for example, although listed companies may have more standardised accounting this may not be the case with accounts that are used for private equity investments.

Complexity / clarity / transparency of accounting information

Accounting information is generally clear but in the case of pension accounting information it is too complicated. It is really necessary to use a specialist to understand it and rely on the outputs especially in the case of a corporate acquisition.

Disclosures – extent and appropriateness

Disclosures are generally useful but there is still a need for extra information beyond the accounting data and explanations. There is potential to obtain such additional information as long as you have access to the management of the company – as analyst or potential acquirer of the entire business (private equity/buy-out firms).

Supplementary information used – unpublished material?

Yes – very much so especially when a takeover is involved as mentioned earlier – so you need information beyond the annual reports.

What are the most useful analytical techniques applied to financial statements?

The key analytical techniques are: P/E analysis; scrutiny of historic information; and, cash flow analysis primarily – the latter being the most important aspect of the analysis especially when it comes to forecasting. Tax and gearing analysis is also important (in response to question).

Specific pensions accounting matters

Is pensions info better / worse than general / other accounting info?

In the specific case of pensions it is harder to assess risk – it is a "finger in the air job". The complexity of pensions finance and accounting is an illustration of how a little information is more dangerous than none!

Is B/S info more/less useful than P/L info?

The tendency is to look at the liability to a large extent particularly when a buy-out of the fund is required as part of an acquisition (this is usually the case now). The valuation of a pension fund is considered to require very specialist knowledge [entailing a forecasting of future cashflow needs and appropriate discounting for valuation purposes]. After balance sheet analysis cashflow is more useful than the profit and loss.

Are notes to accounts useful enough / how could they be improved?

The nature of the analysis in acquisition transactions means that more detailed information is required – specialist expert advice is taken from a qualified actuary. The vendor of a business will also have input from an actuary as part of the due diligence process where there is a significant (defined benefit) pension scheme in place.

What are the most useful analytical techniques for pensions accounting info?

Metrics such as P/E multiples are used – adjusted for pensions issues
No DCFs are used but forecasting is undertaken starting with the historic information.

What are the major problems (up to 3) with pension accounting / financial reporting?

Firstly, complexity
Secondly, cashflow information is not clear enough (given that it is probably the most important part of the information)
Thirdly, the maximum potential pension liability is not clear enough

Do you use the services of a qualified actuary – in house or external?

Yes – in particular, a buy-out valuation is obtained using the services of an actuary. In practical terms this may lead to an agreed price reduction in lieu of an actual buy-out.
As a practical example (from my own recent experience) the existence of a significant pension scheme (and the difficulty of valuing the pensions liabilities) is a major cause of a deal falling over. Again, from a recent real example, the actuarial valuation was found to be two thirds of the buy-out valuation!

How much use is made of actuarial reports / specific actuarial info?

As mentioned before a lot of use is made of actuarial reports and the specific actuarial information contained in such reports.

Audit / auditors

General audit environment -
Do you or other analysts (in your view) have any particular concerns about the auditing environment e.g. in relation to independence or potential consultancy bias?

I think it's fair to say that I am reasonably comfortable in general. Having said that I have what I expect might today be called "normal concerns" with some aspects of standardised accounting. In fact when in comes to private companies as distinct from large listed companies there won't necessarily be standardised accounting so that there is more need for discussions to clarify certain items in the financial reports.

Specific pension audit environment -
Are there concerns about audit of pensions information and disclosures (and are these concerns greater than the general case)?

The concerns are even greater when it comes to pensions accounting given the greater complexity and apparent scope for subjective arguments in measurement.

Other Points

People may get used to the idea of standardised accounting but it isn't always relevant beyond listed companies as noted earlier.

Reference – Informant A6

General themes

General usefulness of financial reports to investors/analysts

Financial reports are the top of the list of information used, certainly from a corporate finance perspective, as they are the basis for valuing a company. We also rely on analysts reports and certain other information.

Complexity / clarity / transparency of accounting information

As an overall comment the accounting information is mostly okay but it could be clearer at times.

Disclosures – extent and appropriateness

Disclosures are generally okay at least, under normal circumstances in my view. As I said before when you asked about complexity and transparency there are some issues there and it is useful to supplement the information obtained from the financial reports.

Supplementary information used – unpublished material?

As well as using the financial reports we rely on analysts - most public companies have analysts' reports that are directionally useful. It is also useful to look at key contracts and information that is contained in circulars that companies are required to issue to shareholders. Press comment is also in the list of information but it may only be directionally useful.

What are the most useful analytical techniques applied to financial statements?

There are a whole range of metrics and methodologies – the main ones are P/E methods, EBITDA multiples of free cash flow and LBO analysis of the "target company" to assess its possible value and based on the forecasts and what it might be worth. As mentioned under "other points" below gearing analysis is important in the context of pension liabilities as well in that the market tends not to take much account of pension liabilities until they become significant in the context of the company and then the analysts say "we are going to add that to net debt". Tax analysis is also important (acknowledged in response to question).

Specific pensions accounting matters

Is pensions info better / worse than general / other accounting info?

Yes it is worse or at least, I would say that it is a particularly complex area of financial reporting. The (defined benefit) pension liability is quite different as it can't be looked at in the same way as debt which is usually presented with a breakdown between long-term and short-term debt and so on. There is even the feeling that only the pension trustees have the most relevant information and know what is going on!

Is B/S info more/less useful than P/L info?

When valuing companies both are relevant. The balance sheet information helps to assess the liabilities and is very important when there are unfunded schemes. Balance sheet information is sensitive to input assumptions and some of these are understood to be subjective e.g. discount rates? The profit and loss information is important for showing the effect of the ongoing funding and this leads us of course to cash flow as well. Cash flow is also very important and probably the most important consideration.

Are notes to accounts useful enough / how could they be improved?

In the notes you tend to get a reasonable statement of assets and liabilities of the scheme. It seems possible to get a reasonably clear understanding of the position of the scheme and the company.

What are the most useful analytical techniques for pensions accounting info?

As mentioned in the general part metrics used include P/E analysis, EBITDA multiples of free cash flow and LBO analysis – all of these will include adjustments to take account of the cost and net liabilities associated with pensions.

What are the major problems (up to 3) with pension accounting / financial reporting?

Firstly, it is not always easy enough to get information on cash flow – this is an important drawback since these figures are needed
Secondly, complex reporting doesn't provide great confidence
Thirdly, it is hard to assess the likely future position

Do you use the services of a qualified actuary – in house or external?

Yes – as it is very difficult to model the pension scheme it is necessary to use a specialist (i.e. an actuary) – in corporate finance advisory activity you will rely on an expert appointed by the client to have a look.

How much use is made of actuarial reports / specific actuarial info?

There is limited direct use made of actuarial reports themselves so that we look to the summarised position in the accounting information. From the perspective of valuing a limited company we are not too concerned about the value of the assets in the pension fund – that is more of a forensic matter with companies that are very heavily exposed – the BTs and the BAs of this world! The assumption is generally that if a company is servicing its debt and handling its pension exposure comfortably out of operating earnings then there is less concern about precise valuations of pension assets and liabilities at any particular time.

Audit / auditors

General audit environment -
Do you or other analysts (in your view) have any particular concerns about the auditing environment e.g. in relation to independence or potential consultancy bias?

I feel comfortable relying on audited accounts in normal circumstances – only in circumstances when for example, the auditor is small relative to the client would there be a possible cause for concern.

Specific pension audit environment -
Are there concerns about audit of pensions information and disclosures (and are these concerns greater than the general case)?

I have generally the same feelings about the audit of (defined benefit) pension accounting information as for the overall audit but (defined benefit) pensions are more complicated so I would expect that the auditor also has to rely on specialist input and actuarial conclusions as the basis for the report.

Other Points

My final comment is that the market tends not to take much account of pension liabilities until they become significant in the context of the company and then the analysts say "we are going to add that to net debt".

Reference – Informant A7

General themes

General usefulness of financial reports to investors/analysts

Financial reports are generally important to many analysts and investment professionals but of course my work is specialised so I only look at specific information.

Complexity / clarity / transparency of accounting information

There are issues with complexity and transparency and pensions accounting is an example of that .

Disclosures – extent and appropriateness

There are different levels of disclosure and in a number of areas it is not terribly transparent.

Supplementary information used – unpublished material?

In areas of core specialism.

What are the most useful analytical techniques applied to financial statements?

As these are very specific it is more relevant to discuss this in the context of pensions In terms of tax and gearing the implication is that these would be important for analysts generally but in this case the clear focus of the analysis is on the financing of the DB pensions – so only if there are tax or gearing aspects to this would such analysis be relevant.

[See next section].

Specific pensions accounting matters

Is pensions info better / worse than general / other accounting info?

Pension accounting is immediately less relevant! Pension accounting is very confusing. Trustees, for example, consider many factors such as covenant assessment that is, the value of the sponsor (company) and the ability of the sponsor given its underlying capacity to support the scheme. The information provided for these purposes is not useful in fact it is misleading.

Is B/S info more/less useful than P/L info?

There are major problems with balance sheet and P/L information. The balance sheet (information) is usually materially flattering while the P/L (income statements) include returns on pension assets that are entirely fictional. Looking at the B/S a key problem is that for the purposes of pensions accounting a common discount rate (the AA bond rate) is recommended yet this common rate is inappropriate if anything. The circumstances normally require a discount rate that is lower and normally a long way away from being a AA bond rate. Looking beyond the balance sheet and profit and loss account the information that is required to assess cash flow needs to be sought this requires looking carefully at the details (notes). .

Are notes to accounts useful enough / how could they be improved?

Deficit repair is a cash flow item – you can get the cash flow information but often you can't get the length of the recovery plan as details are not in the accounts – so this is a problem (if you want to perform a more detailed analysis of the pension funding and obligations going forward).

What are the most useful analytical techniques for pensions accounting info?

The most useful analysis is the process of looking at the valuation to derive "enterprise value". Just like analysts adjust for debt, the pension fund is just another creditor of the company so it needs to be deducted from the real underlying value to produce a net position.

What are the major problems (up to 3) with pension accounting / financial reporting?

Firstly, the accounting produces a theoretical measure rather than one which more closely reflects reality – put another way, the underlying deficit is needed rather than the accounting deficit;
Secondly, there is a problem determining an appropriate discount rate or discounting process – input from actuaries is needed for this analysis
Thirdly, leading on form the previous point there isn't a clear presentation of the long term versus the short term view – you don't have rolling average discount rates (the selection and form discount rates is complex and an area for actuaries?)

Do you use the services of a qualified actuary – in house or external?

Yes – for example, in M & A deals actuaries are involved as the amounts are very material. A further point is that trustees look at the "solvency deficit" – which is different from the information presented in the financial reports.

How much use is made of actuarial reports / specific actuarial info?

A lot – see earlier comments.

Audit / auditors

General audit environment -
Do you or other analysts (in your view) have any particular concerns about the auditing environment e.g. in relation to independence or potential consultancy bias?

As this concerns the sponsoring company it is not something I think about so much as I specialise on the pension schemes and at the trustee level – so I'm not sure that I have any strong views on this nor that they would be of much help – as I have said earlier, I do not place any reliance on the pension accounting figures in the financial reports!

Specific pension audit environment -
Are there concerns about audit of pensions information and disclosures (and are these concerns greater than the general case)?

The big firms have specialised pension departments with actuaries involved so they should be well aware of the reporting and auditing obligations

Note: this interview is one of the most critical of the whole basis of pension accounting and reporting in the (audited) financial reports.

Other Points

The big challenges come down to accounting treatment and transparency – discussed of course throughout the interview so this is by way of summing up.

Note: There are issues concerning fundamental measurement – as well as presentation and transparency that is inherently associated with measurement reliability. This also raises questions about the role of the actuarial and accounting professions and how they should work together in the interests of all the users, not just clients!

Reference - Informant A8

General themes

General usefulness of financial reports to investors/analysts

It may be said that financial reports are a major part – in fact the major part – of the material used in analysis for investment management purposes.

Complexity / clarity / transparency of accounting information

All of these aspects – complexity, clarity and transparency – can vary between jurisdictions but also between companies ort sectors in a single jurisdiction e.g. the UK. This variation exists in spite of the requirement that companies have to conform to accounting standards. It seems there is considerable scope for various presentation forms within the requirements.

Disclosures – extent and appropriateness

Unfortunately, there is wide variation in the extent and appropriateness of disclosures albeit accounting standards are meant to establish uniformity. On the whole more information is to be preferred but of course depending on the form and clarity of that information it may or may not be useful to investment analysis. Less can be more.

Supplementary information used – unpublished material?

The simple answer is that very little of the headline stuff is useful – the useful material is mostly in the notes to the financial statements.. Information obtained from discussions with the management – this would be "unpublished material" – is very important. There is also a balance between extracting information and observing or accepting the commercial sensitivity of certain corporate information.

What are the most useful analytical techniques applied to financial statements?

The most useful techniques involve cash flow analysis – that requires 'drilling' into the documents. Certainly cash flow information is more useful than profit and loss information. I also use ratio analysis, some DCF with forecasting analysis although it has to be remembered that valuation is entirely subjective.

Specific pensions accounting matters

Is pensions info better / worse than general / other accounting info?

Pension accounting information is definitely worse than other accounting information. In the majority of cases accounting information is definitive – it exists! Pension accounting is different – perhaps even a fantasy! Pension accounting brings companies into our (financial analysts') world which is about estimating the future.

Is B/S info more/less useful than P/L info?

I would say that the B/S and P/L information on pensions is of about equal use. At least in the P/L you get some idea of regular costs and expenses – but it is still not as useful as cash flow information. In the B/S you get some sense of the total future liability – again this is qualified by the need to consider the underlying assumptions.

Are notes to accounts useful enough / how could they be improved?

In their present form the pension accounting notes are not useful enough. They are not comprehensive and detailed information – as inputs – is severely lacking. What needs to be there is: information on the allocation (and detail) of pension assets; the assumptions beyond the basic actuarial assumptions; and, a summary in the form of a specific pension accounting financial report.

What are the most useful analytical techniques for pensions accounting info?

Specific techniques need to be used for companies with significant current or potential pension exposures: a detailed breakdown of investments; maturity profile of the pension liability; and, some sense of the duration of the liability.

What are the major problems (up to 3) with pension accounting / financial reporting?

Firstly, there is the difficulty of ensuring that realistic assumptions exist in the notes to the financial statements.
Secondly, it is very difficult to obtain or produce on the basis of the information given a realistic statement of liability and duration with a debt curve.
Thirdly, the validity of the pension information is reduced by the ability under current accounting standards (to be amended) to smooth results.

Do you use the services of a qualified actuary – in house or external?

If necessary the advice of a qualified actuary would be sought – there may also be sufficient skills in-house - in fact in our case we have a qualified actuary on the team. It is worth pointing out that the need for an external actuary is unlikely as we try to avoid 'unionised' companies!

How much use is made of actuarial reports / specific actuarial info?

Very little use is made of these detailed actuarial reports – such use would only be envisaged if there was a crisis or it was considered very important due to extremely large exposures.

Audit / auditors

General audit environment -
Do you or other analysts (in your view) have any particular concerns about the auditing environment e.g. in relation to independence or potential consultancy bias?

The potential lack of audit independence or bias is only a concern if the audit doesn't come up to standard. In reality fraud is difficult to spot. Creative accounting is another matter – again it may be difficult to identify but fundamental analysis aims at achieving a greater understanding. The process may be complicated as auditors are all part of the creation! There are only rare cases of auditors contesting creative accounting.

Specific pension audit environment -
Are there concerns about audit of pensions information and disclosures (and are these concerns greater than the general case)?

In the case of the pension accounting the auditor is really beholden to the scheme actuary. The likelihood is that audit work is based more on compliance with the relevant law and applicable accounting standards than any extensive questioning of measurement or valuation.

Other Points

Accounting for pensions is a very complicated aspect of financial reporting and deserves more research by the accounting profession.

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