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**Cass Business School**  
City of London

**$\pi$**  Pensions  
Institute

# AN UNREAL NUMBER

How company pension accounting fosters an illusion  
of certainty

A Pensions Institute report for accounting standard setters,  
policymakers, employers and trustees

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*January 2008*

## An Unreal Number

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## Contents

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Foreword.....	3
Executive Summary .....	4
Introduction.....	5
A Brief History.....	6
Objectives .....	6
Past Transactions and Other Events .....	7
Mixed Measurements .....	8
Future Cash Flows.....	9
Present Values.....	9
Summary.....	10
From Gratuity To Guarantee.....	11
Pensions as Altruism.....	11
Pensions as Deferred Pay.....	11
Pensions as Funding Obligations.....	14
Pensions as Contingent Claims.....	15
Pensions as Guarantees.....	16
Summary.....	17
A Range Of Views .....	18
Not Ours, Guv.....	18
Ours, But Net .....	18
Ours, But Offset.....	19
How Much?.....	19
Summary.....	21
Smooth Operators.....	22
Spot The Conundrum.....	26
Future Cash Flows.....	26
Present Values.....	28
Plan Asset Values.....	28
Pension Liability Values.....	30
Summary.....	36
An Illusion.....	37
Conclusions.....	42
Appendices.....	43
References.....	79
Acknowledgements.....	83
About the Authors.....	83
The Institute of Chartered Accountants in England and Wales.....	84
The Pensions Institute.....	85

## Foreword

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This is the fifth\* of our series of reports that focus on pensions issues of direct relevance to accounting standard setters, policymakers, employers and trustees.

*An Unreal Number* examines pension accounting and, in particular, its effects on the results and financial position of the sponsor of a defined benefit pension plan.

Current pension accounting standards are better than their predecessors because they seek to provide information about the value of a pension plan's assets and the amounts and timing of the projected pension payments. But they reduce this useful information to a single number, which is reported as a pension surplus or deficit. This report argues that any single number is "unreal" because it cannot adequately communicate the uncertainty surrounding the ability of the assets to fund the payments.

To be sure, most of the assets held by pension funds are traded in deep and liquid markets and so can be recorded at market or fair value. Nevertheless, markets are volatile and reflecting just the market value of assets on the balance sheet date can give a misleading impression of their long-term value and of their ability to provide the cash flows needed to make pension payments over a long future period.

Dealing with pension liabilities is even more problematic, since there is currently no deep and liquid market trading these. Pension liabilities therefore have to be forecast and this calls for 'heroic' assumptions as to future wage growth, future inflation and future longevity etc. And, if we want to report present values, we have to decide on a discount rate. The assumptions can differ significantly from realised future outcomes; one current prominent example being the serious underestimation of longevity improvements.

Forecasts are only helpful if we understand their surrounding uncertainty. Pension accounting standard setters now advocate disclosure of the risks and rewards of pension plans, thereby implicitly acknowledging the limitations of any single number measure of the pension obligation. And the UK Accounting Standards Board has taken the lead by recommending the use of sensitivity analysis; this tells us by how much a number will change if we change its underlying assumptions. But it doesn't tell us how much confidence we can have in the number. What we need are valuation methods that can convey information about the probabilities of outcomes over a range of time horizons. We hope that this report will contribute to the debate on how we can achieve this.

This research was undertaken as a result of a grant from the Institute of Chartered Accountants of England & Wales' charitable trusts. We are extremely grateful to the ICAEW for its support. It has not sought to influence the conclusions of the report and it may not share the views expressed here. Finally, I should stress that the views in this report are those of the authors and not those of their employers or of the Pensions Institute, which itself takes no policy position.

Professor David Blake, Director, Pensions Institute, *January 2008*

\* The previous reports were: 'Delivering DC? Barriers to participation in the company-sponsored pensions market', by Debbie Harrison, Alistair Byrne, and David Blake, October 2004; 'Pyrrhic Victory? The unintended consequences of the Pensions Act 2004', by Debbie Harrison, Alistair Byrne, Bill Rhodes and David Blake, October 2005; 'Annuities and Accessibility: How the industry can empower consumers to make rational choices', by Debbie Harrison, Alistair Byrne and David Blake, March 2006; and 'Dealing with the reluctant investor: Innovation and governance in DC pension investment', by Alistair Byrne, Debbie Harrison and David Blake, April 2007.

## Executive Summary

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We consider whether pension accounting is aligned with the objectives of financial reporting.

Our review presumes that: the objectives of financial reporting are the provision of information useful both in assessing stewardship and in making resource allocation decisions; this information contributes to a larger value-estimation process; and fulfilment of these objectives is helped by accounts which distinguish operating activity information from investment activity information.

We trace the development of pension accounting as it evolves to reflect changing views of the nature of the pension obligation.

Cash accounting was justified when pensions were viewed as altruism. Pensions are now viewed as deferred pay; this necessitates accrual accounting.

SSAP 24's view of pensions as funding obligations was valid for defined contribution plans but not for defined benefit plans.

Historical cost accounting works for defined contribution plans but not for defined benefit plans.

Uncertainty characterises a defined benefit plan. Uncertainty as to: the ownership of the plan's assets and liabilities; the amount of pay deferred; and future cash flows.

Extant pension accounting standards: differ in their views as to the ownership of defined benefit plan assets and liabilities; limit balance sheet recognition to a pension surplus or deficit; and agree that the pension obligation of a company with a final salary pension plan is best determined by reference to projected final salary.

All pension accounting standards smooth pension costs. They do so to mitigate the effect on a company's operating results of changes in the value of its pension fund. They should, instead, segregate current service cost from other pension fund changes in value.

The "present value" of a liability is the discounted sum of the projected cash flows required to settle it. The decision-usefulness objective suggests the use of the discount rate on a reference security to determine the present value of pension liabilities. And the stewardship objective suggests that the reference security should be risk free.

The most useful information about a defined benefit plan's funded status is the market, or fair, value of its assets and the amounts, timing and uncertainty of its projected pension payments. Pension accounting standards create an illusion of certainty by reducing this information to a single number.

The defined benefit pension asset or liability that appears on a balance sheet is a hypothetical construct; an unreal number. Supplementary sensitivity analyses are but the first step towards developing valuation methods that convey information about the range of uncertain outcomes that can result from the pension promise.

## Introduction

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During the past decade, pension accounting – the ways in which companies report the financial effects of their pension plans – has been a subject of change and controversy. Today, the International Accounting Standards Board, the Accounting Standards Board and the Financial Accounting Standards Board (respectively, the international, UK and US accounting standard setting bodies) all have working parties reviewing their pension accounting guidance.

In this paper, we consider whether pension accounting is aligned with the objectives of financial reporting. We:

- briefly review those objectives and the nature of the information needed to fulfil them;
- discuss changing views of the nature of the pension obligation and the ways in which pension accounting has evolved to reflect those views; and
- evaluate different pension accounting approaches.

We refer, in our paper, to a “Show Jumping Trial”, presented in Appendix A. In that trial, we judge different pension accounting approaches against four principles: Disclosure; Measurement; Recognition; and Consistency. These principles are derived from the IASB’s conceptual framework (IASB, 2001). A pension accounting standard that applied them would require a company’s accounts to:

- disclose and reliably measure its pension expenses, income, liabilities and assets (“pension items”);
- recognise all pension items that can be reliably measured; and
- disclose, measure and recognise pension items consistently.

Our trial suggests that pension accounting is evolving towards satisfaction of these principles. Each accounting approach does better in the trial than does its predecessor. None of the extant pension accounting standards fully satisfies the principles; but an approach prepared in accordance with the latest, preliminary, views of the staff of the ASB (ASB, 2007b) does.

And yet, despite this evolution towards principled pension accounting, unease persists. Most recently, the Association of British Insurers has suggested that FRS 17, the extant UK pension accounting standard, may be distorting investment decisions (ABI, 2007).

Unease persists because, although uncertainty permeates the defined benefit pension obligation, pension accounting standards measure the funded status of a defined benefit pension plan with a single number. This, to borrow a phrase used by the Governor of the Bank of England, creates “*an illusion of certainty*” (King, 2004, page 3).

A single number cannot convey useful information about the distribution of a range of outcomes; and supplementary cash flow projections and sensitivity analyses do not dispel the illusion of certainty created by the single number. If pension accounting is to help fulfil the objectives of financial reporting, it needs to develop valuation methods that can measure the uncertainties inherent in the defined benefit pension obligation. We conclude our paper with a description of one possible method – the fan chart, invented by the Bank of England to illustrate future inflation uncertainty.

## A Brief History

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In this part of our paper, we briefly trace the history of financial reporting, in so far as it is relevant to pension accounting. We focus on the objectives of financial reporting (currently, a moving target) and the nature of the information needed to fulfil them.

### *Objectives*

Accounts were, at one time, prepared for completed, single ventures. Such a venture might have been a ship's voyage to the Indies. If the ship returned, the venture's investors would receive their share of the proceeds (Mydleton, 2004). The accounts of a single venture were prepared retrospectively to determine the value of the claims upon it (Treyner, 1993). They fulfilled this objective by recording and summarising the historical cash flows of the venture's completed transactions (Brief & Owen, 1975).

When going-concerns superseded single ventures, accounting moved from a one-period model to a multi-period framework (Brief & Owen, 1975) in which transactions in one period can have effects in other periods and in which the values of assets and liabilities can be affected by events other than transactions.

A going-concern's investors and creditors are interested in the values of their claims. But, unlike a completed venture, the value of a going-concern is not the sum of its historical cash flows. Rather, it is the sum of its discounted future cash flows (Beaver, 1989 and Treyner, 1993). At the time the accounts of a going concern are prepared, however, its future cash flows are unknown. So, the preparers and users of accounts faced a choice: estimate the going-concern's value by forecasting its future cash flows or change the accounting objective. They decided to change the objective.

Until about 1930, *"the focus was on 'stewardship'. Accounting's primary purpose was to report how well a company's management had discharged its responsibilities for safeguarding the company's assets"* (Anthony, 1987). The stewardship objective *"is concerned with monitoring past transactions and events"* (IASB, 2006, paragraph AV 1.2) about which the accounts need to provide information (IASB, 2006, paragraph AV 1.3).

Despite this stewardship focus, many users of accounts continued to seek estimates of value to help both to assess stewardship and to make investment decisions. There was, thus, a gap between the stewardship information provided by accounts and the estimates of value required by many users of accounts. Two developments helped to close this gap.

First, in the mid-1960's, in what Beaver (1989) called an "accounting revolution", accounting standard setters adopted "decision-usefulness" as an objective; defined, most recently, as the provision of *"information that is useful to present and potential investors and creditors and others in making investment, credit, and similar resource allocation decisions"* (IASB, 2006, paragraph OB2).

Secondly, security analysts assumed responsibility for providing estimates of value based on the information provided by the accounts and by other sources. The accounts facilitate *"judgements about the entity's financial performance*

and financial position and it is these judgements, in combination with other information, that enable, inter alia, a value for the entity to be assessed" (ASB, 1999, paragraph 6.10).

As a result, the "main objective of financial accounting has slowly but surely become providing information for security analysis ..... today it is probably realistic to view the activities of the accountant and the security analyst as two parts of a larger process primarily devoted to estimating the value of corporate common stocks" (Treynor, 1972).

So, a company's accounts need to provide information that will help both in monitoring past transactions and other events and in making resource allocation decisions. And they need to provide this information as part of a larger value-estimation process.

### *Past transactions and other events*

An account of past transactions can be partly provided by information about a company's cash flows during an accounting period. But transactions in one accounting period can affect cash flows in subsequent periods. So, "information about financial performance measured by accrual accounting rather than only by the entity's cash flows during the period is essential ....." (IASB 2006, paragraph OB23). Accrual accounting recognises the effects of transactions when they occur, and not as cash is received or paid.

Opinions differ as to the measurement basis best suited to providing an account of past transactions and other events. Myddleton (2004) advocates historical cost accounting for stewardship. "The historical cost of an asset is the amount paid for it and the historical cost of a liability is the amount received in respect of it or the amount expected to be paid to satisfy it" (ICAEW, 2006, page 22). Historical cost accounting helps fulfil the stewardship objective because it focuses on the decision to acquire an asset or incur a liability, the effect on earnings of that decision over the life of the asset or liability and the ultimate recoverable value of the asset or settlement value of the liability (FASB, 1993, paragraph 42). Historical cost accounting "is firmly based on the traditional common view that profit is the excess of revenues over historic expenditure... .. Historically this system has proved to be of great value in protecting the interests of shareholders and creditors of companies, and, when prices are stable, results in a clear and unambiguous view of a company's affairs" (Sandilands' Committee, cited in Myddleton, 2004).

Barrett et al (1991) concede that historical cost accounting is a relevant and reliable method of recording transactions under conditions of price stability in that it is both representationally faithful and verifiable. "But when the system is called on to reflect the effects of other events and circumstances besides transactions to which the entity is a party, and when it confronts conditions of unstable prices, its virtues fall away" (Barrett et al, 1991, page 91). Historical cost accounts are deficient "for dealing, in particular, with derivatives (which have little or no initial cost but can expose companies to very substantial financial risk) and diminutions in the value – impairments – of assets" (Ernst & Young, 2005, page 1). And they do not recognise upward value changes in assets (Barrett et al, 1991, page 91).

### *Mixed measurements*

Accounting has evolved to address some of the deficiencies of historical cost accounting. There was *“first a prudent recognition of future liabilities and impairments in asset values, towards what may be described as recoverable historical cost and, second, increasing recognition of some assets and liabilities at a current value, leading to a system that may be described as modified historical cost (or, more precisely, modified recoverable historical cost”* (ICAEW, 2006, page 7) - a “mixed measurement attribute model” of accounting.

Modified historical cost accounting requires decisions as to which assets and liabilities should be recognised at current values. For some assets and liabilities, users of accounts may need both historical cost information and current values (Penman, 2006, paragraph 1.4). The issue then becomes which measurement basis should take precedence, i.e., which should be used in the primary financial statements and which should be provided in supplementary footnotes. *“There are some items for which one [measurement] basis or another seems to have particular strengths or weaknesses”* (ICAEW, 2006, page 47).

Penman (2006) agrees that the stewardship of operating activities is best assessed with historical cost information taking precedence. It measures the value added to a *“business by purchasing inputs (from suppliers), transforming them according to a business plan, and selling the consequent product (to customers) over cost ...”* (Penman, 2006, paragraph 2.2). In contrast, the stewardship of investment activities is better assessed using current value information because it better discloses *“both the investment success and the volatility to which investors have been subjected”* (Penman, 2006, paragraph 2.1).

Using historical cost accounting for operating activities means that the earnings statement records the value added *“from actual transactions in the input and output markets being arbitrated”* (Penman, 2006, paragraph 2.2). But the use of current value information for investment activities means that the earnings statement also includes changes in the current values of investment assets and liabilities. This makes earnings more erratic and, potentially, less useful as a measure of how the company is doing (Black, 1980): there is a risk that the changes in value will obscure the underlying operating performance.

Black (1993) suggested that accounts which “smooth” earnings would reinforce their usefulness (Black, 1993, page 5). Smoothing minimises the transitory components of earnings, such as non-recurring changes in current values, which introduce volatility into earnings, making them less predictive of future cash flows.

Black (1993) believed that we could smooth earnings without *“making them less objective or less reliable”* (Black, 1993, page 4). Regulators, however, are wary of the danger that *“earnings’ management”* abuses pose to the integrity of financial reporting. They do not want earnings which *“reflect the desires of management rather than the underlying financial performance of the company”* (Levitt, 1998). Nevertheless, it is *“important for investors to understand a company’s operating activities and to be able to differentiate between these and other activities that may obscure operating results”* (CFA, 2005, page 24).

One approach that should be acceptable to regulators is to split the earnings statement so that it distinguishes between a company’s operating earnings and

the change in the value of its net investment assets. This should be helpful to users of accounts because research *“has consistently shown that the capital markets weigh components of reported income differently.....”* (Linsmeier et al, 1997, page 122): operating activities are valued by “capitalising” or “scaling” operating earnings (with a “price-earnings” multiple) whereas investment activities are valued by reference to the current value of their net assets.

### *Future cash flows*

The value of a going-concern is the sum of its discounted future cash flows. A security analyst’s valuation effectively collapses those future cash flows into a single number (Beaver, 1989). A going-concern’s investors and creditors have claims on its future cash flows. So, the decision-usefulness objective calls for the accounts to provide information to help us assess the amount, timing and uncertainty of those future cash flows (IASB, 2006, paragraph OB3).

As the best source of information about the amount, timing and uncertainty of a company’s future cash flows is the company itself (Ronen & Sorter, 1972, page 260), the accounts could simply report management’s estimates of the company’s expected future cash flows. Or, as they are uncertain, *“perhaps the probability distribution of future cash flows would be given because it represents the most complete information that could be given to the user of financial statements”* (Brief & Owen, 1973).

Companies routinely prepare profit and cash flow forecasts but they rarely include them in their accounts. Nor, despite their relevance to the objectives of financial reporting, do accounting standards mandate such disclosures. In fact, *“the accountant is constrained from directly reporting to the user of financial statements information about the future”* (Brief & Owen, 1973, page 14): a company’s future cash flows are so uncertain that even estimates of their probability distributions are felt to be too unreliable to be included in accounts.

### *Present values*

One source of information about a company’s future cash flows is the “present values” of its assets and liabilities. The present value of an asset is the sum of its discounted future cash flows; and the present value of a liability is the sum of the discounted future cash flows required to settle it (IASB, 2001, paragraph 100). So, if we recognise investment assets and liabilities at their present values, we will provide users of accounts with a measure of the discounted value of the future cash flows of those assets and liabilities.

“Value-in-use” and “market value” are two present value measures.

*“The value in use of an asset or liability is the discounted value of the future cash flows attributable to it. However, as cash flows are generated by businesses, or by units within businesses, rather than by individual assets, value in use is a basis of valuation applicable to businesses or business units rather than to separable assets and liabilities”* (ICAEW, 2006, page 34). Value in use represents management’s expectations of the future cash flows discounted at a rate that reflects the company’s cost of capital (Barth, 2006, page 273).

Market value is the market’s estimate of the discounted value of the future cash flows attributable to an asset or liability. It represents market participants’

expectations of the future cash flows discounted at the rate that market participants would use to discount them (Barth, 2006, page 273).

Value-in-use measurements should have appeal if, as Ronen & Sorter (1972) contend, the best source of information about a company's future cash flows is the company itself. However, values-in-use have to be estimated and estimation can be difficult (Barth & Landsman, 1995). Market values have appeal because they "are verifiable and objective" (ICAEW, 2006, page 30).

Market value is one category of "fair value". Fair value has been defined, most recently, as "the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date" (FASB, 2006a, paragraph 5). Thus defined, a fair value measurement is an exit price: sale value for assets and settlement value for liabilities (ICAEW, 2006). Security analysts seem to find fair values useful. According to the CFA Institute, "Fair value measures reflect the most current and complete estimates of the value of the asset or obligation, including the amounts, timing and riskiness of the future cash flows attributable to the asset or obligation" (CFA, 2005, page 12). In the absence of market prices, fair value can sometimes be estimated using valuation models or techniques ("mark-to-models"). However, as with values-in-use, fair value estimation can be difficult and is sometimes impossible.

### *Summary*

This brief history indicates that:

- as part of a larger value-estimation process, a company's accounts need to provide information that will help both in monitoring past transactions and other events and in making resource allocation decisions;
- the provision of such information necessitates accrual accounting;
- operating activities are best valued by scaling historical cost operating earnings, whereas investment activities are best valued by reference to the current value of their net assets;
- distinguishing a company's operating earnings from changes in the values of its investment assets and liabilities increases their usefulness; and
- value-in-use and market value are two present value measures we can use to record the current values of investment assets and liabilities.

In the rest of our paper, we consider whether pension accounting is aligned with the above objectives of financial reporting and whether it provides information needed to help fulfil those objectives. We discuss three main pension accounting approaches:

- cash accounting;
- actuarial-based pension accounting standards (e.g. SSAP 24); and
- market-based pension accounting standards (FRS 17, SFAS 87 & 158 and IAS 19).

Appendix B contains brief summaries of the pension accounting standards.

## From Gratuity to Guarantee

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In this part of our paper, we discuss changing views of the nature of the pension obligation. Understanding the nature of company pensions should help us decide whether pension accounting is aligned with the objectives of financial reporting.

### *Pensions as altruism*

Until the late 1970's, most companies accounted for their pension plans on a cash basis (Napier, 2007). "... [T]he prevailing practice was to treat the contribution to a pension plan in any given year as the pension expense for that year" (McGill et al, 2005, page 718).

In part, cash accounting was a residue of the view of pensions as altruism. According to Logue (1979), prior to World War Two, "both management and labor viewed pensions as gratuities provided by enlightened employers, who believed that employees, like machines, not only depreciate but also are improvident and must be cared for financially in their old age."

Gratuities are typically accounted for on a cash basis: the cost being the cash paid in the period. Gratuities do not give rise to liabilities. Nor, under cash accounting, did pension plans. Once the pension promise came to be viewed as an obligation, rather than as altruism, cash accounting for pensions failed both the stewardship and decision-usefulness tests. "A business could improve its earnings statement for a given year simply by omitting or reducing its contribution to the pension plan.....On the other hand, a firm could understate its true earnings by making a disproportionately large contribution to its pension plan in a particular year, to take advantage of a favourable cash or tax position" (McGill, 2005, page 718).

Accrual accounting, as we know, remedies the shortcomings of cash accounting. So, all pension accounting standards mandate some form of accrual accounting.

### *Pensions as deferred pay*

The deferred pay view, as summarised by Ippolito (1985, page 1032), assumes "that firms do not provide pensions to workers for free, and that workers will not sacrifice wages in excess of the true value of the pension. Workers pay firms an amount that is precisely equal to the present value of expected pension payments. They forgo a portion of their total compensation throughout their work lives in the firm in exchange for a pension at retirement."

### *Defined contribution plans*

The deferred pay view nicely accommodates defined contribution plans. In such a plan, the company and, in a contributory plan, its employees pay contributions into a pension fund account. Contributions are usually determined by reference to current salary and are tax-deductible. Investment returns accrue tax-free on the contributions and, at retirement, the employee receives a lump sum or an annuity, the value of which is determined by the contributions, the investment returns thereon and prevailing annuity rates.

Often the employee has some choice as to how the account is to be invested. In

principle, contributions may be invested in any asset class, although in practice most plans limit investment to bonds, shares and money market funds. The employee bears all the investment risk, the pension fund account is by definition fully funded and the company has no obligation beyond making its periodic contribution. Defined contribution plans are in effect tax-deferred retirement savings accounts held in trust for the employees (Bodie, 1990).

Accounting for a defined contribution plan is straightforward because, at any balance sheet date, the cash flows arising from past transactions and other events (the contributions paid in the period and required to be made to settle outstanding contributions) are known with certainty. So:

- the cash flow statement records the contributions paid by the company to the pension fund in the accounting period;
- operating earnings are arrived at after charging the pension cost for the year, being the contributions payable by the company to the fund; and
- the balance sheet includes, as an asset, any pre-paid pension contributions or, as a liability, any unpaid contributions. The historical cost of any pre-paid or unpaid contributions equals its current value.

We set out, below, a simple, illustrative example of the way in which a company might account for its defined contribution plan.

### Example 1

Let us assume that a widget-making company:

- requires 10 units of capital which it raises through a share subscription, at the beginning of the first year of its life and which it immediately invests in a widget-making machine;
- has an annual turnover of 5 units;
- employs, at the beginning of the first year of its life, an employee, aged 25, who will work for the company for 40 years, earning 2 units of wages and 1 unit of pension contributions each year;
- establishes a separate pension fund into which each year it pays annual pension contributions equal to the value of the pension benefits earned in the year; and
- distributes any excess capital at the end of each year.

To keep the accounts simple, we will assume that widget-making machines do not depreciate and that widget-making companies do not pay tax.

We set out, in Table 1 on the next page, an earnings statement and a balance sheet for our company for the thirty-ninth year of its life.

**Table 1: Earnings Statement and Balance Sheet**

<b>Earnings Statement for Year 39</b>	
	<b>units</b>
Turnover	5
Wages	(2)
Pension cost	(1)
Profit (operating earnings)	2
Dividends paid	(2)
Retained profit	<u>NIL</u>

<b>Balance Sheet at end of Year 39</b>	
	<b>units</b>
Asset	<u>10</u>
Issued share capital	<u>10</u>

These accounts are prepared under historical cost accounting and they tick the stewardship and decision-usefulness boxes.

They are helpful in assessing stewardship. They tell us that, during the year: the company's turnover was 5 units: wages cost 2 units; pensions cost 1 unit; and the company had earnings of 2 units. At the end of year 39, the company has an operating asset that cost 10 units.

The accounts also provide decision-useful valuation inputs. If a security analyst believes that widget-making companies should trade on price-earnings multiples of 10, she might tell us that the company has a value of 20 units ( $2 \times 10$ ) at the end of year 39. So, the company has a value double that of its widget-making machine.

Accounting for a defined contribution plan is straightforward because its cash flows, arising from past transactions, are known with certainty. In contrast, the future cash flows of a defined benefit plan, which the deferred pay view also accommodates, are uncertain.

### *Defined benefit plans*

In a defined benefit plan, the company is responsible for funding its employees' pension benefits. The value of the pension benefits earned in any period (the "service cost") is determined by the terms of the plan and is usually based on length of service and average or final salary. However, at the time the benefits are earned, these factors, together with the number of years a pension will be paid, are uncertain. So, the value of the pension benefits earned can only be estimated, based on the pension plan formula and on assumptions about other determinants of the pension obligation such as mortality rates, employee turnover and expected pay increases.

Most UK and US company pension plans are funded, i.e., there is a separate pension fund into which contributions are paid. As with defined contribution plans, the contributions are invested so that the proceeds can be used to pay pensions as they become due. However, in a defined benefit plan, the company

undertakes to provide the promised pension benefits regardless of the investment performance of the plan assets. So, there is uncertainty as to the amount and timing of the future cash flows of both the assets and the liabilities of defined benefit plans.

The deferred pay view necessitates accrual accounting: the cost of a defined benefit plan is the pension benefits earned (being the pay deferred by employees) in an accounting period; and the cumulative value of benefits earned but not yet paid is a liability.

### *Pensions as funding obligations*

Although all pension accounting standards view pensions as deferred pay, the actuarial-based standards, such as the UK's SSAP 24 and the US Opinion No.8, recognised neither the pension liabilities and plan assets, nor even a pension fund deficit or surplus (the difference between the values of the assets and liabilities), as liabilities and assets of the company. They viewed the sponsoring company as having a funding obligation.

Most UK and US company defined benefit plans are established under trust law, as amended by statute, and most trust deeds contain provisions which restrict the company's legal liability to the payment of contributions to a separate fund in accordance with the trust deeds and any statutory requirements. The trust deeds usually permit the sponsor to terminate the pension plan without having to make good any pension fund deficit. In the absence of pension protection regulation, the plan members are not legally creditors of the company and, in the case of a plan termination, the only legally enforceable claim the pension beneficiaries have is on the plan assets.

Actuaries traditionally referred to the cash contributions payable by a company to its pension fund as the "cost" of the plan. Lee (1986), for example, states that "costs are usually expressed in terms of the capital sums which if set aside and accumulated are expected, on the actuarial assumptions used, to be sufficient to provide the benefits when they fall due". Thus defined, the cost of a company's pension plan is a funding charge and the obligation arising from the pension promise is restricted to the payment of the annual funding charge or contribution. Accountants are able to accept this definition of cost for defined contribution plans because, with such plans, what is defined are the contributions. In a defined benefit plan, however, it is the amount of the pension benefits, and not that of the contributions, that is defined.

Provided the pension fund has sufficient assets to settle the pension liabilities as they fall due, and to satisfy any minimum funding or solvency requirements, there can be flexibility as to the contribution rate. An infinite variety of funding strategies will allow a defined benefit plan to pay the promised pension benefits, ranging from funding everything up front at one extreme to funding payments as they fall due, at the other. However, according to Anderson (1992, page 7), actuaries have traditionally taken the view that "the cost of a pension plan must be recognised during the working lifetimes of the employees who are ultimately going to receive pensions, preferably by actually funding amounts sufficient to provide completely for each employee's life annuity at the time of retirement. When pension plans are funded in this manner, the safety of pensions which are being paid to those already retired is assured, and cannot be jeopardised by fluctuations in employment levels among active employees or by the financial collapse of the employer himself".

The traditional actuarial view regards the pension obligation as being restricted to funding the plan because, in an ongoing plan, the company can always defer the full settlement of any pension fund deficit. In the absence of pension protection legislation, the company is never compelled to eliminate a deficit immediately but is only required to fund (i.e. amortise) that deficit. The traditional actuarial view appears to confuse, in accounting terms, a liability with a funding target. However, the view of pensions as funding obligations rests on the assertion that the pension liabilities and the plan assets are those, not of the company but, of the pension fund, which is a separate legal entity. Such a view, essentially, is the premise upon which SSAP 24 was predicated. As with a defined contribution plan, if the actuarially determined cumulative pension costs of a defined benefit plan had not been completely discharged by the payment of contributions, SSAP 24 required any shortfall to be shown as a pension provision (with a prepayment being recorded if the contributions paid exceeded those payable).

The “pensions as funding obligations” view allowed SSAP 24 to subordinate the accrual basis of accounting to any “*systematic and rational basis*” of accounting in which: the service cost is a level percentage of pensionable payroll; the estimated costs of pensions are recognised over the period during which the company benefits from its employees’ services; and variations from the estimates are accounted for over the remaining service lives of employees.

If pensions are deferred pay, SSAP 24 fails the stewardship and decision-usefulness tests when it fails to fully recognise a pension fund deficit or surplus. It fails the stewardship test, indirectly, because the decision of the managers to set up the pension plan creates an investment activity whose performance, although not directly under their control, impacts shareholder value. And it fails the decision-usefulness test because a pension surplus or deficit can have a material impact on the value of the sponsoring company.

### *Pensions as contingent claims*

Although pension accounting standards interpret pensions as deferred pay, Logue (1979) doubted whether that view could adequately explain defined benefit pension plans. Logue (1979) concluded that defined benefit plan features such as vesting rules, eligibility requirements and average or final salary determinants, together with the fact that many plans are not fully funded, mean that employees bear a considerable share of the risk of a defined benefit plan. As such, he concluded, pensions are best viewed as “contingent claims contracts” under which an employee’s rights fall somewhere between the “polar extremes” of the no-contract view of pensions as gratuities and the 100% certain-contract deferred pay view.

The view of pensions as contingent claims sees the pension plan as being designed to provide both incentives and risk insurance (Merton, 1985) and regards both the company and employees as having contingent claims (or “options”) on the assets of the pension plan and the company.

If the investment performance of the plan assets is strong and a pension surplus emerges, the company can reduce its future contributions into the plan. Alternatively, if the pension plan were to be terminated and the plan assets realised, the pension obligation could be settled in full and the surplus returned to the company. The company, in effect, has a claim or *call option* on the pension

fund assets. A call option gives the holder the right (but not the obligation) to buy an asset at a predetermined price (the “exercise” price). In the event of a surplus emerging, the company can exercise the call option and thereby extract the surplus (Sharpe, 1976; Blake, 1998).

The plan members, however, have a claim on the assets of the company, contingent on a pension fund deficit emerging. If the pension plan were terminated and the company was prepared or (as is the case in the UK for solvent companies since June 2003) required to meet its obligation to fully fund the plan, the company would make a further contribution to the fund to eliminate the deficit and the pension obligation would be settled in full. The plan members, in effect, have a *put option* over the plan assets. A put option gives the holder the right (but not the obligation) to sell an asset at a predetermined price (the “exercise” price). In the event of a deficit emerging, the plan members can exercise their option thereby forcing the company to make a further contribution (Sharpe, 1976; Blake, 1998).

However, the company has some control over how any deficit is managed. It can, for example, pay off the deficit gradually over time or it can (if legislation does not prevent it) manage the deficit through its employee recruitment and retention policy, e.g., by firing workers just before their pension entitlements vest and replacing them with younger, unvested workers.

As previously noted, the deferred pay view of pensions regards the company as being under an obligation to pay pension benefits to the value determined by the terms of the plan and, consequently, as bearing the investment risk of the plan. The contingent claims view of pensions recognises, however, that the company holds a put option on the plan assets (or the plan assets and the corporate assets), against the plan members, which, in extreme cases, it can exercise by terminating the pension plan and reneging on its obligation to fully fund the plan, thereby transferring some or all of the investment risk to the plan members (Treyner, 1977). Thus, if a pension fund with a deficit were terminated and the company was not prepared, not required or not able to further fund the plan, the pension beneficiaries would receive partial settlement of their pension benefits to the value of the plan assets. In these circumstances, the company can be viewed as, in effect, holding a put option on the plan members’ put which will be exercised if, for example, the sponsor becomes insolvent.

### *Pensions as guarantees*

Pension protection legislation has increasingly affirmed the deferred pay view of pensions and has reduced or eliminated the value of the company’s put option. Blinder (1981) explains that, in the US, the Employment Retirement Income Security Act of 1974 imposed a web of regulations, including minimum funding requirements. In the UK, following the Pensions Act 2004 and the introduction of the Pension Protection Fund: pension funds in deficit need to be treated as any other material unsecured creditor; anti-avoidance provisions of the Act prevent employers from rearranging their affairs to avoid their pension obligations; and, in the event of the pension plan being terminated, the debt on the employer is the amount required to ensure sufficient assets are available to buy out accrued pensions. According to Harrison et al (2006), the 2004 Pensions Act turned the defined benefit pension promise in the UK into a pension guarantee.

## *Summary*

Company pension plans “have traditionally had a ‘something for nothing’ aspect about them, whereby their value to beneficiaries seemed to exceed the financial burden they imposed on the operating company” (Treynor, 1977, page 627).

Cash accounting was justified when pensions were indeed something for nothing. But, if pensions are deferred pay, the actuarial-based standards’ view of pensions as funding obligations is valid for defined contribution plans but not valid for defined benefit plans.

It was the existence of the company’s put option which gave defined benefit plans their something for nothing aspect. Pension protection legislation has reduced or removed the value of the company’s put option. So, in the current regulatory environment, it is appropriate for accounts to be prepared on the basis that the company will honour its defined benefit pension promises, i.e., on the basis that pensions are deferred pay.

## A Range of Views

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Pension protection legislation has removed some, but far from all, of the uncertainty that characterises the defined benefit pension obligation. Uncertainty still permeates even such a basic issue as who owns the assets and liabilities of a defined benefit pension plan.

A company promises to pay a defined benefit pension regardless of the investment performance of the plan assets. One might, therefore, think that both its pension liability and any pension assets would be included on a company's balance sheet. No pension accounting standard has ever adopted such an approach.

### *Not ours, Guv*

FRS 17 is based on the premise that the separate pension fund changes the nature of the company's pension obligation. In the UK, defined benefit funds are typically established as irrevocable trusts. Paragraph 24 of the Appendix to FRS 17 explains that a defined benefit pension plan will not usually be a subsidiary of the sponsoring company because it is controlled by trustees. The company cannot ensure that the trustees will act as it would wish in many significant areas (e.g. investment strategy) and, hence, it does not control the plan assets nor is it directly liable for the pension payments. So, the plan assets and pension liabilities are not assets and liabilities of the company. Instead, the company has a pension asset or liability to the extent that it is entitled to benefit from any surplus or has a legal or constructive obligation to make good any deficit. Consistent with this explanation, FRS 17 (paragraph 37) requires a company to recognise: an asset to the extent that it is able to recover, through future reduced contributions or refunds, a defined benefit plan surplus; or a liability to the extent that a plan deficit reflects its legal or constructive obligation.

### *Ours, but net*

According to IAS 19 (paragraph 27), "*under defined benefit plans: (a) the enterprise's obligation is to provide the agreed benefits to current and former employees; and (b) actuarial risk (that benefits will cost more than expected) and investment risk fall, in substance, on the enterprise.*" IAS 19 takes the view "*that plan assets reduce (but do not extinguish) an entity's own obligation and result in a single, net liability*" (paragraph 66 of the Basis for Conclusions). IAS 19 (paragraph 54) requires a company to recognise as a defined benefit liability/asset the net total of the value of the pension liabilities minus the value of the plan assets at the balance sheet date.

IAS 19 (paragraph 59) recognises a recoverable plan surplus, rather than the plan assets, as a company asset because "*(a) the enterprise controls a resource, which is the ability to use the surplus to generate future benefits (b) that control is a result of past events ... and (c) future economic benefits are available to the company in the form of a reduction in future contributions or a cash refund.*" IAS 19 does not explain how a company can control the surplus of another entity without controlling either that entity or both the assets and liabilities of which the surplus is the result.

### *Ours, but offset*

SFAS 87 does regard the liabilities and assets of a defined benefit plan as liabilities and assets of the sponsoring company. It takes the view that “creating a separate legal entity does not change the nature of the employer’s obligation to pay promised benefits to retirees” (Appendix A, paragraphs 109 – 111). It explains that the Financial Accounting Standards Board (the US accounting standard setting body) considered and rejected the argument that the liability for accrued pension benefits rests with the pension fund and that the company’s obligation is restricted to making periodic contributions sufficient to support the fund (the SSAP 24 approach).

Similarly, Appendix A (paragraph 112) to SFAS 87 explains that the FASB rejected the argument that the fund’s assets are not those of the company, noting that, as the company’s future contributions to the fund will be affected by the performance of the fund’s assets, the company bears the risks and rewards of those assets. It further notes that, in the 1980’s significant assets were withdrawn by companies from pension funds.

Although SFAS 87 regards pension liabilities and plan assets as liabilities and assets of the company, it does not require them to be separately disclosed on the company’s balance sheet. This is because, the SFAS 87 Summary explains, the standard requires “offsetting”, whereby the pension liabilities and plan assets are shown net on the company’s balance sheet “even though the liability has not been settled, the assets may still be largely controlled and substantial risks and rewards associated with both of those amounts are clearly borne by the employer.”

So, the market-based pension accounting standards take differing views of the ownership of the liabilities and assets of a defined benefit pension plan. But, for varying reasons, all three limit balance sheet recognition to the plan surplus or deficit, with further analyses of the plan assets and liabilities in the footnotes.

The market-based standards all view pensions as deferred pay. But how much pay is deferred under a final salary plan?

### *How much?*

In Example 1, we assumed no salary progression, i.e., our worker earned the same amount of wages (2 units) each year. What happens if we have a defined benefit plan and there is salary progression? How does this affect the accounting?

Let us assume that, although it does not know how long it will retain her services, when it recruits its employee, the company promises her that:

- each year she will earn lump sum pension benefits equal to a half of her final salary;
- her salary will double to 4 units from 31 January in year 21; and
- when she retires aged sixty-five, she will receive a lump sum pension payment based on the formula:  
Lump sum pension = number of years worked  $\times \frac{1}{2}$  final salary.

If the employee resigns on, say, 31 December in year 20, she will receive a lump

sum pension, when she reaches age sixty-five, of 20 units ( $20 \times \frac{1}{2} \times 2$ ). If, however, she works for the company until she reaches retirement age, her lump sum pension will be 80 units ( $40 \times \frac{1}{2} \times 4$ ). Given that there is uncertainty as to how long the employee will remain with the company, how much pay has been deferred at the end of year 20 if she remains employed at that date?

Two contrasting economic theories - *implicit* and *explicit contract* theories – have been used to explain the nature of the pension obligation that arises when workers defer pay in exchange for final salary defined benefit payments.

Ippolito (1985, 1997) and Lazear (1979, 1983 and 1985) interpret the pension as being part of a long-term *implicit contract* between a company and its employees in which the promise to pay pensions that are indexed to average or final salaries has important incentive effects. Under this contract, “workers and the firm effectively agree that, unless unusual market exigencies arise, the firm will not exercise its legal right to terminate the pension plan. Workers forgo wages for pensions assuming that they stay with the firm until retirement; and the company does not terminate the pension except for compelling reasons” (Ippolito, 1997, page 13). Under the *implicit contract* theory, the company’s obligation in respect of the benefits earned by the current members of the plan up to any valuation date is based on projected final salary and is known as the “Projected Benefit Obligation” (“PBO”). It is calculated using the “Projected Unit Method”. In our example, the settlement value of the PBO at the end of year 20 is 40 units ( $20 \times \frac{1}{2} \times 4$ ).

In contrast, Bulow (1982) argued that employees have *explicit contracts* in which pension benefits are determined by reference to current, not future, salaries. Such contracts are subject to frequent, and in extreme cases (e.g., when workers are employed on a daily *spot labour market*) constant, renegotiation. The *explicit contract* theory holds that the company can terminate the pension plan at any time and therefore its pension obligation cannot exceed the value of the pension benefits payable if the plan were immediately terminated. Rational workers do not forgo wages in excess of the termination value of their pensions, the argument goes. The company’s obligation in respect of the benefits earned by the current members of the plan up to any valuation date based on current salaries is known as the “Accumulated Benefit Obligation” (“ABO”) and is calculated using the “Current Unit Method”. In our example, the settlement value of the ABO at the end of year 20 is 20 units ( $20 \times \frac{1}{2} \times 2$ ).

Corporate accounting is predicated on the assumption that, in the absence of evidence to the contrary, the company is a *going-concern*. SFAS 87 (paragraph 149) asserts that the *going-concern* assumption, “as applied to pensions, assumes that the plan will continue in operation and the benefits defined in the plan will be provided.” Thus defined, the accounting concept of the pension plan as a *going-concern* is consistent with the economic view of the pension plan as an *implicit contract*. Thus the FASB concluded (and its UK and international counterparts, respectively the ASB and the IASB, agreed) that, from an accounting viewpoint, the PBO better describes the company’s pension obligation.

However, at the time it prepared SFAS 87, the FASB decided that recognising the PBO in a company’s accounts would be too great a change from past practice. So, SFAS 87 only required a company’s balance sheet to show a minimum liability equal to any excess of the ABO over the value of plan assets (paragraph 37). SFAS 158 amended SFAS 87 and removed this anomaly: it requires a

company to recognise, as an asset or a liability, the difference between the PBO and the value of the plan assets. FRS 17 does likewise but, as Appendix A explains, IAS 19 permits a company's balance sheet to understate the effect of the PBO.

Not all commentators agree with the view of the extant standards. In our revised example, we assumed that from the outset the company had promised its employee a pay increase in year 21. Few employers make such promises. Some commentators, (e.g. Bodie, 1990 and Exley, 2002), doubt that a company can have a "present obligation" based on a future uncertain event – they contend that if the company is not committed to salary increases, it cannot have a liability for the resulting increased pension benefits until the salary increases are granted. They also argue that provision based on current salary recognises that a salary increase for a worker with many years of pensionable service is more expensive than the same increase for a member with few years' service (this is because benefits are *backloaded* in defined benefit pension plans). Furthermore, provision based on projected final salary is inconsistent with the treatment of wages and salaries – future pay increases are not a corporate liability, nor should the pension benefits resulting from those increases be considered a liability. Finally, they reason that if plan assets are recognised at current value, pension liabilities should be recognised by reference to current salaries. They believe that the ABO better reflects the amount at which the obligation could be settled with a third party and that if the plan were closed at the balance sheet date, the company's legal liability would be determined by reference to remuneration at that date.

Implicitly recognising that there is uncertainty as to how much pay is deferred under a final salary plan, the ASB Reporting Statement "*Retirement Benefits – Disclosure*" (ASB, 2007a) now recommends that accounts should disclose the ABO in the footnotes to the accounts.

### *Summary*

Despite pension protection legislation, uncertainty pervades the final salary defined benefit pension plan: uncertainty as to the ownership of the pension assets and liabilities; and uncertainty as to the amount of the pay deferred under the plan. Extant pension accounting standards: differ in their views as to the ownership of defined benefit plan assets and liabilities; limit balance sheet recognition to a pension surplus or deficit; but agree that the pension obligation of a company with a final salary pension plan is best determined by reference to projected final salary.

## Smooth Operators

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We suggested, earlier, that operating activities are best valued by scaling operating earnings whereas investment activities are best valued by reference to the current value of their net assets. Is this the recipe for pension accounting?

In Example 1, widget-making is the company's only activity. Historical cost accounting did an acceptable job in monitoring stewardship of this operating activity. And it provided useful valuation inputs. Based on an historical cost earnings of 2 units in year 39 and a price-earnings multiple of 10, our security analyst valued our company at 20 units.

Historical cost accounting works in Example 1. But, we know that it is deficient when called upon to reflect changes in the values of assets and liabilities and the effects of events other than transactions to which the company is a party. We can refine our Example 1 to illustrate these deficiencies.

### Example 2

Let's assume that:

- the employee is promised a lump sum pension of 40 units (a defined benefit), to be paid when she reaches retirement age; and
- the company pays annual pension contributions of 1 unit into the pension fund. So, at the end of year 39, the fund holds 39 units of cash.

Let us now, callously, introduce an event besides a transaction to which our company is a party: assume that our employee dies at the beginning of year 41, just before picking up her pension.

Let's also diminish the value of some assets: assume that in year 40 the plan assets are invested in equities just prior to a stock market crash. By the end of year 40, after the crash, those equities are worth just 20 units.

Accountants call the release of the pension obligation caused by the tragic loss of our employee an "actuarial gain". And the difference between the return our company expected on the plan assets and the actual return is an "actuarial loss". Actuarial gains and losses also occur when assumptions change.

Historical cost accounting won't do a good job here (although modified recoverable historical cost would). At the end of year 40: the pension obligation has an historical cost of 40 units but its current value is zero; and the plan assets have an historical cost of 40 units but a current value of 20 units.

When we introduced a defined benefit plan into Example 2, we added an investment activity (management of the pension assets and liabilities) to our widget-making activity. We and our security analyst need to know the current values of these pension assets and liabilities if we are to assess stewardship and value the company. But how should we account for changes in those values, such as the actuarial gain and the actual loss in Example 2?

We suggested, earlier, that accounts that "smooth" the earnings statement might improve its usefulness (Black, 1993). All pension accounting standards smooth pension costs.

The actuarial-based standards (e.g. SSAP 24, paragraphs 22, 30 and 31) smoothed pension costs by requiring actuarial gains/losses and past service costs (improvements in accrued pension benefits in respect of prior periods of service) to be spread over the expected remaining service lives of current employees in the plan.

SFAS 87 permits a company, if it so desires, to:

- substitute the expected long-term return on plan assets (the “expected return”) for the actual return (paragraphs 34 and 93 and footnote 13);
- spread past service cost over employees’ expected future service lives (paragraph 25); and
- delay the immediate recognition of actuarial gains and losses if, at the beginning of the year, the unrecognised net gain or loss does not exceed 10% of the greater of the present value of the pension liabilities or the fair value of plan assets; any excess is required to be amortised over the employees’ expected remaining service lives (paragraph 32).

Delayed recognition “means that changes in the pension obligation ..... are not recognized as they occur but are recognized systematically and gradually over subsequent periods” (SFAS 87, paragraph 85). SFAS 87 delays the recognition of gains and losses because they may reflect refinements in estimates as well as real changes in economic values and because gains in one period may be offset by losses in another and vice versa (SFAS 87, paragraph 29). (Gains and losses that cancel out over time will have an expected value of zero. So, excluding them from current net income makes it more reliable as an estimate of future net income.)

Consistent with Black’s recommended valuation method, SSAP 24 and SFAS 87 both spread actuarial gains and losses and past service costs over future accounting periods: we might call this “temporal” smoothing. A side-effect of temporal smoothing is a balance sheet which does not record the current value of a pension deficit or surplus. To mitigate this effect, SFAS 87 (paragraph 36) requires the recognition of a liability equal to at least the excess of the ABO over the value of the plan assets.

SFAS 158 amends SFAS 87. It requires actuarial gains or losses and past service costs that are not recognised in net income to be recognised in “other comprehensive income”. We might call this spreading of pension costs between different components of comprehensive income “spatial” smoothing. It overcomes the balance sheet deficiency of temporal smoothing, i.e., the balance sheet recognises the current value of a pension deficit or surplus (the PBO less the value of the plan assets). Because amounts recognised as other comprehensive income are adjusted as they are subsequently recognised in net income pursuant to SFAS 87, temporal smoothing of net income continues but without balance sheet consequences.

FRS 17 (paragraph 54) requires the profit and loss account to:

- include the expected return on plan assets. The expected return is based on long-term expectations at the beginning of the period and is expected to be “reasonably stable” (smooth). The expected return and the *interest cost* are presented in the profit and loss account as a net financial item, adjacent to interest (paragraph 55);

- recognise past service cost immediately, to the extent benefits vest immediately. Past service cost is otherwise recognised on a straight line basis over the period in which benefits vest (paragraph 60); and
- exclude actuarial gains and losses. It recognises them in the statement of total recognised gains and losses (“STRGL”) (paragraphs 37, 47 and 57).

So, FRS 17 applies spatial smoothing to actuarial gains and losses and temporal smoothing to unvested past service costs.

IAS 19 follows the FRS 17 approach to past service cost. It requires, as a minimum, gains and losses outside the 10% “corridor” to be amortised through the profit and loss account. But it permits faster recognition of gains and losses including the approaches of either SFAS 87 or FRS 17: immediate recognition in the profit and loss account or in the statement of recognised income and expenditure (“SORIE”).

So, all pension accounting standards, to a greater or lesser extent, seek to reinforce the usefulness of the accounts by smoothing pension costs. By removing from earnings some of the changes in the value of the pension assets and liabilities, they seek to prevent short term gains and losses from obscuring operating earnings. Whether users of the accounts can understand the smoothing mechanisms is questionable.

Although SFAS 158 and FRS 17 adopt smoothing techniques which preserve transparency, the discretion they permit in the setting of the expected return on plan assets, and its inclusion in net income or profit and loss, has raised suspicions of possible earnings management abuses.

In its *Discussion Summary: Reporting changes in net assets and liabilities arising from retirement benefit funds* (ASB, 2007b), the ASB’s staff suggest that actuarial gains and losses arising from a pension liability, together with actual gains and losses on plan assets and all past service costs should be reported as part of the profit and loss account. There would be no smoothing under this proposal. Actual gains and losses on plan assets would be reported as financing income, as would the unwinding of any “interest” on the discounted value of the pension liability. Our Show Jumping trial, in Appendix A, reveals that such an approach (“FRS 17 PLUS”) is consistent with principles derived from the IASB’s conceptual framework.

We suggested, earlier, that users of accounts should find it helpful if a company segregated its earnings statement so that it distinguishes its operating earnings from the change in the value of its net investment assets. It might be better, therefore, if the pension accounting standards charged only the service cost to net income or profit and loss. The return on plan assets and the interest charge are not components of operating earnings. The market-based pension accounting standards view them as financing costs or income but they are better viewed as components of the pension fund investment activity. It would be preferable if, like actuarial gains and losses under FRS 17, they were separated from profit and loss. All movements in a pension deficit or surplus, other than service cost, contributions received and benefits paid, could be taken through the STRGL (or SORIE or other comprehensive income). As with the ASB staff’s suggestion, such an approach would obviate the need to estimate the expected return on plan assets: the company could simply report the actual investment return. And it would, additionally, mean that a pension fund in deficit would not contribute to its sponsoring company’s profit or loss or net income.

Although we want the earnings statement to separate the service cost from other changes in the value of a pension deficit or surplus, it will be helpful if the footnotes to the accounts summarise in one place all of the movements in the values of the pension assets and liabilities in an accounting period. Indeed, the extant pension accounting standards all require such disclosures.

Users of the accounts should also find it helpful if the balance sheet draws a distinction between operating and investment assets and liabilities. Alternatively, if practicable, two balance sheets might be presented, one for the operating assets and liabilities (prepared under modified historical cost accounting) and one for the investment assets and liabilities (based on current values).

### *Summary*

All pension accounting standards smooth pension costs. They do so to prevent a company's operating results from being obscured by changes in the value of its pension fund. Unfortunately, smoothing has connotations of earnings management abuses. Nevertheless, it is helpful to distinguish a company's operating activities from its investment activities. So, it might be better to segregate current service cost from other pension fund changes in value.

## Spot the Conundrum

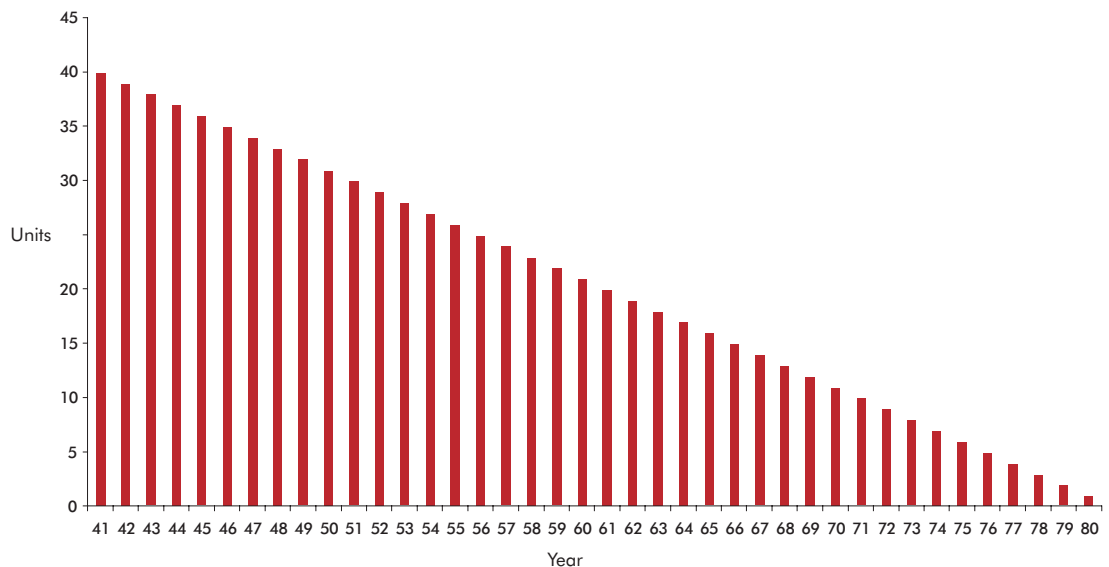
### *Future cash flows*

Example 2 demonstrates that we need to know the current values of defined benefit plan assets and liabilities. One way to determine the current value of an asset or a liability is to estimate and discount its future cash flows: this is known as an *actuarial valuation*. But future cash flows are often uncertain. So, estimates of their discounted value may be unreliable.

Are the future cash flows of our company's pension plan reliable enough to be included within our company's accounts?

The timing and amount of the future cash flows required to settle our company's defined benefit pension liabilities are projected by our actuary as part of the process of determining the contributions that our company needs to make to its pension fund. The accounts could, therefore, disclose those projected future cash flows. This would be simple if, as in our earlier example, our company's liability is restricted to making a lump sum payment to one worker (e.g. 40 units in year 41). Even for a company with dozens of members, it should be reasonably straightforward to provide a chart (such as that in Figure 1, below) showing the best estimate of the amounts and timing of accrued lump sum pension payments.

**Figure 1: pension liabilities by amount and due dates at end of year 40**



To help understand the chart, we could describe its underlying assumptions. The projected cash flows set out in Figure 1 assume that, at the end of year 40, a company has 40 employees aged 25 to 64. All employees are assumed to have earned lump sum pension benefits of 1 unit each year. The chart shows, for example, that: our 64-year-old employee will receive her lump sum pension of 40 units in year 41; and the youngest employee has accrued pension benefits of 1 unit payable as part of her lump sum in year 80. The accrued pension benefits of all employees at the end of year 40 total 820 units (40 plus 39 etc to ... plus 1 unit).

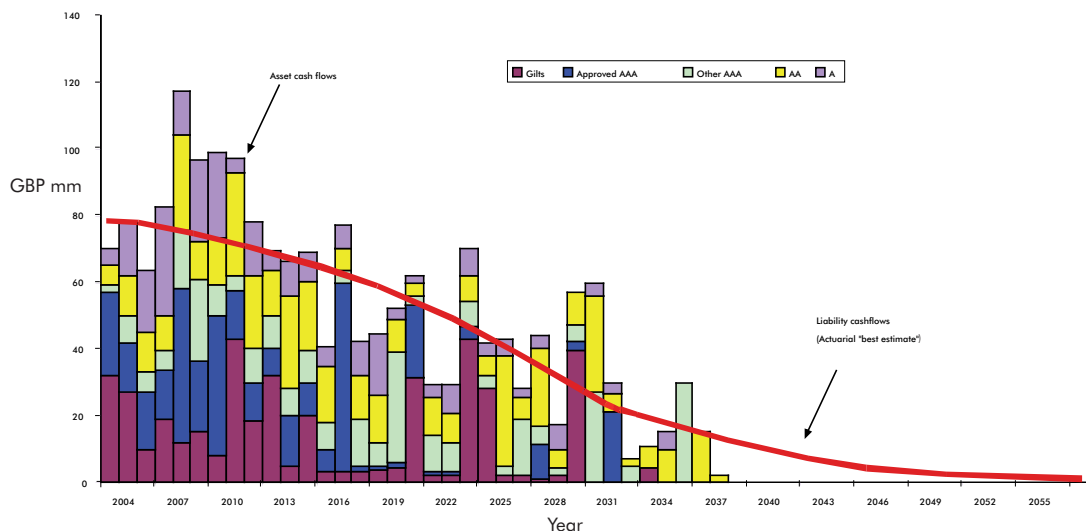
The ASB Reporting Statement "*Retirement benefits – Disclosures*" now recommends a disclosure such as that in Figure 1 (ASB, 2007a, paragraph

25): the accountant is no longer constrained. Later in this paper, we explore the reliability of such “best estimate” projections of final salary pension payments (see the section headed **An Illusion** on page 37).

What about the cash flows from the plan assets? Again, the return expected on the plan assets is projected by our actuary as part of the process by which she determines the contribution rate. The expected return on plan assets is usually determined by extrapolating historic returns on the various asset classes held in the pension fund, e.g., equities, bonds, cash and real estate. It is customary to compute historic returns net of consumer price inflation and add these real returns to the expected future inflation rate. The reason for doing so is the belief that real returns will be more stable than nominal returns, because investors allow for the expected depreciation in the value of money when pricing securities (Fisher, 1930). The length of the period over which past returns should be averaged is a matter for actuarial judgement. Too short a period may result in an unrepresentative sample, whereas too long a period may include economic eras too distant to have any relevance to the future. Actuaries have tended to use long periods, 40 years or more, to estimate future returns because of the long term nature of a pension plan.

If the plan assets are invested in bonds, we can amend Figure 1 to show our actuary’s projections of how the cash flows arising from the bonds held at the balance sheet date (the interest payments thereon and any sales and redemptions thereof) will be used to settle the pension liabilities. An example of this, taken from Blake (2006), is set out in Figure 2 below.

**Figure 2: projected asset and liability cash flows**



What if the plan assets are invested in equities and property? Can we include their projected cash flows (their future dividend, rental income and realized capital returns) on our chart? Views differ. “Some claim that the assumptions made about future investment returns are likely to be so unreliable that the modelling exercise provides very little value. Less sceptical proponents of asset-liability modelling argue that the ‘models are to be used but not believed’.....” (Blake, 2006, page 251). Indeed, if stock market prices, and therefore total returns, follow a random walk, forecasting is a futile exercise. However, others, such as Carne (2004), believe that projecting estimated cash flows from equities and property “is no different from projecting estimated benefit outgoes” (Carne, 2004, page 21). Both are unknown and both are based on assumptions.

Carne (2004) suggests that, as in Figure 2, we compare the projected cash inflows and outflows, starting at the balance sheet date and working forward. Where the inflows exceed the outflows, we go beyond Figure 2 and assume that the net income is reinvested to generate cash inflows. Where the inflows fall short of the outflows, we assume that an asset is sold to meet the liability but, as a result, one set of future inflows is cancelled. We continue “until the benefits are paid off or the assets run out. This tells us whether the fund is in deficit at the valuation date .....or in surplus” (Carne, 2004, page 21).

If we were to project forward the plan asset cash flows, it would only be sensible to do so at the rate of return expected on those assets. And if we were doing so with the benefit of hindsight, we would do so at the actual rate of return on those assets.

Figures 1 and 2 show expected future cash flows arising from accrued pension liabilities and the assets held at the end of year 40, i.e., those future cash flows arising from past transactions and events. Investors and creditors, however, want this information for all transactions – past and future (see, for example, ABI, 2007, Figures 1, 2 and 3). It might be possible to provide such information for closed pension plans but such cash flow projections are likely to be difficult, at reasonable cost, for open plans for which the streams of future pension payments and assets returns are very long lived.

### *Present values*

It may be that the schedule of projected cash flows required to settle our company’s defined benefit pension liability, together with its underlying assumptions, is useful information that our analyst can use to help her value the pension liability. Or, it may be that it and the projected plan asset cash flows (especially those from equities and property) are so inherently uncertain that their inclusion in the accounts contributes little or nothing to the fulfilment of the objectives of financial reporting.

In any event, accounting conventions require more than cash flow projections. They demand that we value the pension assets and liabilities. And the market-based pension accounting standards require the net value of any pension deficit or surplus to be included on the company’s balance sheet. So, although the objectives of financial reporting do not require the accounts to value our company, pension accounting standards do require them to value a pension deficit or surplus.

We need present values if we are to convert cash flow projections to current values; and we know that value-in-use and market value are two present value measures.

### *Plan asset values*

Actuaries have, traditionally, used two main approaches to asset valuation when determining the rate at which a company needs to make contributions to its defined benefit plan:

- notionally re-invest the pension fund in a ‘standard portfolio’ with the same market value as the pension fund assets. This method has been widely used in the UK, where the standard portfolio might consist of 70% equities and

30% gilts. The actuary determines the present value of the projected income stream from this standard portfolio, which has the effect of damping down the volatility associated with the fluctuations in the market values of the actual assets held; and

- average the market values of the pension fund assets over a fixed period of years up to the valuation date. This method is widely used in the US, where a period of five years is often used, i.e., long enough to create a smoothing effect, but not so long that the smoothing effect is excessive.

There are two reasons justifying the traditional actuarial approaches in funding valuations for mature pension plans that are still open to new entrants. First, provided the investment return on the plan assets is sufficient to cover the difference between the annual pensions paid and the contributions received, there is no need to realise assets to pay pensions. Consequently, the market value of the plan assets is not crucial in deciding upon a funding strategy. What matters, instead, is the projected investment income from the assets which will be used to pay pensions. This is the idea behind the first of the above methods. In accounting terminology, it is a value-in-use measure.

Second, valuing plan assets at market value can result in short-term volatility in values, particularly if the fund is heavily invested in equities. It has traditionally been considered undesirable for long-term funding decisions, such as the amortisation of a surplus or the enhancement of benefits, to be unduly influenced by these short-term movements. This can be avoided by smoothing market values, which is the idea behind the second of the above methods. This is a smoothed, market value method.

The belief that market values might be better indicators of long-term value if they are smoothed implies that much of their volatility is unrelated to fundamental value.

This is a view shared by adherents of “behavioural finance”. Shiller (1989), for example, claims that “*price movements in the stock market appear to show excess volatility*” (page 71) and explains that excess volatility means that “*if price movements were rescaled down in some sense to be defined, so as to be less variable, then price would do a better job of forecasting fundamentals*” (page 2).

The notion that the fundamental value of a stock to a long-term investor may differ from its quoted market price is an axiomatic belief of “value investors” (e.g. Graham, 1973).

Plantin et al (2004) draw a distinction between “*completely frictionless markets where market prices fully reflect the fundamental values of all assets and liabilities*” and imperfect or inefficient markets in which “*the market price may not be the ‘true and fair’ value of the asset*” or liability (Plantin et al, 2004, page 147).

The actuarial-based accounting standards, such as SSAP 24, incorporated traditional actuarial asset valuation approaches as an integral part of calculating the pension cost. However, the traditional actuarial approaches were developed to determine a contribution rate and, as we noted earlier, SSAP 24 did not require the pension assets (or a pension deficit or surplus) to be included on the company’s balance sheet.

Unsurprisingly, perhaps, given that they require a pension deficit or surplus to be recognised on a company's balance sheet, the market-based pension accounting standards all reject the traditional actuarial approaches to asset valuations and favour fair values: market values or, where no active markets exist, mark-to-model fair values. Market values are verifiable and objective. If accounting standard setters permitted plan assets to be measured at value-in-use or at a smoothed market value, different companies might attribute different values to identical assets.

Valuing plan assets at fair value helps fulfil both the stewardship and decision-usefulness objectives.

The stewardship of an investment portfolio is better monitored by changes in its fair value than by values derived from projecting forward expected cash flows. The FASB thinks that the change in the fair value of plan assets "*provides information necessary for assessing annual investment performance and stewardship responsibility*" (SFAS 35, paragraph 105). And the stewardship of a portfolio of financial assets is best assessed by the return achieved on market value, even when markets are not efficient. This is so because the fund manager is expected to exploit any inefficiency by buying undervalued assets and selling overvalued ones.

Valuing plan assets at fair value should help our analyst to value a pension deficit or surplus. That value can then be subtracted from or added to the value of the operating activity to arrive at a value for the company.

### *Pension liability present values*

What is the best measure of the current value of our pension liability? Since we are going to offset the values of the plan assets and the pension liability to arrive at the value of the pension deficit or surplus, we want a current value for our pension liability that we can compare with the current value of our plan assets.

If we want to be consistent, we should value our pension liability on the same basis as that upon which we value plan assets: at market value or, where no active markets exist, at mark-to-model fair value.

Unfortunately, there is no market currently in existence in which a company can trade the liabilities of a pension plan still open to members. And, because the entitlement to a defined benefit pension is non-transferable, there is no market in which plan members can sell their pension entitlements.

Our company could "buy-out" its pension liability or its pensions in payment, i.e., pay an insurance company to take on the liability. But the buy-out cost is usually calculated on the basis that the pension plan is, or will be, closed. So, it is not representative of the value of the liability of an on-going plan. Furthermore, the buy-out market is still quite small, although in the UK several new entrants have recently entered it.

So, if we want a fair value for our company's pension liability, we have little option but to use a mark-to-model valuation.

### Example 3

Another example will help us explore how a mark-to-model valuation might work. Let us assume that our widget-making company:

- employs, at the beginning of the first year of its life, an employee, aged 25, who will work for the company for 40 years, earning 2 units of wages and 1 unit of pension benefits each year (the pension to be paid as a lump sum at the end of year 40); and
- establishes a separate pension fund into which at the end of year 39 it pays a pension contribution of 38 units.

Assume also that:

- the risk-free interest rate is 5.3 %; and
- the plan assets of 38 units are immediately invested at the risk-free interest rate.

What is the value of the pension liability and the deficit or surplus at the end of year 39?

We know that, at the end of year 39, our worker has accrued pension benefits with a settlement value of 39 units which will be paid as part of her lump sum pension in just over a year's time. And our pension fund has assets of 38 units. If we value the pension liability at its settlement value and the plan assets at their current value, we will report a pension deficit of 1 unit at the end of year 39. However, our plan assets are invested at the risk-free interest rate, so we know that they will have a value of 40 units ( $38 \times 1.053$ ) at the end of year 40: just enough to guarantee payment of the lump sum pension. So, the settlement value of the pension liability does not lead to a useful measure of the pension deficit or surplus. We need a discounted value. But what discount rate should we use?

Our company's plan assets are invested at the risk-free interest rate of 5.3 %. If we want to compare the present value of our pension liability with that of the plan assets, might we not discount the liability at the risk-free interest rate?

If we used the risk-free interest rate of 5.3 % to discount our employee's accrued pension benefits, they would have a present value of approximately 37 units ( $39/1.053$ ) at the end of year 39. And, given that our plan assets have a value of 38 units at the date, we would have a pension surplus of approximately 1 unit. During year 40, the discount will "unwind" giving rise to an "interest charge" of 2 units (39-37 units).

We might be persuaded that this is the right discount rate to use if our actuary assures us that she determines the contributions that our company needs to make to its pension fund based on her best estimate of the expected rate of return on the plan assets. As Anderson (1992) explains, the discount rate used in a traditional actuarial valuation *"is not an estimate of interest rates generally, but is the assumed rate of investment return on the particular fund we are concerned with"* (Anderson, 1992, page 162). Our actuary might also remind us that we based our asset cash flow projections on her assumptions about the expected returns on the plan assets.

If we choose to discount at the expected rate of return on the plan assets, Slater & Copeland (2005) will not be happy. In their view, *“pension liabilities are a charge on the firm’s assets in the same way as any other liabilities. If pensions have a potential call on the totality of the firm’s assets, not simply on those nominally owned by the pension fund, their value should be computed in a way consistent with this approach. At the margin, additional pension liabilities have to be covered by recourse to the external capital markets in the same way as any other capital outlay (or from the reserves, which implies an equal opportunity cost of funds). In either case, the cost of funds is the same as the firm’s overall (weighted) cost of capital, and it is therefore this market return which should be used in valuing pensions. In other words, the earning assets which have to pay for pensions are those of the firm as a whole, not just those of the fund”* Slater & Copeland (2005, page 2).

Slater & Copeland’s approach is consistent with our earlier description of a value-in-use. In our example, the plan assets have an expected annual return of 5.3%. And the company’s operating activity has a value of 20 units with an expected annual return thereon of 2 units (10%). So, the overall (weighted) cost of capital is 6.9%  $((38 \times 0.053) + (20 \times 0.10)) / (38 + 20)$ . If we used the overall (weighted) cost of capital to discount our employee’s accrued pension benefits, they would have a present value of approximately 36.5 units  $(39 / 1.069)$  at the end of year 39; and, given that our plan assets have a value of 38 units at that date, we would have a pension surplus of approximately 1.5 units.

One consequence of discounting the pension liability at the weighted cost of capital, or at the expected rate of return on the plan assets, is that we can change its present value by changing the expected rate of return. If we invest in riskier assets with higher expected returns, the present value of our pension liability will fall.

If we choose to discount at the overall (weighted) cost of capital or at the expected return on the plan assets, Bader & Gold (2005) will not be happy. They explain that it is a principle of financial economics that *“a liability is valued at the price at which a reference security trades in a liquid and deep market. A reference security (or portfolio) has cash flows that match the liability in amount, timing and probability of payment”*. *“Financial economics measures a liability by using the discount rate curve embedded in a reference portfolio – a portfolio that matches the liability.”*...The *“reference portfolio must reflect the risk of the liabilities. Riskless liabilities...must be measured with a riskless reference portfolio. Pension liabilities that are subject to default require a reference portfolio of comparable creditworthiness* (Bader & Gold, 2005, page 4).”

Bader & Gold’s approach to discounting is consistent with fair value accounting. And our analyst likes fair values.

The fair valuing of pension liabilities would have some interesting consequences. The fair value of a pension liability falls as its risk of default increases. A fall in the book value of a company’s liabilities increases the book value of its equity and, thereby, its perceived financial strength.

The fair value of a liability is based on the assumptions that the liability is transferred to a market participant (the liability to the counterparty continues; it is not settled) and that the non-performance risk relating to the liability is the same before and after its transfer (FASB, 2006a, paragraph 15). But pension protection

regulations only allow pension liabilities to be transferred if there is minimal risk of the transferee defaulting. So, a discount rate which reflected the plan sponsor's default risk would produce an entirely hypothetical fair value: there is not a market in which the pension liability can be transferred and, if there were, the transfer price would not reflect any default risk. Similarly, when a company is sold as a going concern, pension legislation gives the trustees of its pension plan considerable powers to require the purchaser to strengthen the funding basis. Again, this implies that the value of the pension liability recognised in the company's accounts should not be written down because of default risk.

In our example, the pension liability is riskless if we assume that the plan assets of 38 units are invested at the risk free rate. Treynor would have us discount pension liabilities at the risk-free rate regardless of any risk of default. He argued that discounting expected future pension payments using the risk-free rate *"comes close to being an objective measure of the financial burden of the company's pension liability. It is the relevant number, not only for the pension claimant, but also for private creditors of the company and, finally, for the analyst of the employer's equity shares"* (Treynor, 1977, page 632).

Treynor considered pension obligations to be equivalent to loans by the pension beneficiaries to the company. In his view *"the basic issue is: How does the 'contractual' value of the lenders' claim compare with what he could sell the underlying security for in foreclosure?"* (Treynor, 1977, page 627). The answer, he suggests, is that current market prices provide the best measure of the realisable value of plan assets and the contractual value of pension obligations is best determined by discounting their settlement value back to the present at the risk-free interest rate. (Such a comparison, arguably, is a good measure of management's stewardship of the pension plan. Good stewards would, presumably, safeguard plan members' claims from default risk. As, too, would good pension protection regulations. So, if management is responsible for ensuring that a company can meet its obligations as they fall due, the stewardship objective requires the use of a risk-free interest rate.)

The present value of the pension obligations that results from discounting at the risk-free rate is, Treynor concluded, *"an estimate of the market value of the assets on which lenders must have a claim if they are not to be subjected to investment risk. If the assets available exceed the present value of future claims only when the latter are discounted at a higher rate, the expected proceeds from assets will fail to meet the claims unless the assets are invested aggressively, with the attendant possibility of loss"* (Treynor, 1977, page 628).

Treynor's view is shared by the Financial Economists Roundtable (2004) whose members *"believe that the correct rate for measuring a company's promised obligation to its employees is the pre-tax rate on risk-free obligations with approximately the same average maturity as the pension liability. Any higher rate would require pension funds to take the risk of assets being insufficient to pay the promised pensions"* (FER, 2004).

So, a present value is a hypothetical number and we have several hypotheses as to the appropriate discount rate for pension liabilities: expected rate of return on the plan assets; overall cost of capital; discount rate on a reference security; and the risk-free interest rate. The decision-usefulness objective suggests the use of the discount rate on a reference security to determine the fair value of our pension liability. And the stewardship objective suggests that the reference security should be free of default risk.

### *What do the accounting standard setters say?*

Various pronouncements of the UK and US accounting standard-setting bodies suggest that accountants well understand the theory of discounting.

UK accounting guidance on discounting is contained in the 1997 Accounting Standards Board working paper *“Discounting in financial reporting”* (ASB, 1997). US guidance is contained in the *“Statement of Financial Accounting Concepts No.7 – Using Cash Flow Information and Present Value in Accounting Measurements”* (FASB, 2000) and in Appendix B to SFAS 157 *“Fair Value Measurements”* (FASB, 2006a).

There are similarities between the UK and US guidance but also differences.

The papers have the following principles in common:

- the present value of an asset or liability reflects two factors that are taken into account in all rational economic decisions: the time value of money and the risk associated with the cash flows (ASB, 1997, preface; FASB, 2000, paragraph 29); and
- present value can be calculated in two ways. Either:
  - the expected value of the cash flows can be adjusted for risk and the adjusted figure (the *certainty equivalent*) discounted at a risk-free rate; or
  - the expected value of the cash flows can be discounted at a risk-adjusted rate (ASB, 1997, paragraph 2.3; FASB, 2000, paragraph 40).

The UK and US discounting guidance differs in the following respects:

- the ASB paper views the choice of discount rate as being dependent *“on the measurement basis that is being calculated”* (paragraph 4.1). In other words, the choice depends upon the purpose for which the present value is being calculated. The US guidance, in contrast, considers that the *“only objective of present value ..... is to estimate fair value. Stated differently, present value should attempt to capture the elements that taken together would comprise a market price if one existed, that is, fair value”* (FASB, 2000, paragraph 25). Consequently, if a price for an asset or liability can be observed in the market, there is no need to calculate its present value because the price embodies the market’s assessment of present value (FASB, 2000, paragraph 17);
- the ASB paper equivocates as to whether, for accounting purposes, it is appropriate for the discount rate to reflect default risk, noting that it *“can be argued that the going concern assumption on which financial statements are prepared does not allow the entity to record a liability at the amount that reflects a possibility that the entity will not meet the liability in full, except where a counterparty has accepted that possibility (by agreeing terms that take it into account)”* (ASB, 1997, paragraph 4.3). In contrast, the US guidance explains that a fair value measurement of a liability, using present value, should reflect the non-performance risk relating to that liability, including the company’s own credit risk (FASB, 2006a, paragraph B2).

So, accounting standard setters do not have a “standard” discount rate for determining the present value of future cash flows.

### *What discount rates do the pension accounting standards use?*

SSAP 24 did not specify a discount rate. It followed the traditional actuarial approach and, consequently, the expected return on the plan assets was typically used as the discount rate for the pension liabilities.

SFAS 87 (paragraph 44) requires discount rates to “reflect the rates at which the pension benefits could be effectively settled. It is appropriate in estimating those rates to look to available information about rates explicit in current prices of annuity contracts that could be used to effect settlement of the obligation .... In making those estimates, employers may also look to rates of return on high-quality fixed-income investments currently available and expected to be available during the period to maturity of the pension benefits.” In 1993, the SEC issued a letter making it clear that “... a fixed-income security that receives a rating of Aa or higher from Moody’s would be considered high quality” (Zion et al, 2002).

According to IAS 19 (paragraph 79), “the discount rate reflects the time value of money but not the actuarial or investment risk. Furthermore, the discount rate does not reflect the enterprise-specific risk borne by the enterprise’s creditors, nor does it reflect the risk that future experience may differ from actuarial assumptions.” Under IAS 19 (paragraph 78), the rate to discount estimated cash flows is “determined by reference to market yields at the balance sheet date on high quality corporate bonds. In countries where there is no deep market in such bonds, the market yields ..... on government bonds should be used. The currency and term of the corporate bonds or government bonds should be consistent with the currency and estimated term of” the pension liabilities. The IAS 19 guidance is inconsistent because market yields on high-quality corporate bonds do reflect the enterprise-specific risks borne by creditors of the issuers of the bonds.

FRS 17 (paragraph 32) requires the present value of pension liabilities to be determined by discounting the future cash flows required to settle the liabilities at “the current rate of return on a high quality bond of equivalent term and currency to the liability”. This means the rate applicable to a bond that has been rated at the level of AA or equivalent status.

Appendix IV, paragraphs 13 to 22, to FRS 17 explains that the discount rate reflects the time value of money (given by the return on a risk-free investment) and the risks associated with the liability because of the uncertainty surrounding the ultimate cash payments due. FRS 17 (paragraph 32) explains that the risks associated with the liability because of the uncertainty surrounding the ultimate cash payments are the options that the company has to reduce the pension liabilities, including in extremis the option of closing down the plan. “In principle, the premium over the risk-free rate should vary from scheme to scheme (and within schemes), reflecting the differing levels of discretion that exist for different scheme liabilities. However, assessing the appropriate premium is difficult and subjective. In the interests of objectivity and international harmonisation, the Board has therefore decided to adopt a standard discount rate: the rate of return on a high quality corporate bond, i.e. one rated at the level of AA or equivalent status” (FRS 17, paragraph 21, Appendix IV).

Although the extant pension accounting standards all require the pension liabilities to be discounted at the yield on AA or high quality corporate bonds (a rate which, of course, reflects the default risk of such bonds), they all assert that the discount rate does not reflect any default risk. FRS 17 and IAS 19 call this

measurement basis “fair value” but SFAS 87 describes it as “actuarially valued”. *Statement of Financial Accounting Concepts No.7* explains that SFAS 87 permits an exemption to fair value measurement because it takes the view that a liability measurement that focuses on the company’s obligation is more decision-useful than a measure that reflects its risk of default. The extant pension accounting standards all prescribe an approach whereby two companies with the same pension obligation but different credit standings report the same present value (FASB, 2000, paragraph 84).

### *Summary*

Example 2 demonstrates that we need to know the current values of our defined benefit plan’s assets and liabilities.

An asset’s present value is the sum of its discounted cash flows and a liability’s present value is the sum of the discounted cash flows required to settle it.

Pension plan asset cash flows are uncertain; perhaps, too uncertain to include in the accounts. But their market value is objective and verifiable.

The projected liability cash flows are also uncertain, particularly those of a final salary plan. And there is no market value for the pension liability.

So, the most useful information we have about our defined benefit plan’s funded status is the market, or fair, value of its assets and the liability’s projected cash flows. But pension accounting standards require this information to be reduced to a single number.

Accounting standards do not have a “standard” discount rate for determining the present values of future cash flows. The decision-usefulness objective suggests the use of the discount rate on a reference security to value our pension liability; a reference security whose cash flows match those of our pension liability in amount, timing and uncertainty. The stewardship objective suggests that the reference security should be free of default risk. But, the market-based pension accounting standards mandate the use of the AA corporate bond yield as the discount rate for pension liabilities. And they require the market or fair value of the plan assets to be deducted from the present value of the pension liability to arrive at the single number measure of a pension deficit or surplus.

## An Illusion

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Uncertainty is the distinguishing characteristic of the final salary defined benefit pension obligation: uncertainty as to the ownership of the pension assets and liabilities; uncertainty as to how much pay is deferred; uncertainty as to the amounts and timing of the future pension payments; uncertainty as to the discount rate to be used to calculate their present value; and uncertainty as to the future cash flows of the plan assets that will be used to settle those liabilities.

In Appendix A to this paper, we present a “Show Jumping Trial” in which we judge different approaches to company pension accounting against four principles: Disclosure; Measurement; Recognition; and Consistency. These principles are derived from the IASB’s conceptual framework (IASB, 2001). A pension accounting standard that applied these principles would require a company’s accounts to:

- disclose and reliably measure its pension expenses, income, liabilities and assets (“pension items”);
- recognise all pension items that can be reliably measured; and
- disclose, measure and recognise pension items consistently.

In so doing, it should help a company’s accounts to fulfil the stewardship and decision-usefulness objectives.

Our trial confirms that pension accounting is evolving. Each accounting approach does better in the trial than does its predecessor. None of the extant pension accounting standards fully satisfies the principles; but an approach prepared in accordance with the latest, preliminary, views of the ASB staff (ASB, 2007b) does.

Our trial simplifies pension accounting by assuming that we know the values of pension assets and liabilities. In other words, we create an illusion of certainty in which we judge some company pension accounting approaches to be more principled than others. Pension accounting standards, too, create an illusion of certainty, through their use of mark-to-models and by their reliance on a single number (a “point estimate”) to measure the funded status of a defined benefit pension plan.

Ernst & Young (2005) express general doubts as to whether mark-to-model values are “sufficiently understandable, reliable, relevant and comparable to be suitable for financial reporting. Do the users of accounts understand how hypothetical and subjective certain ‘fair values’ can be? Can valuations that are not independently verifiable and subjective be considered reliable? And is information that is not reliable relevant in the world of financial reporting? ..... A calculated mark-to-model ‘fair value’ is a prediction not an observation: in essence it is based on internally-derived assumptions and judgements about the future, to a degree not generally appreciated” (Ernst & Young, 2005, page 4).

Ernst & Young’s reservations echo concerns expressed by Haberman et al (2003) about the use of mark-to-models to value pension liabilities. Haberman et al (2003) point out that, as in our trial, the examples used to convince people that it is possible to value pension liabilities are usually very simple, e.g., make a series of assumptions about the amount and timing of future cash flows and then discount them at the yield on a matching portfolio of marketable securities. Using

mark-to-models to value pension liabilities “for which no market exists involves making many assumptions that are open to question” and there is “no way of testing the accuracy of the ‘prices’ derived, unless the liabilities are actually sold” (Haberman et al, 2003, page 554).

Haberman et al (2003) suggest that the best that a mark-to-model can do may be to produce a range of values for a company’s pension liabilities. They explain how pension actuaries are increasingly turning to stochastic techniques to produce such a range (Haberman et al, 2003). “Based on historical data and judgements about the future....., these [stochastic] projection models stimulate a large number of possible paths (or scenarios) .....around a central, expected path” (Coughlan et al, 2007, page 12).

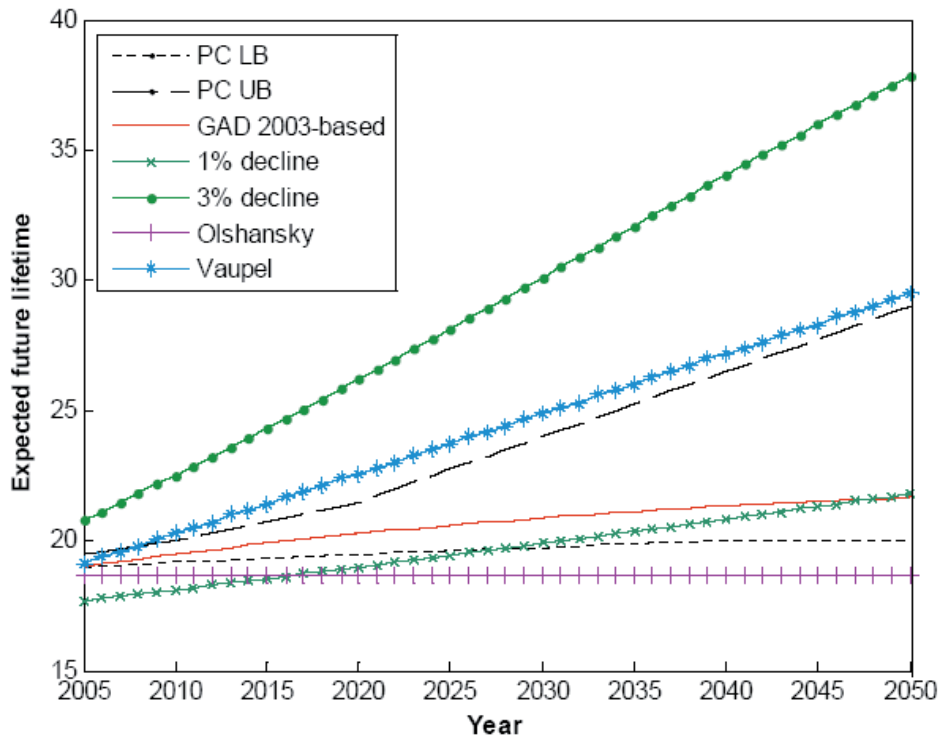
Projecting the cash flows required to settle real-world accrued pension payments is much more difficult than the examples in this paper and in our trial suggest. Figure 1, which looks like a stream of zero-coupon bond redemptions, assumes lump sum pension payments. In reality, most final salary pensions are index-linked annuities: retired employees receive monthly pension payments, linked to inflation, for the rest of their lives. So, our actuary needs to estimate both inflation and the longevity of the plan members.

When the FASB was developing SFAS 87, it satisfied itself that pension liabilities could be measured with sufficient precision to justify balance sheet recognition. It concluded that pension liabilities valued on the basis of best estimates of future events are sufficiently reliable to be useful (SFAS 87, paragraph 146). The extant pension accounting standards all are based on this belief; a delusion not suffered by experts on inflation and on longevity.

The Bank of England does not consider it meaningful to reduce its inflation forecasts to a single number. As the Governor of the Bank explains, “We do not say that in our view inflation will be 2%, or any other number. Such a statement is incoherent because a forecast is inherently probabilistic” (King, 2004, page 12). And the UK Actuarial Profession no longer considers it possible to rely on a single projection of longevity. It recommends that actuaries – and other professionals using mortality projections – should consider a range of scenarios (Actuarial Profession, 2006).

Awareness of the uncertainty surrounding human life expectancy has increased dramatically in recent years. Figure 3 from Dowd et al (2007) brings together some recent projections of life expectancy for 65 year old British males. It shows that there is no consensus surrounding future projections of life expectancy and illustrates what is meant by the “uncertainty of life”.

Figure 3: Some recent projections of life expectancy for 65 year-old British males



Notes: 'PC LB' and 'PC UB' refer to the bounds of the putative 90% prediction interval taken from Fig E.11 of the Pensions Commission Report (2005), 'GAD 2003-based' refers to the GAD principal projection based on 2003 data obtained from the same source, '1% decline' and '3% decline' refer to the Pension Commission projections based on 1% and 3% declines in mortality, and is taken from Figure E.4 of the Pensions Commission Report (2005), 'Olshansky' and 'Vaupel' refer to the putative Olshansky and Vaupel projections given in the Figure E.5 of the Pensions Commission Report (2005). Source: Dowd et al 2007, Figure 1.

A pension liability is highly sensitive to changes in life expectancy assumptions. On average, each additional year of life adds approximately 3 - 4% to the value of a pension liability (Coughlan et al, 2007, page 6).

The UK Pensions Commission describes life expectancy as being subject to "inherent uncertainty" not "mathematically modellable risk". It recommends that "official publications which set out estimates of life expectancy should provide not only the best mean estimate, but also the range of possible results which could arise from alternative reasonable assumptions" (Pensions Commission, 2005, Appendix E, pages 181, 186 and 191).

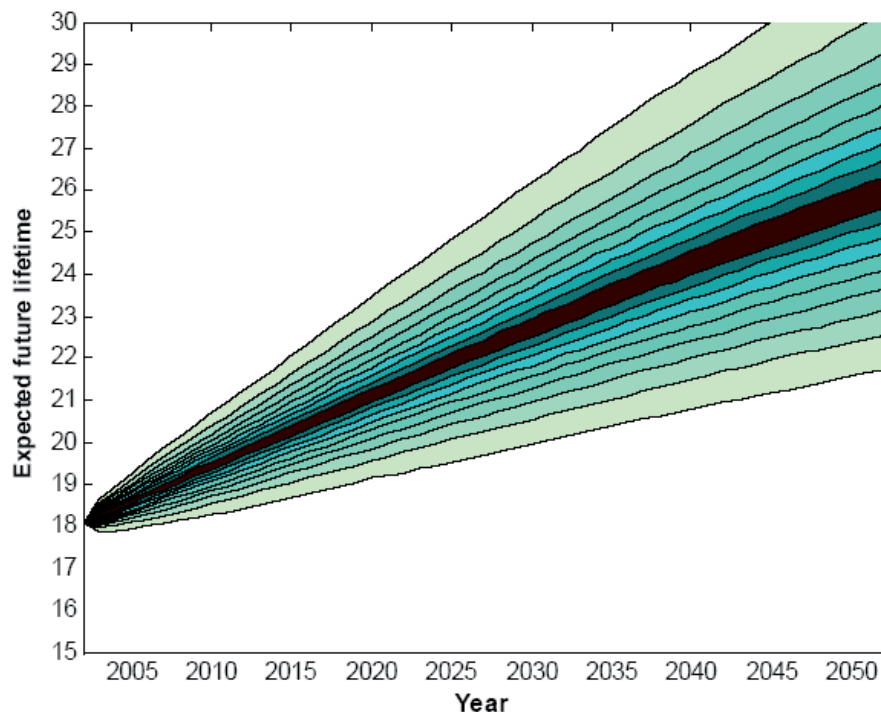
If we were to extend the Pensions Commission's recommendation on life expectancy estimates to pension accounting, we would use our best estimate of longevity and a smoothed discount rate to determine the current pension service cost and the pension deficit or surplus. And we would disclose the range of possible costs and possible pension deficits or surpluses that could arise from alternative reasonable assumptions. This should help us fulfil the stewardship and decision-usefulness objectives because it would provide information to help us assess the risks of the pension plan and the uncertainty of its future cash flows. Our range of possible deficits or surpluses would include those based on the PBO, the ABO and the buy-out cost. And it would require the use of a range of discount rates to measure the present value of the pension liability.

Accounting standard setters recognise that users of accounts need to understand the effects that changes in the underlying assumptions will have on a pension deficit or surplus and on pension costs and contributions. Pension accounting standards have continually had their disclosure requirements enhanced (see Appendix B). Most recently, in January 2007, the ASB issued Reporting Statement “Retirement Benefits – Disclosure” (ASB, 2007a). This encourages companies to give enough information to enable the risks and rewards of their defined benefit plans to be understood. The accounts should include sufficient information about the principal assumptions used to measure pension liabilities to allow users to understand their inherent uncertainties (ASB, 2007a, paragraph 8). And these assumptions should include mortality rates. It also recommends that the accounts should include a sensitivity analysis showing the effects of changes in the assumptions.

Fan charts are one way of illustrating a range of possible outcomes. A fan chart is a diagram showing the probabilities of particular outcomes over a range of time horizons. The first fan chart appears to have been the Bank of England’s inflation fan chart. More recently, they have been used to illustrate life expectancy, e.g., King (2004), Pensions Commission (2005) and Dowd et al (2007).

Figure 4 is a fan chart for male life expectancy at age 65 in England & Wales, starting in 2002. It is based on mortality rates provided by the UK Government Actuary’s Department.

**Figure 4: longevity fan chart for 65-year old males starting in 2002**



Source: Dowd et al 2007, Figure 3.

The width of the fan chart in Figure 4 indicates the degree of uncertainty about future life expectancy and different shades indicate different probability bands. The central projection of life expectancy is the dark band in the middle of the

fan chart. The probability of being in this central band is only 10%: too small to place reliance upon. Future life expectancy for males aged 65 is expected to lie somewhere within the entire shaded area with 90% confidence. So, the funnel of doubt surrounding improvements in life expectancy, as illustrated by the fan chart, is sufficiently wide as to accommodate a very broad diversity of views about future life expectancy; sufficiently wide in the case of many plans, particularly those still open to new members, as to preclude reliance being placed on any single value of future life expectancy.

### *Summary*

The final salary, defined benefit pension deficit or surplus value that appears in a company's balance sheet is a hypothetical construct; an unreal number. A single number cannot convey useful information about the distribution of a range of outcomes, particularly over life expectancy. And supplementary cash flow projections and sensitivity analyses do not dispel the illusion of certainty created by the single number. "*Good disclosure doesn't cure bad accounting*" (Sutton, 1996). There are other corporate assets and liabilities with future economic benefits and outflows of long duration and high uncertainty and in which there are no liquid markets; but none of the others appears in the balance sheet net of assets valued on a different basis. If pension accounting is to help fulfil the objectives of financial reporting, accounting standard setters need to develop valuation methods that can measure and communicate the uncertainties inherent in the defined benefit pension obligation.

## Conclusions

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Accounting was easy when it valued the claims on a single venture by recording the cash flows of its completed transactions. It got hard when it was required to fulfil the dual objectives of stewardship and decision-usefulness for going-concerns. A going-concern's accounts seek to record the cash flows arising from its past transactions but some of those cash flows occur in the future and some of them are uncertain.

Our first example (Example 1) demonstrated that historical cost accounting works for a defined contribution plan, where the future cash flows, arising from past transactions, are certain.

Accounting for a defined benefit plan is difficult because many of its cash flows lie far into the future and are highly uncertain. Example 2 demonstrates that, whereas operating activities can be valued by scaling operating earnings, users of accounts need to know the current values of defined benefit plan assets and liabilities. So, the extant pension accounting standards are an improvement on the actuarial-based standards because they seek to provide information about these current values.

We explained why pension accounting standards smooth pension costs and why regulators are likely to resist smoothing. And we highlighted the merits of charging only the pension current service cost to operating earnings, with all other movements in a pension deficit or surplus (other than contributions and pensions paid) being taken through the STRGL and with the different components of the change-in-value of a pension deficit or surplus being disclosed separately in the footnotes to the accounts.

The objectives of financial reporting call for information that will help us assess a company's future cash flows. So, it is helpful for a company's accounts to provide projections, based on alternative reasonable assumptions, of the range of future cash flows required to settle its defined benefit pension liabilities.

The most useful information that we can provide about a defined benefit pension plan is the market value of its assets and our actuary's projections of its future pension payments, together with their underlying assumptions. Valuing a company is not an objective of financial reporting; but the use of accounts for purposes such as the calculation of dividends, taxes and management bonuses and the monitoring of debt covenants, calls for a bottom line profit number or net asset calculation (Horton & Macve, 1995). So, the extant pension accounting standards require a single value to be ascribed to a pension deficit or surplus; and they have concluded that that value is best determined as the difference between the fair value of the plan assets and the PBO, actuarially valued using a discount rate linked to the return on high quality bonds.

Deterministic mark-to-model approaches that generate a single-number balance sheet pension deficit or surplus have severe limitations: they are, necessarily, hypothetical and subjective. A single number cannot provide information about the timing and uncertainty of a pension plan's future cash flows. Accounting standard setters are encouraging enhanced disclosures of the risks and rewards of pension plans. Sensitivity analyses are but the first step towards developing valuation methods that can measure and communicate the uncertainties inherent in the defined benefit pension obligation and thereby shatter pension accounting's illusion of certainty.

## Appendix A: A Show Jumping Trial

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In this Appendix, six pension accounting approaches (the “Standards”) are portrayed as horses competing in a Show Jumping trial.

### *The horses*

The horses are:

#### **CASH**

Full name: *Cash Accounting Standard*

Birth year: 1494

National origin: Italy

Trainer: Pacioli

#### **SSAP 24**

Full name: Statement of Standard Accounting Practice No. 24 *Accounting for Pension Costs*

Birth year: 1988

National origin: UK

Trainer: Accounting Standards Committee (ASC)

#### **SFAS 87**

Full name: Statement of Financial Accounting Standards No. 87 *Employers' Accounting for Pensions*

Birth year: 1985

National origin: USA

Trainer: Financial Accounting Standards Board (FASB)

#### **FRS 17**

Full name: Financial Reporting Standard No. 17 *Retirement Benefits*

Birth year: 2000

National origin: UK

Trainer: Accounting Standards Board (ASB)

#### **SFAS 158**

Full name: SFAS 87 as amended by Statement of Financial Accounting Standards No. 158 *Employers' Accounting for Defined benefit Pension and Other Postretirement Plans. An amendment of FASB Statements No. 87, 88, 106 and 132(R)*

Birth year: 2006

National origin: USA

Trainer: Financial Accounting Standards Board (FASB)

#### **FRS 17 PLUS**

Full name: FRS 17 PLUS. (An option under IAS 19 since 2002 and now proposed by ASB *Project update: accounting for pensions Discussion Summary: Reporting changes in assets and liabilities arising from retirement benefit funds.*)

Birth year: 2007

National origin: UK

Trainer: Accounting Standards Board (ASB) staff

**IAS 19** which, broadly, accommodates SFAS 87, FRS 17 or FRS 17 PLUS (see IAS 19, paragraph 93 and Basis for Conclusions paragraphs 46 and 47) does not compete in the trial.

## *The fences*

The trial consists of eight fences over which the Standards have to jump. Each fence is a model designed to highlight a key company pension plan feature. A list of the fences, which address all of the key features of company pension plans, is set out in Table A.

**Table A: Details of the Fences**

<b>Number</b>	<b>Type of pension plan</b>	<b>Key feature</b>	<b>Key issue</b>
1	Defined contribution	Pension contribution	Accounting for defined contribution plan
2	Unfunded defined benefit	Current service cost	Accounting for unfunded defined benefit plan and current service cost
3	Unfunded defined benefit	Expected mortality differs from actual mortality	Actuarial gain on pension liabilities
4	Unfunded defined benefit	Past service cost	Past service cost
5	Unfunded defined benefit	Final salary plan	Accumulated or projected benefit obligation calculation
6	Funded defined benefit	Separate pension fund	Accounting for funded defined benefit plan
7	Funded defined benefit	Investment return exceeds expected return	Actuarial gain on plan assets
8	Unfunded defined benefit	Interest rates / rates of return	Discounting

Fence 1, a variant of Example 1 in the main body of this paper, tests the horses on the key accounting issues raised by the introduction of a defined contribution plan.

Fences 2 to 5 inclusive examine the issues raised by different features of an unfunded defined benefit plan – current service cost, an experience gain, past service cost and salary progression. Fence 3 is a variant of Example 2.

Fences 6 and 7 (an Example 2 variant) examine the issues raised by the establishment of a separate defined benefit fund, including an experience gain on plan assets.

Fence 8, a variant of Example 3, explores the concept of discounting.

## *The principles*

Four principles (the “Principles”) represent the bars of each fence. The Principles have been designed as a minimal, mutually exclusive and exhaustive set of pension accounting requirements, compliance with which contributes to satisfying the objective of the IASB’s *Framework for the Preparation and Presentation of Financial Statements* (the “Framework”) of producing financial information that is useful in making economic decisions. Collectively, the Principles aim to span the Framework requirements in a way that eliminates overlapping. Hence, the failure of a Standard to apply any one Principle leads to one, and only one, bar of a fence being dislodged. The Principles are:

**Disclosure** – a company’s accounts should disclose its pension expenses, income, liabilities and assets (“pension items”) and their bases of measurement and recognition;

**Measurement** – pension items should be reliably measured;

**Recognition** – a company’s accounts should recognise all pension items that can be reliably measured; and

**Consistency** – pension items should be consistently disclosed, measured and recognised.

The terms “expenses”, “income”, “liabilities” and “assets” have the meanings attached to them in the “Framework”.

At each fence, each Standard is tested, first, to ascertain whether it requires disclosure of the existence of a company’s pension items and of their values and bases of measurement and recognition. Secondly, each Standard’s basis of measurement of pension items is examined. Next, each Standard is tested as to whether it recognises these items in the income statement or balance sheet and, finally, it is examined to ascertain whether it treats pension items consistently. Whenever a Standard fails to apply a Principle, a bar of a fence is dislodged and a fault incurred. As in Show Jumping, the Standard with the fewest faults wins. In judging the Standards, it is assumed that where a Standard sets minimum requirements only the minimum are applied.

### *The results at each fence*

The eight fences constitute a series of pension accounting issues encountered by a simplified, imaginary company. The basic features of the company and the economy in which it operates are presented in the base-case below.

#### **The base-case**

The company is assumed with certainty to:

require 100 units of capital per employee;

have an annual turnover of 3 units per 100 units of capital;

raise 100 units of capital through share subscriptions, at the beginning of each of the first 40 years of its life, which it immediately invests in operating assets; and

employ, at the beginning of each year, one new employee, aged 25, who works for the company for 40 years, earning 3 units of wages per year, before living in retirement for a further 20 years.

There is no company pension plan in the base-case but it is assumed that each employee consumes 2 units per year and saves 1 unit per year to provide for retirement. At the end of a 40 year working life, the employee has saved 40 units which are consumed at a rate of 2 units a year over the next 20 years of retirement. Each employee's annual consumption is thus equalised at 2 units per year.

By the end of year X40, the company has 40 employees, aged 25 to 64. At the beginning of year X41, the oldest employee reaches age 65, retires and is replaced by a 25 year old. The company continues indefinitely in this steady state with a 25 year old employee replacing a 65 year old retiree every year.

It is further assumed that the company operates in an economy which has:

zero interest rates;

zero depreciation rates; and

zero tax rates.

Thus, it is assumed with certainty that, at the end of year X40, the company has assets that cost 4000 units – 40 employees at 100 units of capital per employee – and shareholders' funds of 4000 units. During the year X40, the company's turnover is 120 units, as is the cost of wages and the company earns nil profits.

Additional features are now introduced to this base-case to provide the eight fences. At each fence, an explanation is given of the additional feature and a commentary provided on each horse's performance.

The horses now come under Starter's Orders.

### *Fence 1 – Defined contribution pension plan*

The **key feature** of Fence 1 is that there is a defined contribution pension plan. It is assumed that, each year, each employee earns 3 units, comprising wages of 2 units and a contribution of 1 unit to a defined contribution plan.

A profit & loss account, balance sheet and pension note for Fence 1 for the year ended 31.12.X40 prepared in accordance with the Principles are set out in Table 1A.

**Table 1A: Fence 1 – Profit & Loss Account and Balance Sheet**

Profit & Loss Account – Year Ended 31.12.X40		
	units	workings
Turnover	120	4000*3/100
Wages	( 80)	40*2
Pension cost	<u>( 40)</u>	40*1
Profit	<u>NIL</u>	

BALANCE SHEET AT 31.12.X40		
	units	
Assets	<u>4000</u>	
Issued share capital	<u>4000</u>	40*100

#### PENSION NOTE

The company operates a defined contribution pension plan. The assets of the plan are held in a separate, independently administered fund. The pension cost for the year represents contributions payable by the company to the fund. There are no outstanding or pre-paid pension contributions.

#### Commentary

All Standards account for Fence 1 as in Table 1A above.

**Disclosure** – all Standards disclose the pension cost and its basis of calculation. All Standards, except CASH, SFAS 87 and SFAS 158, disclose the amounts included in the balance sheet. However, because there are no outstanding or pre-paid contributions in Fence 1, there are no amounts included in the balance sheet. So, **CASH, SFAS 87 and SFAS 158 rattle but do not dislodge the Disclosure bar.**

**Measurement** – all Standards reliably measure the pension items.

**Recognition** – all Standards recognise as the pension cost the contribution payable in the period, except CASH which recognises the contributions paid in the period. However, at Fence 1, the contribution paid is the same as the contribution payable and, therefore, **CASH rattles but does not dislodge the Recognition bar.**

**Consistency** – all Standards are consistent in their requirements.

All horses are safely over the first fence.

## *Fence 2 – Unfunded defined benefit plan (current service cost)*

The **key feature** of Fence 2 is that there is an unfunded defined benefit pension plan.

Fence 2 assumes that, each year, each employee earns 3 units, comprising 2 units of annual wages and 1 unit of pension benefits. The value of pension benefits earned in each period is referred to as the “current service cost” and depends upon the annual pension payable and the number of years over which it is payable. At Fence 2, both of these variables are known with certainty. An annual pension of 2 units will be paid to each employee for 20 years. At the end of a 40 year working life, each employee will have accrued 40 units of pension benefits. So, each year, each employee accrues 1 unit, being the entitlement to 20 annual pension benefits, each equal to 1/40<sup>th</sup> of the annual wages of 2 units.

As a consequence of the above assumption, the company generates cash in each of the first 59 years of its life, as pension benefits earned exceed pension benefits paid. Accordingly, it is further assumed that: cash generated, in any year in which pension benefits earned exceed pension benefits paid, funds capital increases; and surplus capital is returned to shareholders.

At Fence 2, the steady state is not reached until year X61. In year X60, the company has 40 employees and 20 pensioners, aged 25 to 84. In year X61, the oldest pensioner dies aged 85 and is replaced by a new 65 year old pensioner and the firm is in a steady state. Henceforth, pension benefits earned each year of 40 units equals pension benefits paid of 40 units and the company has a constant pension liability of 1200 units.

A profit & loss account, balance sheet and pension note for Fence 2 for the year ended 31.12.X60 prepared in accordance with the Principles are set out in Table 2A.

**Table 2A: Fence 2 – Profit & Loss Account and Balance Sheet**

### **Profit & Loss Account – Year Ended 31.12.X60**

	<b>units</b>
Turnover	120
Wages	( 80)
Pension current service cost	<u>( 40)</u>
Profit	<u>NIL</u>

### **Balance Sheet at 31.12.X60**

	<b>units</b>		<b>units</b>
Assets	<u>4000</u>	Pension liabilities	1200*
		Issued share capital	<u>2800</u>
			<u>4000</u>

### **PENSION NOTE**

The company operates a defined benefit pension plan. The pension cost represents the value of pension benefits which it is assumed with certainty were earned in the year by employees. Pension liabilities represent accrued pension benefits

#### \*WORKINGS

The pension liability is 1200 units, being cumulative pension benefits earned of 1620 units less cumulative pensions paid of 420 units. Cumulative pension benefits earned comprise 1 unit earned in year X1, plus 2 units in year X2, and so on up to 40 units in each of years X40 to X60 inclusive. Cumulative pensions paid of 420 units comprise 2 units paid in year X41, plus 4 units in year X42 and so on up to 40 units in year X60.

The pension liability can also be expressed as comprising 1 unit for the youngest employee (aged 25 at the start of the year), 2 units for the next youngest employee, and so on up to 40 units for the oldest employee, on the point of retirement (totalling 820 units), together with the remaining liability of 38 units for the employee who retired at the beginning of the year, 36 units for the employees who retired at the beginning of the previous year, down to zero for the employee who has just died after 20 years of retirement (totalling 380 units), making a grand total of 1200 units.

#### Commentary

All standards account for Fence 2 as in Table 2A above, except CASH which records only the pensions paid, of 40 units in year X60, and not the accrued pension benefits.

**Disclosure** – all Standards disclose the pension charge and its underlying assumptions. All Standards, except CASH and SSAP 24, disclose the value of the accrued pension benefits. CASH **hits the Disclosure bar**. SSAP 24 discloses the pension provision which, as explained below, equals the accrued pension benefits.

**Measurement** – all Standards reliably measure the pension items, except CASH which does not measure the accrued pension benefits. CASH **hits the Measurement bar**.

**Recognition** – SFAS 87, FRS 17, SFAS 158 and FRS 17 PLUS all require the current service cost to be recognised as a pension charge and the present value of the accrued pension benefits to be recognised as a liability.

CASH requires the company to record only the cash payment of 40 units. It does not recognise the accrued pension benefits of 1200 units and **hits the Recognition bar**.

SSAP 24 recognised as a provision any cumulative pension charges not completely discharged by pensions paid. It permitted any method of calculating the pension charge provided it recognised the cost on a “*systematic and rational basis*” over the period of employees’ service and that the current service cost is a level percentage of pensionable payroll. In practice, a variety of methods were used. At Fence 2, the value of the pension provision equals that of the accrued pension benefits if it is assumed that SSAP 24 adopts a method which accords with the accrual basis of accounting.

**Consistency** – all Standards are consistent in their disclosure, measurement and recognition requirements.

All Standards except CASH clear the second fence. CASH is trailing the field, with 3 faults, as the horses approach the third fence.

*Fence 3 – Unfunded defined benefit plan  
(actuarial gain on pension liabilities).*

The **key feature** of Fence 3 is that, in the year X60, there is an actuarial gain on pension liabilities. Fence 3 examines the treatment of a gain arising as a result of experience differing from assumptions (an “experience” gain). Identical considerations would apply had the gain arisen as a result of a change in assumptions or had the gain been a loss. Both types of gain are known as an “actuarial gain”.

Fence 3 is similar to Fence 2 except that:

the assumption of certainty regarding mortality rates is removed; and

it is assumed that, at the end of year X60, the oldest employee dies.

So, the company’s pension liabilities immediately decrease by 40 units (to 1160 units at 31.12.X60), reflecting a decrease in pension benefits payable of 2 units a year in each of the next 20 years. There are no survivor’s benefits.

A profit & loss account, balance sheet and pension note for Fence 3 for the year ended 31.12.X60 prepared in accordance with the Principles are set out in Table 3A.

**Table 3A: Fence 3 – Profit & Loss Account and Balance Sheet**

**Profit & Loss Account – Year Ended 31.12.X60**

	<b>units</b>
Turnover	120
Wages	( 80)
Pension current service cost	( 40)
Pension experience gain	<u>40</u>
Profit	<u>40</u>

**Balance Sheet at 31.12.X60**

	<b>units</b>		<b>units</b>
Assets	<u>4000</u>	Pension liabilities	1160
		Profit & loss account: retained profit	40
		Issued share capital	<u>2800</u>
			<u>4000</u>

**PENSION NOTE**

The company operates a defined benefit pension plan. The pension current service cost represents the value of benefits which it is assumed with certainty were earned in the year by employees and the pension experience gain represents the decrease in accrued pension benefits which it is assumed with certainty arose in the year as a result of an employee’s death. Pension liabilities represent accrued pension benefits.

### Commentary

The accounting standards have different requirements in respect of an actuarial gain on pension liabilities, as summarised in Table 3B.

**Table 3B: Fence 3 – Accounting Treatments**

Year ended 31.12.X60	CASH units	SSAP 24 units	SFAS 87 units	FRS 17 units	SFAS 158 units	FRS 17 PLUS units
Pension charge - P & L	40	38	40	40	40	0
Profit for year	nil	2	nil	nil	nil	40
Pension credit – STRGL / other comprehensive income	-	-	-	(40)	(40)	-
Pension liability	nil	1198	1200	1160	1160	1160

**Disclosure** – all Standards require disclosure of the pension charge and its assumptions. All Standards, except CASH and SSAP 24, require disclosure of the accrued pension benefits. Neither CASH nor SSAP 24 discloses the actuarial gain or the accrued pension benefits. So, both **hit the Disclosure bar**.

**Measurement** – all Standards reliably measure the pension items, except CASH which does not measure the accrued pension benefits. CASH **hits the Measurement bar**.

**Recognition** – CASH requires the company to record only the cash payment of 40 units. It does not recognise the actuarial gain of 40 units or the accrued pension benefits of 1160 units and consequently **hits the Recognition bar**.

SSAP 24 (paragraph 30) required the experience gain to be taken into account by reducing current and future costs. The gain is amortised over the expected remaining service lives of current employees, being an average of 20 years at Fence 3. If the current service charge is as calculated at Fence 2, commencing year ending 31.12.X60, the pension charge will be 38 units, comprising the current service cost of 40 units less 2 units in respect of the amortisation of the experience gain, being 40 units divided by 20 years. As a result, the profit for the year will be 2 units and the pension provision at 31.12.X60 will be 1198 units. As a consequence of recognising only 2 units of the experience gain of 40 units, SSAP 24 **hits the Recognition bar**.

Under SFAS 87 (paragraph 32), experience gains need not be recognised immediately in the charge to income if, at the beginning of the year, the unrecognised net gain or loss does not exceed 10% of the value of the pension liabilities. At Fence 3, there were no unrecognised gains or losses at the beginning of year X60. Accordingly, the experience gain of 40 units is not recognised and the pension charge for the year is the service cost of 40 units. In future years, the unrecognised experience gain of 40 units will be ultimately recognised except to the extent it is offset by subsequent losses.

SFAS 87 (paragraph 37) requires the balance sheet to show as a minimum liability (*unfunded accumulated benefit obligation*) any excess of the value of the pension liabilities, of 1160 units, over the value of plan assets, of nil units. And SFAS 87 (paragraph 54) requires a company's accounts to include a schedule reconciling the funded status of the plan with the amounts reported in the balance sheet, showing separately: (1) the PBO; (2) the amount of unrecognized net actuarial gain or loss; and (3) the amount of net pension liability recognized in the balance sheet.

As a consequence of not recognising the experience gain when calculating the pension charge, SFAS 87 **hits the Recognition bar**.

FRS 17 (paragraphs 37, 47 and 57) requires the experience gain, of 40 units, to be reflected in the statement of total recognised gains and losses ("STRGL") and the company to recognise the accrued pension benefits.

SFAS 158 requires the experience gain, of 40 units, to be reflected in "other comprehensive income". Amounts so recognised are adjusted as they are subsequently recognised in earnings pursuant to SFAS 87. SFAS 158 recognises, as an asset or a liability, the difference between the PBO and the value of the plan assets.

The treatment of FRS 17 PLUS is the same as FRS 17 except that it recognises the experience gain in the profit and loss account.

**Consistency** – all Standards are consistent in their requirements, except FRS 17 and SFAS 158 which charge the increases in accrued pension benefits in the period to the profit & loss account but charge the decreases in accrued pension benefits to the STRGL/other comprehensive income and consequently **hit the Consistency bar**. SFAS 87 allows discretion as to how much of a gain is recognised and could, thus, permit inconsistent reporting between companies. At Fence 3, SFAS 87 clears the Consistency bar because it is assumed that its minimum requirements are applied.

As shown in Table 3C, FRS 17 PLUS clears the third fence. SFAS 87, FRS 17 and SFAS 158 each hit one bar. SSAP 24 hits two bars. CASH hits three bars.

**Table 3C: Fence 3 – Scores**

	Accounting Standard					
	CASH faults	SSAP 24 faults	SFAS 87 faults	FRS 17 faults	SFAS 158 faults	FRS 17 PLUS faults
Disclosure	1	1	0	0	0	0
Measurement	1	0	0	0	0	0
Recognition	1	1	1	0	0	0
Consistency	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>0</u>
<b>Fence 3</b>	<b><u>3</u></b>	<b><u>2</u></b>	<b><u>1</u></b>	<b><u>1</u></b>	<b><u>1</u></b>	<b><u>0</u></b>

FRS 17 PLUS narrowly leads the trial. CASH is far behind the field.

	CASH	SSAP 24	SFAS 87	FRS 17	SFAS 158	FRS 17 PLUS
Bars hit so far	6	2	1	1	1	0

#### *Fence 4 – Unfunded defined benefit plan (past service cost).*

The **key feature** of Fence 4 is past service cost – an increase in accrued pension benefits in respect of prior periods of service.

Fence 4 is similar to Fence 2 but additionally it is assumed that, at the end of the year X60, the company increases its employees' accrued pension benefits by 40 units, with benefits vesting immediately. As a consequence, pension liabilities are 1240 units at 31.12.X60. Fence 4 does not deal with unvested prior service cost, which is still an issue for accounting standard-setters but not, in our opinion, a sufficiently key issue to necessitate a separate fence.

A profit & loss account, balance sheet and pension note for Fence 4 for the year ended 31.12.X60 prepared in accordance with the Principles are set out in Table 4A.

**Table 4A: Fence 4 – Profit & Loss Account and Balance Sheet**

##### **Profit & Loss Account – Year Ended 31.12.X60**

	<b>units</b>
Turnover	120
Wages	( 80)
Current service cost	( 40)
Past service cost	( 40)
Loss	( 40)

##### **Balance Sheet at 31.12.X60**

	<b>units</b>		<b>units</b>
Assets	<u>4000</u>	Pension liabilities	1240
		Profit & loss account: accumulated losses	(40)
		Issued share capital	<u>2800</u>
			<u>4000</u>

##### **PENSION NOTE**

The company operates a defined benefit pension plan. The current service cost represents the value of pension benefits which it is assumed with certainty were earned in the year by employees and the past service cost represents the increase in accrued pension benefits in respect of prior periods. Pension liabilities represent accrued pension benefits.

##### **Commentary**

CASH, SSAP 24, SFAS 87 and SFAS 158 each adopt different approaches to accounting for past service costs from those of FRS 17 and FRS 17 PLUS, as shown in Table 4B.

**Table 4B: Fence 4 – Accounting Treatments**

Year ended 31.12.X60	CASH units	SSAP 24 units	SFAS 87 units	FRS 17 units	SFAS 158 units	FRS 17 PLUS units
Pension charge - P & L	40	42	42	80	42	80
Loss for year	nil	(2)	(2)	(40)	(2)	(40)
Pension charge – other comprehensive income					38	
Pension liabilities	nil	1202	1240	1240	1240	1240
Reduction in equity	–	–	38	–	–	–

**Disclosure** – all Standards require disclosure of the pension charge and its underlying assumptions. All Standards, except CASH and SSAP 24, require disclosure of the value of the accrued pension benefits at the balance sheet date. Neither CASH nor SSAP 24 require disclosure of the value of the accrued pension benefits, of 1240 units, as at the balance sheet date and therefore both **hit the Disclosure bar**.

**Measurement** – all Standards reliably measure the pension items, except CASH which does not measure the accrued pension benefits. Consequently, CASH **hits the Measurement bar**.

**Recognition** – CASH records only the cash payment of 40 units. It recognises neither the past service cost nor the accrued pension benefits and consequently **hits the Recognition bar**.

SSAP 24 (paragraph 31) required past service cost to be written off over the remaining service lives of current employees. If the current service cost is as calculated in Fence 2, commencing year ending 31.12.X60, the pension charge will be 42 units, comprising the current service cost of 40 units plus 2 units in respect of the amortisation of past service cost, being 40 units divided by 20 years. As a result, the loss for the year will be 2 units and the pension provision at 31.12.X60 will be 1202 units. As a consequence of not recognising past service cost immediately, SSAP 24 **hits the Recognition bar**.

SFAS 87 (paragraph 25) permits past service cost to be spread over employees' future service lives, being an average of 20 years. Commencing year ending 31.12.X60, the company's profit and loss account pension charge will be the current service cost of 40 units plus a charge of 2 units in respect of the amortisation of past service cost, being 40 units divided by 20 years.

SFAS 87 (paragraph 37) requires the company's balance sheet to show as a minimum liability (*unfunded accumulated benefit obligation*) any excess of the value of the pension liabilities, of 1240 units, over the value of plan assets, of nil units. Additionally, the excess of the *unfunded accumulated benefit obligation*, of 1240 units, over the *unfunded accrued pension cost*, of 1202 units, is reported as a reduction of equity, being 38 units. The *unfunded accrued pension cost* is

the cumulative net periodic pension cost, of 1622 units, less cumulative pensions paid, of 420 units.

SFAS 87 (paragraph 54) requires a company's accounts to include a schedule showing separately: (1) the PBO; (2) the amount of unrecognized past service cost; and (3) the amount of net pension liability recognized in the statement of financial position.

As a consequence of not recognising past service cost immediately, SFAS 87 hits the Recognition bar.

FRS 17 (paragraph 60) requires the profit & loss account to recognise past service cost immediately, to the extent benefits vest immediately. Past service cost is otherwise recognised on a straight line basis over the period in which benefits vest.

SFAS 158 requires past service cost to be reflected in "other comprehensive income". Amounts so recognised are adjusted as they are subsequently recognised in earnings pursuant to SFAS 87. SFAS 158 recognises, as an asset or a liability, the difference between the PBO and the value of the plan assets.

FRS 17 PLUS recognises all past service cost immediately.

**Consistency** – all Standards are consistent in their disclosure, measurement and recognition requirements, except SFAS 158 which charges the increases in accrued pension benefits arising from current service cost to the profit & loss account but that arising from past service cost to other comprehensive income. So, SFAS 158 hits the Consistency bar.

FRS 17 and FRS 17 PLUS clear the fourth fence. SFAS 87 and SFAS 158 each hit one bar, SSAP 24 hits two bars and CASH hits three bars.

**Table 4C: Fence 4 – Scores**

	Accounting Standard					
	CASH faults	SSAP 24 faults	SFAS 87 faults	FRS 17 faults	SFAS 158 faults	FRS 17 PLUS faults
Disclosure	1	1	0	0	0	0
Measurement	1	0	0	0	0	0
Recognition	1	1	1	0	0	0
Consistency	0	0	0	0	1	0
<b>Fence 4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>

The field is becoming more spread out as the horses move towards the fifth fence.

	CASH	SSAP 24	SFAS 87	FRS 17	SFAS 158	FRS 17 PLUS
<b>Bars hit so far</b>	9	4	2	1	2	0

### *Fence 5 – Unfunded defined benefit plan (final salary plan).*

The **key feature** of Fence 5 is that the value of pension benefits earned is determined by reference to each employee's final salary.

Fence 5 has the same assumptions as Fence 2 but, in addition, it is assumed from year X1 that:

annual wages per employee will be doubled to 4 units for all periods after 31.12.X60; and

each year, each employee earns 20 annual pension benefits each equal to 1/40<sup>th</sup> of that employee's final annual wages.

In accordance with the base-case assumption that the company will continue indefinitely in its steady state, the company's pension cost is calculated on the assumption that its pension plan will continue indefinitely and, at Fence 5, pension benefits are determined by reference to each employee's final salary. Employees who retire on or before 31.12.X60 receive an annual pension of 2 units (as at Fence 2) whereas those retiring after that date receive an annual pension double that, i.e., 4 units. Each employee's annual pension equals that employee's final annual wages.

A profit & loss account, balance sheet and pension note for Fence 5 for the year ended 31.12.X60 prepared in accordance with the Principles are set out in Table 5A.

**Table 5A: Fence 5 – Profit & Loss Account and Balance Sheet**

#### **Profit & Loss Account – Year Ended 31.12.X60**

	<b>units</b>
Turnover	120
Wages	( 80)
Pension cost	<u>( 79)*</u>
Loss	<u>( 39)</u>

#### **Balance Sheet At 31.12.X60**

	<b>units</b>		<b>units</b>
Assets	<u>4000</u>	Pension liabilities	1980
		Profit and loss account: accumulated losses	(780)*
		Issued share capital	<u>2800</u>
			<u>4000</u>

#### **PENSION NOTE**

The company operates a defined benefit pension plan. The pension cost is calculated on the assumption that the pension plan will continue in operation for the foreseeable future and represents the value of pension benefits which it is assumed with certainty were earned in the year by employees. Pension liabilities represent accrued pension benefits.

#### **\*WORKINGS**

The value of pension benefits accrued at 31.12.X60 is 1980 units, being cumulative pension benefits accrued of 2400 units less cumulative pensions paid of 420 units. During the year X60, the 39 employees who will still be employed after the pay rise each earn 2 units of pension benefits while the employee who retires at the end of X60, before the pay rise, earns 1 unit of

pension benefits. This gives a current service cost of 79 units and a loss 39 units for the year. The loss increases by one unit in each of the years X21 to X59, i.e., 1 unit in the year X22 up to 38 units in the year X59, as a result of which accumulated losses at 31.12.X60 are 780 units. In the real world, the company would take action to address the losses but, to keep the fence simple, no further amendments are made to the assumptions.

### Commentary

CASH and SSAP 24 adopt different approaches to those of the other Standards, as explained below.

**Table 5B: Fence 5 – Accounting Treatments**

Year ended 31.12.X60	CASH units	ALL OTHER STANDARDS units
Pension charge - P & L	40	79
Loss for year	nil	(39)
Pension liabilities	nil	1980

**Disclosure** – all of the Standards require disclosure of the pension charge and the assumptions used to calculate that charge. All of the Standards, except CASH and SSAP 24, require disclosure of the value of the accrued pension benefits at the balance sheet date. **CASH hits the Disclosure bar.** SSAP 24 discloses the pension provision which, as explained below, equals the accrued pension benefits.

**Measurement** – all Standards reliably measure the pension items, except CASH which does not measure the accrued pension benefits. Consequently, **CASH hits the Measurement bar.**

**Recognition** – CASH records only the cash payment of 40 units. It does not recognise the accrued pension benefits, however calculated. **CASH hits the Recognition bar.**

SSAP 24 required the company to recognise as a liability any unpaid cumulative pension charges. SSAP 24 permitted the use of any “systematic and rational” method of calculating the pension charge. In practice, a variety of methods were used. SSAP 24 clears Fence 5 only if it is assumed that it calculates the pension charge using the “Projected Unit Method”, under which the value of pension benefits earned is determined by reference to projected final salary. The judges have decided that SSAP 24 does use such a basis at this fence.

SFAS 87 and FRS 17 specifically require the current service cost to be calculated in accordance with the Projected Unit Method. SFAS 158 and FRS 17 PLUS make no changes to these requirements.

**Consistency** – all Standards are consistent in their disclosure, measurement and recognition requirements.

As shown in Table 5C, all horses except CASH clear the fifth fence. CASH hits three bars.

**Table 5C: Fence 5 – Scores**

	Accounting Standard	
	CASH faults	ALL OTHER STANDARDS faults
Disclosure	1	0
Measurement	1	0
Recognition	1	0
Consistency	<u>0</u>	<u>0</u>
<b>Fence 5</b>	<b><u>3</u></b>	<b><u>0</u></b>

	CASH	SSAP 24	SFAS 87	FRS 17	SFAS 158	FRS 17 PLUS
Bars hit so far	12	4	2	1	2	0

## Fence 6 – Funded defined benefit plan

The **key feature** of Fence 6 is that there is a funded defined benefit pension plan.

Fence 6 has the same assumptions as Fence 2 except that, additionally, it is assumed that the company establishes a separate pension fund into which each year it pays annual pension contributions equal to the value of the pension benefits earned in the year. This means that the pension fund is fully funded – at 31.12.X60, there are accrued pension benefits of 1200 units and plan assets of 1200 units.

A profit & loss account, balance sheet and pension note for Fence 6 for the year ended 31.12.X60 prepared in accordance with the Principles and on the basis that the pension liabilities and the plan assets are liabilities and assets of the company are set out in Table 6A.

**Table 6A: Fence 6 – Profit & Loss Account and Balance Sheet**

### Profit & Loss Account – Year Ended 31.12.X60

	units
Turnover	120
Wages	( 80)
Pension cost	( 40)
Profit	<u>NIL</u>

### Balance Sheet at 31.12.X60

	units		units
Assets	4000	Pension liabilities	1200
Plan assets	<u>1200</u>	Issued share capital	<u>4000</u>
	<u>5200</u>		<u>5200</u>

#### PENSION NOTE

The company operates a defined benefit pension plan. The pension cost represents the value of pension benefits which it is assumed with certainty were earned in the year by employees. Pension liabilities represent accrued pension benefits. The value of the pension liabilities and the plan assets are assumed to be known with certainty.

#### Commentary

As explained below, the Standards express different views as to the extent to which the nature of the company's obligation in respect of its employees' accrued pension benefits is affected by the establishment of the pension fund. Furthermore, the requirements of CASH and SSAP 24 differ from those of the other Standards. If, at Fence 6, it is assumed that the "systematic and rational basis" used to calculate the SSAP 24 pension charge accords with the accrual basis of accounting, all Standards report as in Table 6A except that they do not show the pension assets and liabilities on the balance sheet.

**Disclosure** – CASH does not disclose the accrued pension benefits or the plan assets or a pension deficit or surplus and therefore gives no indication of the risks and rewards of the plan assets and pension liabilities to which the company is exposed.

However, because the value of the pension surplus/deficit is nil units at Fence 6, CASH rattles but does not dislodge the Disclosure bar.

SSAP 24 required disclosure of the results of the most recent formal actuarial valuation including the main actuarial assumptions, the market value of plan assets at the valuation date and the level of funding, expressed in percentage terms, based on the actuarial value of assets.

SFAS 87 (paragraph 54) and SFAS 158 require a company's accounts to include a schedule reconciling the funded status of the plan with amounts reported in the employer's statement of financial position, showing separately: (1) the fair value of plan assets; (2) the projected benefit obligation; and (3) the amount of net pension liability recognized in the statement of financial position.

FRS 17 (paragraph 88) and FRS 17 PLUS require a company to show, in a note to the company's accounts, the pension fund's assets, liabilities and resulting deficit together with an analysis of the movements in the fund's deficit during the accounting period.

**Measurement** – all Standards reliably measure the pension items although CASH does not measure the plan assets and pension liabilities. However, because the value of the pension surplus/deficit is nil units at Fence 6, the judges have decided that **CASH rattles but does not dislodge the Measurement bar**.

In practice, SSAP 24 and SFAS 87 allow valuations at other than the balance sheet date.

**Recognition** – CASH requires the company to record only the cash contribution of 40 units. However, because the value of the pension surplus/deficit is nil units at Fence 6, the judges have decided that **CASH rattles but does not dislodge the Recognition bar**.

SSAP 24 did not recognise the pension liabilities and plan assets, or a plan deficit or surplus, as liabilities and assets of the company. If the cumulative pension cost had not been completely discharged by the payment of contributions, SSAP 24 required the excess to be shown as a pension provision. At Fence 6, if it is assumed that SSAP 24 adopts a method of accounting which accords with the accrual basis of accounting, the value of the pension provision equals that of the pension surplus/deficit. The judges have decided that this is the case and accordingly SSAP 24 clears the fence.

FRS 17 and FRS 17 PLUS are based on the premise that a separate pension fund changes the nature of the company's pension obligation. In the UK, defined benefit funds are typically constituted as irrevocable trusts. Paragraph 24 of the Appendix to FRS 17 explains that defined benefit pension plans will not usually be subsidiary undertakings of the company because they are controlled by trustees. The company cannot in practice ensure that the trustees will act as it would wish in many significant areas, and hence, does not control the assets nor is it directly liable for the pension payments. A pension plan can give rise to assets and liabilities of the company but they are not the gross amounts of the plan assets and pension liabilities. Instead, the company has a pension asset or liability to the extent that it is entitled to benefit from any surplus or has a legal or constructive obligation to make good any deficit. Consistent with this explanation, FRS 17 (paragraph 37) and FRS 17 PLUS require a company to recognise an asset to the extent that it is able to recover, through future reduced contributions or refunds, a defined benefit plan surplus and a liability to the extent that a plan deficit reflects its legal or constructive obligation.

SFAS 87 and SFAS 158 regard the pension liabilities and plan assets as liabilities and assets of the company. They take the view that *“creating a separate legal entity does not change the nature of the employer’s obligation to pay promised benefits to retirees”* (Appendix A, paragraphs 109 – 111). The FASB considered and rejected the argument that the liability for accrued pension benefits rests with the pension fund and that the company’s obligation is restricted to making periodic contributions sufficient to support the fund. The FASB concluded that there is a *“fundamental difference between the inherent promise and the resulting obligation under a defined benefit plan and the promise and obligation under a defined contribution plan. An employer that has undertaken an obligation to provide defined pension benefits based on service already rendered may view it as an obligation directly to the employees (looking through the funding arrangement) or as an obligation to make future contributions to the plan, but the employer has a present obligation based on the defined benefits either way.”*

Similarly, Appendix A (paragraph 112) to SFAS 87 explains that the FASB rejected the argument that the fund’s assets are not those of the company, noting that, as the company’s future contributions to the fund will be affected by the performance of the fund’s assets, the company bears the risks and rewards of those assets. It further notes that, in the 1980’s significant assets were withdrawn by companies from pension funds. Although SFAS 87 regards pension liabilities and plan assets as liabilities and assets of the company, it does not require them to be separately disclosed on the company’s balance sheet. This is because, the SFAS 87 Summary explains, the standard requires *“offsetting”*, whereby the pension liabilities and plan assets are shown net on the company’s balance sheet *“even though the liability has not been settled, the assets may still be largely controlled and substantial risks and rewards associated with both of those amounts are clearly borne by the employer.”*

SFAS 87 (paragraph 36) requires that if the ABO, of 1200 units, exceeds the fair value of plan assets, of 1200 units, the company should recognise a liability that is at least equal to the *unfunded accumulated benefit* obligation, being nil units.

SFAS 158 requires a company to recognise, as an asset or a liability, the difference between the PBO and the value of the plan assets.

**Consistency** – all Standards are consistent in their disclosure, measurement and recognition requirements.

All Standards clear the sixth fence and retain their positions.

	CASH	SSAP 24	SFAS 87	FRS 17	SFAS 158	FRS 17 PLUS
Bars hit so far	12	4	2	1	2	0

### *Fence 7 – Funded defined benefit plan (experience gain on plan assets)*

The **key feature** of Fence 7 is that the actual return on plan assets exceeds the expected return, i.e., there is an experience gain on plan assets. Fence 7 extends Fence 6 and assumes that in the year X61 only:

risk-free interest rates and high quality corporate bond yields are zero;

all but one unit of the plan assets are invested in high quality corporate bonds; and

1 unit of the plan assets is used to bet on a rank outsider horse running in the UK Grand National, at odds of 120 to 1. The outsider wins the race.

At Fence 7, the expected return on the assets is zero, i.e., this is a fair bet. The betting winnings give rise to an experience gain of 120 units. The winnings enable the company to reduce its pension contributions to zero in each of the next three years.

Fence 7 is contrived but we need an expected return that does not have implications for the discount rate.

At 31.12.X61 there are accrued pension benefits of 1200 units and plan assets of 1320 units; so there is a pension surplus of 120 units. The movements in the value of the pension fund during that year are the service cost of 40 units, the experience gain of 120 units and the pensions paid of 40 units. At Fence 7, the time value of money is zero, as measured by risk-free interest rates, and there is no risk of default in the payment of the liabilities, because the value of the plan assets always equals or exceeds that of the pension liabilities and in all years subsequent to 31.12.X61 the plan assets are risk free.

Accounts for Fence 7 for the year ended 31.12.X61 prepared in accordance with the Principles and on the basis that the accrued pension benefits and plan assets are liabilities and assets of the company are set out in Table 7A.

**Table 7A: Fence 7 – Profit & Loss Account And Balance Sheet**

**Profit & Loss Account – Year Ended 31.12.X61**

	units
Turnover	120
Wages	( 80)
Pension cost	( 40)
Pension plan asset	<u>120</u>
Profit	<u>120</u>

**Balance Sheet at 31.12.X61**

	units		units
		Pension liabilities	1200
Assets	4000	Profit and loss account: retained profit	120
Plan assets	<u>1320</u>	Issued share capital	<u>4000</u>
	<u>5320</u>		<u>5320</u>

**PENSION NOTE**

The company operates a defined benefit pension plan. The pension cost represents the value of pension benefits which it is assumed with certainty were earned in the year by employees and the pension experience gain represents the investment return on plan assets which it is assumed with certainty arose in the year. Pension liabilities represent accrued pension benefits. The value of the pension liabilities and the plan assets are assumed to be known with certainty.

**Commentary**

The Standards have different requirements, as summarised in Table 7B.

**Table 7B: Fence 7 – Accounting Treatments**

Year ended 31.12.X61	CASH units	SSAP 24 units	SFAS 87 units	FRS 17 units	SFAS 158 units	FRS 17 PLUS units
Pension charge (credit) - P & L	(80)	34	40	40	40	(80)
Profit for year	120	6	nil	nil	nil	120
Pension credit – STRGL/other comprehensive income	–	–	–	120	120	–
Pension surplus	120	6	nil	120	120	120

**Disclosure** – all Standards disclose the pension charge and its assumptions. All Standards, except CASH and SSAP 24, disclose the value of both the plan assets and the accrued pension benefits. SSAP 24 required disclosure of the results of the most recent formal actuarial valuation, including the main actuarial assumptions, the market value of plan assets at the valuation date and the level of funding, expressed in percentage terms, based on the actuarial value of assets. SSAP 24 does not require disclosure of the value of the experience gain of 120 units or the pension surplus, of 120 units. CASH and SSAP 24 both **hit the Disclosure bar**.

SFAS 87, FRS 17, SFAS 158 and FRS 17 PLUS disclosures are as at Fence 6.

**Measurement** – all Standards reliably measure the pension items, except CASH which does not measure the plan assets and the accrued pension benefits. CASH hits the Measurement bar.

**Recognition** – CASH does not recognise the plan assets and the accrued pension benefits and consequently hits the Recognition bar.

SSAP 24 (paragraph 30) amortises the experience gain over the expected remaining service lives of current workers, being an average of 20 years. If the current service charge is as calculated at Fence 2, the pension charge will be 34 units, comprising the current service cost of 40 units less 6 units in respect of the amortisation of the experience gain, being 120 units divided by 20 years. So, the profit for the year will be 6 units and the pension prepayment will be 6 units, comprising cumulative costs of 1614 units less cumulative payments of 1620 units. Because it recognises only 6 units of the experience gain of 120 units, SSAP 24 hits the Recognition bar.

Under SFAS 87 (paragraph 32), experience gains need not be recognised immediately if, at the beginning of the year, the unrecognised net gain or loss does not exceed 10% of the greater of the values of the pension liabilities and the plan assets. At Fence 7, these conditions were fulfilled as there were no unrecognised gains or losses at the beginning of year X61. So, the pension charge for the year is the service cost of 40 units less the expected return of zero. In future years, the unrecognised gain of 120 units will be recognised when, and if, the pension plan is ultimately wound up.

SFAS 87 (paragraph 37) requires the company's balance sheet to show as a minimum liability (*unfunded accumulated benefit obligation*) any excess of the value of the pension liabilities, of 1200 units, over the value of plan assets, of 1320 units.

As a consequence of not recognising the actual return immediately, SFAS 87 hits the Recognition bar.

The FRS 17 net profit & loss account pension charge is 40 units, being the current service cost less the expected return of zero units, and the actuarial gain of 120 units is recognised in the STRGL. Under FRS 17, there is a pension surplus of 120 units.

SFAS 158 requires the experience gain, of 120 units, to be reflected in "other comprehensive income". Amounts so recognised are adjusted as they are subsequently recognised in earnings pursuant to SFAS 87. SFAS 158 recognises, as an asset or a liability, the difference between the PBO and the value of the plan assets.

The treatment of FRS 17 PLUS is the same as FRS 17, except that it recognises the experience gain in the profit and loss account.

**Consistency** – all Standards are consistent in their requirements, except FRS 17 and SFAS 158 which treat inconsistently the expected return and the difference between the expected return and the actual return, although both are components of the actual return, i.e. the actual return equals the expected return

plus the difference between the actual and expected return (i.e., the unexpected return). So, **FRS 17 and SFAS 158 hit the Consistency bar.**

As shown in Table 7C, FRS 17 PLUS clears the seventh fence. CASH hits three bars. SSAP 24 hit two bars. SFAS 87, FRS 17 and SFAS 158 each hit one bar.

**Table 7C: Fence 7 – Scores**

	Accounting Standard					
	CASH faults	SSAP 24 faults	SFAS 87 faults	FRS 17 faults	SFAS 158 faults	FRS 17 PLUS faults
Disclosure	1	1	0	0	0	0
Measurement	1	0	0	0	0	0
Recognition	1	1	1	0	0	0
Consistency	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>0</u>
<b>Fence 7</b>	<b><u>3</u></b>	<b><u>2</u></b>	<b><u>1</u></b>	<b><u>1</u></b>	<b><u>1</u></b>	<b><u>0</u></b>

With one fence to go FRS 17 PLUS leads the field. There is strong competition for second and third places as the horses head for the final fence.

	CASH	SSAP 24	SFAS 87	FRS 17	SFAS 158	FRS 17 PLUS
Bars hit so far	15	6	3	2	3	0

### *Fence 8 – Unfunded defined benefit plan (discounting).*

Fence 8 considers the discount rate used to calculate the present value of the pension liabilities.

The assumptions at Fence 8 are the same as those at Fence 2, except that the assumptions of continuing certainty over interest rates and return on capital are removed although it is assumed that for each of the first sixty years:

the risk-free interest rate is 0%;

high quality corporate bond yields are 1% per annum;

turnover is 160 units (4 units per 100 units of opening capital, giving a 1% return on capital); and

reported profits are distributed as dividends.

The amendment to the interest rate assumption raises the **key issues** of the values at which the pension liabilities and the pension charge should be recorded in the company's accounts.

The Measurement Principle requires recognised pension expenses and liabilities to be reliably measured. It is known with certainty that the pension liabilities have a settlement value of 1200 units, being the undiscounted amounts of cash expected to be paid to settle the liabilities in the normal course of business. Thus, 1200 units is a reliable and understandable measure of the settlement value of the pension liabilities. However, the present value of the pension liabilities may be more relevant than their settlement value because it will provide figures that are more comparable through time and with other enterprises. All of the Standards, except CASH and SSAP 24 which do not report the value of the accrued pension benefits, require the pension liabilities to be recorded at their present value. Unfortunately, the present value of the pension liabilities is not assumed to be known with certainty at Fence 8 and there is more than one possible discount rate which the company might use in order to measure the present value of the pension liabilities. Indeed, had Fence 8 featured a funded defined benefit plan, there would be another candidate discount rate – the expected return on the plan assets.

A profit & loss account, balance sheet and pension note for Fence 8 for the year ended 31.12.X60 prepared in accordance with the Principles and with pension expenses and liabilities measured at settlement value are set out in Table 8A.

**Table 8A: Fence 8 – Profit & Loss Account and Balance Sheet**

Profit & Loss Account – Year Ended 31.12.X60			
	units		
Turnover	160		
Wages	( 80)		
Pension cost	<u>( 40)</u>		
Profit	40		
Dividends paid	<u>( 40)</u>		
Retained profit	<u>NIL</u>		

Balance Sheet at 31.12.X60			
	units		units
Assets	<u>4000</u>	Pension liabilities	1200
		Issued share capital	<u>2800</u>
			<u>4000</u>

**PENSION NOTE**

The company operates a defined benefit pension plan. The pension cost represents the settlement value of pension benefits which it is assumed with certainty were earned in the year by employees. Pension liabilities represent the settlement value of accrued pension benefits

**Commentary**

The requirements of the Standards differ in respect of Fence 8, as explained below.

**Table 8B: Fence 8 – Accounting Treatments**

Year ended 31.12.X60	CASH units	SSAP 24 units	ALL OTHER STANDARDS units
Pension charge - operating P & L	40	*	30
Pension charge - interest	nil	-	10
Profit for year	40	*	40
Pension liabilities	nil	*	1008

\*unclear or incomplete – see below.

**Disclosure** – all Standards require disclosure of the pension charge and its underlying assumptions. All Standards, except CASH and SSAP 24, require disclosure of the value of the accrued pension benefits. CASH does not disclose the accrued pension benefits and **hits the Disclosure bar**. SSAP 24 discloses the pension provision which, as explained below, equals the accrued pension benefits.

**Measurement** – SSAP 24 (paragraph 40) noted that “by their nature actuarial valuations make allowance for interest so that future cash flows are discounted

to their present value. Financial statements, however, normally include items at their face value without discounting them. The question of whether items should be discounted in financial statements is a general one and this Statement does not attempt to establish standard practice. Interest effects arising from short-term timing differences between the payment of contributions and the recognition of cost are not likely to be material and can be ignored. If the difference is long-term, the situation becomes akin to that arising in respect of an unfunded scheme. If a scheme is unfunded the provision for pension costs is assessed and reviewed on a discounted basis and adjusted each year by an amount comprising two elements: a charge for the year (equivalent to a contribution in a funded scheme) and interest on the unfunded liability." SSAP 24 gave no guidance as to the discount rate to be used when valuing the pension liabilities of an unfunded plan.

SFAS 87 and FRS 17 both require the pension liabilities to be discounted, as shown in Table 8B, wherein the discount rate applied is 1%, being the yield on high quality corporate bonds.

SFAS 87 (paragraph 44) requires discount rates to "reflect the rates at which the pension benefits could be effectively settled. It is appropriate in estimating those rates to look to available information about rates explicit in current prices of annuity contracts that could be used to effect settlement of the obligation .... In making those estimates, employers may also look to rates of return on high-quality fixed-income investments currently available and expected to be available during the period to maturity of the pension benefits."

FRS 17 (paragraph 32), requires pension liabilities to be discounted at a rate that reflects the time value of money and the characteristics of the liability. Such a rate should be assumed to be "the current rate of return on a high quality bond of equivalent term and currency to the liability". FRS 17 explains that this means a bond that has been rated at the level of AA or equivalent status and that the rate of return on such a bond reflects the time value of money and a small premium for risk, taken to reflect the options that the company has to reduce the pension liabilities, including in extremis the option of closing down the plan. FRS 17 thus concludes that the characteristics of AA corporate bonds best match those of pension liabilities.

SFAS 158 and FRS 17 PLUS make no changes to the discounting requirements of, respectively, SFAS 87 and FRS 17.

At Fence 8, it would seem that there is little reason to assume any risk in the settlement of the liabilities, given that: at 31.12.X60, the company has assets of 4000 units, which exceed the undiscounted pension liabilities of 1200 units; and each year turnover is assumed to exceed wages paid by 80 units. This would suggest that the risk free discount rate of 0% should be used to calculate the present value of the pension liabilities. Furthermore, the going concern assumption upon which the accounts are prepared may imply that the company is assumed to meet its liabilities as they fall due, i.e., that there is no default risk.

However, the annual return on the company's capital is not risk free – at 1%, it is, at this fence, the same as the yield on high quality corporate bonds. This suggests that, perhaps, the company's credit rating, and its default risk, is similar to that of the issuers' of high quality corporate bonds and that the yield on such bonds should be used to discount the pension liabilities.

At Fence 8, the judges are unable to decide whether the Standards reliably measure the pension liabilities because their present value is not assumed to be known with certainty. The lack of *Framework* guidance as to the appropriate discount rate means that there is no objective way of determining whether the Standards accord with the Measurement Principle – accordingly, all of the Standards are deemed to clear the eighth fence. The judges feel that this is unsatisfactory and that the Measurement bar should be raised for future events so as to better test the discount rate used to calculate the present value of pension liabilities.

**Recognition** – CASH records only the cash payment of 40 units. It does not recognise the accrued pension benefits, however measured, and consequently **hits the Recognition bar**.

SSAP 24 required the company to recognise as a pension provision any cumulative pension charges not completely discharged by pensions paid. At Fence 8, if it is assumed that SSAP 24 adopts a method of accounting which accords with the accrual basis of accounting it clears the fence. The judges have decided that this is the case.

SFAS 87, FRS 17, SFAS 158 and FRS 17 PLUS all require the current service cost to be recognised as a pension charge and the present value of the accrued pension benefits to be recognised as a liability.

**Consistency** – all Standards are consistent in their disclosure, measurement and recognition requirements. Arguably, those Standards that mandate the use of an AA corporate bond discount rate require entities with different default risks to use identical discount rates thereby limiting comparability.

**Table 8C: Fence 8 – Scores**

	Accounting Standard	
	CASH faults	ALL OTHER STANDARDS faults
Disclosure	1	0
Measurement	0	0
Recognition	1	0
Consistency	<u>0</u>	<u>0</u>
<b>Fence 8</b>	<b><u>2</u></b>	<b><u>0</u></b>

**Result**

	CASH	SSAP 24	SFAS 87	FRS 17	SFAS 158	FRS 17 PLUS
Bars hit	17	6	3	2	3	0

## The Standards as Show Jumpers

Table 9A summarises the performance of the Standards as Show Jumpers.

**Table 9A: The Standards As Show Jumpers**

Fence	Key issue	CASH	SSAP 24	SFAS 87	FRS 17	SFAS 158	FRS 17 PLUS	TOTAL
		faults	faults	faults	faults	faults	faults	faults
1	Defined contribution plan	0	0	0	0	0	0	0
2	Unfunded defined benefit plan - current service cost	3	0	0	0	0	0	3
3	Actuarial gain on pension liabilities	3	2	1	1	1	0	8
4	Past service cost	3	2	1	0	1	0	7
5	Accumulated or projected benefit obligation calculation	3	0	0	0	0	0	3
6	Accounting for a funded defined benefit plan	0	0	0	0	0	0	0
7	Actuarial gain on plan assets	3	2	1	1	1	0	8
8	Discounting	2	0	0	0	0	0	2
	TOTAL	<u>17</u>	<u>6</u>	<u>3</u>	<u>2</u>	<u>3</u>	<u>0</u>	<u>31</u>

Table 9A shows that in the Show Jumping trial CASH incurred seventeen faults, SSAP 24 six faults, SFAS 87 & FRS 158 three faults, FRS 17 two faults and FRS 17 PLUS performed faultlessly.

Table 10A identifies each fence wherein a Standard dislodges a Principle bar.

**Table 10A: The Bars of the Fences which the Standards Dislodge**

	CASH	SSAP 24	SFAS 87	FRS 17	SFAS 158	FRS 17 PLUS
Disclosure	2,3,4,5,7,8	3,4,7				
Measurement	2,3,4,5,7					
Recognition	2,3,4,5,7,8	3,4,7	3,4,7			
Consistency				3, 7	3,4,7	

Note: figures refer to the fence numbers.

Table 10A shows that nine faults were incurred on the Disclosure bar; five faults on the Measurement bar; twelve faults on the Recognition bar; and five faults on the Consistency bar. Thus, most faults were incurred on the Recognition bar. Indeed, SFAS 87 hit only Recognition bars while FRS 17's and SFAS 158's method of recognition on the Actuarial Gains fences caused them to knock down the Consistency bars.

Only CASH and SSAP 24 were troubled by the Disclosure bars.

The Show Jumping trial simplified pension accounting by assuming that the values of some, or all, of the pension items were known with certainty. This enabled a single pension accounting issue to be examined at each fence. The trial was, however, unrepresentative of the real world in as much as no one fence contained all pension accounting issues. Furthermore, there was no “weighting” of faults in the trial. Thus, for example, a Disclosure fault had the same effect as a Consistency fault. In the real world, some faults might be considered less serious than others, e.g., disclosure may reduce the consequences of non-recognition, and failure to recognise actuarial gains may be more serious than recognising gains inconsistently. Nevertheless, a Standard that is unable to perform without fault in the simple world of the fences is unlikely to inspire confidence in its ability to deal with the challenges of the real world.

None of the Standards was troubled by the defined contribution plan fence. This was, largely, attributable to the fact that the nature and value of a defined contribution pension obligation is, at all times, known with certainty, being determined by the amount of the contribution payable in each period.

The performance of the horses deteriorated when they encountered defined benefit plans and, particularly, when uncertainty was introduced into the determinants of pension items. Most faults were incurred at the Actuarial Gains fences, where most of the Standards were reluctant to recognise the volatility caused by such gains and to treat movements in pension surpluses and deficits consistently, regardless of their causes. The uncertainty as to the present value of the pension liabilities at the Discounting fence resulted in the judges being unable to decide whether the Standards reliably measure pension items.

## Appendix B: Pension Accounting Standards

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This appendix provides brief summaries of: the old UK Statement of Standard Accounting Practice No. 24 ("SSAP 24"); the US Statements of Financial Accounting Standards No. 87 ("SFAS 87") and No. 158 ("SFAS 158"); the International Accounting Standard IAS 19 Employee Benefits ("IAS 19"); and the UK Financial Reporting Standard No. 17 ("FRS 17").

The standards adopt a common approach to defined contribution plans – the pension cost recognised in the profit & loss account is the contribution payable to the plan in exchange for service rendered by workers in the accounting period and any outstanding or prepaid contributions at the balance sheet date are recognised as a liability or asset.

The accounting standards differ in their approach to defined benefit plans.

SSAP 24 was introduced in 1988 and replaced by FRS 17 in 2005. It regarded the company as having an ongoing pension funding obligation, the cost of which is recognised systematically and rationally. It required the pension cost to be calculated using any actuarial valuation method consistent with the objective of recognising the cost of providing pensions on a systematic and rational basis over the period during which the company benefited from the employees' services. The method was expected to result in a normal pension cost that would be a level percentage of the employee payroll. The actuarial assumptions were required to be best estimates, reflecting expected future salary increases, and future cash flows were discounted at the expected rate of return on the plan assets. It recognised as a liability (or asset) any deficit (or surplus) of contributions paid over cumulative pension charges. In the early years of SSAP 24, plan assets were generally measured at an actuarial value consistent with the approach used in an actuarial funding valuation. In later years, some actuaries used market values for both funding and SSAP 24 valuations. Any material deficit or surplus, of pension liabilities over plan assets, arising as a result of past service cost or gains and losses was a funding liability or asset to be accounted for by adjusting current and future pension charges so as to spread the deficit or surplus over the remaining service life of current plan employees.

SFAS 87 was introduced in 1985. It regards pension liabilities and plan assets as liabilities and assets of the company, although it requires them to be shown as a net item in the company's accounts. It requires pension liabilities to be actuarially valued, using the Projected Unit Method and a discount rate linked to the return on high quality bonds, irrespective of the actual asset allocation of the fund, and plan assets to be valued using current market values.

SFAS 87 analyses the movement in the pension deficit or surplus into the following components:

- the actuarial present value of the pension benefits earned in the period (called the "service cost");
- changes to pension benefits earned in previous periods ("past service cost");
- the unwinding of the discount arising from calculating the net present value of the pension liabilities (the "interest charge");

the investment return on plan assets (the “actual return”); and

gains and losses arising because experience differed from assumptions or because assumptions changed (“gains or losses”).

Under SFAS 87, the pension charge for the year is the sum of the above components adjusted, if the company so desires, to (i) substitute the expected long-term return on plan assets (the “expected return”) for the actual return (ii) spread past service cost over workers’ remaining service lives and (iii) defer gains and losses not exceeding 10% of the greater of the present value of the pension liabilities or the fair value of plan assets (the “10% corridor”), with any excess being amortised over the employees’ expected remaining service lives. In calculating the expected long-term return on plan assets, the average long term return expected on the assets may be applied to either the fair value of plan assets or an adjusted value that recognises changes in fair value in a systematic and rational way over a period of up to five years.

SFAS 87 (paragraph 29) explains that the standard does not require recognition of gains and losses as components of net pension cost in the period in which they arise because they may reflect refinements in estimates as well as real changes in economic values and because some gains in one period may be offset by losses in another and vice versa.

Under SFAS 87, a liability (or asset) was recognised if the cumulative net periodic pension cost exceeded (or was exceeded by) the company’s contributions to the plan. Furthermore, SFAS 87 required the company’s balance sheet to show as a minimum liability any excess of the value of the pension liability, calculated using the Current Unit Method, over the value of plan assets (the “unfunded accumulated benefit obligation”). Finally, to prevent the pension charge for the year from being charged with the full amount of the minimum liability, SFAS 87 required unrecognised past service cost to be shown on the balance sheet as an intangible asset or, if the amount of unrecognised past service cost was insufficient, any balance to be charged directly to equity.

SFAS 158 was published in September 2006 and amended SFAS 87. It requires a company to recognise, as an asset or a liability, the difference between the PBO and the value of the plan assets. It required actuarial gains or losses and prior service costs that arise during an accounting period but are not recognised in earnings to be recognised in “other comprehensive income”; amounts so recognised are adjusted as they are subsequently recognised in earnings pursuant to SFAS 87. It also required plan assets and liabilities to be measured as at the balance sheet date, and not up to three months earlier as permitted by SFAS 87.

FRS 17 was published in 2000 following a detailed comparison by the UK standard setters of the SSAP 24 and the SFAS 87/IAS 19 approaches. Its full requirements became mandatory for accounting periods beginning on or after 1 January 2005. (SSAP 24 had previously been criticised for allowing too much flexibility in the use of actuarial valuation methods and for inadequate disclosure requirements). Having originally favoured an actuarially-based approach with restricted valuation methods and enhanced disclosures, the UK standards setters eventually concluded that such an approach would not enjoy international support and that FRS17 should therefore require plan assets to be recorded at market value, provided such an approach did not introduce undue volatility into

the profit & loss account.

FRS 17 views a company with a funded defined benefit plan as having a liability (or asset) equal to the plan deficit (or recoverable surplus). It requires:

pension liabilities to be measured using the Projected Unit Method and discounted at an AA corporate bond rate;

plan assets to be measured at fair value at the balance sheet date;

a company to recognise, in its balance sheet as a liability, a deficit in a defined benefit fund to the extent that it reflects the company's legal or constructive obligation and, as an asset, a surplus to the extent that it is able to recover it through reduced future contributions or through refunds from the fund.

the profit & loss account to recognise, as an operating charge, the service cost (called "current service cost") and, to the extent vested, past service cost, and, as a net financial item, the interest cost and expected return on assets. Past service cost is required to be recognised on a straight line basis over the period in which benefits vest. To the extent benefits vest immediately, past cost is recognised immediately;

the interest cost and expected return on assets to be presented as a net financial item, adjacent to interest; and

immediate recognition of gains and losses (called "actuarial gains and losses"), including the difference between the actual return and the expected return on plan assets, in the statement of recognised gains and losses ("STRGL"). (The STRGL records all recognised gains and losses of an accounting period including the profit or loss for the period.)

When valuing plan assets under FRS 17: for quoted securities, the current bid price is taken; for unquoted securities, an estimate of fair value is used and the fair value of unquoted securities is taken to be the average of the bid and offer prices. Property is valued at open market value or on another appropriate basis of valuation determined by property experts. Insurance policies that exactly match the amount and timing of some or all of the benefits payable under the scheme should be measured at the same amount as the related obligations. For other insurance policies there are a number of possible valuation methods. A method should be chosen which gives the best approximation to fair value given the circumstances of the scheme (ASB 2000, paragraphs 16 – 18).

IAS 19 accommodates the approaches of both SFAS 87 and FRS 17. A revised IAS 19, introduced in 1998, required:

pension liabilities (the "defined benefit obligation") to be actuarially valued using the Projected Unit Method and a high quality corporate bond-linked discount rate;

plan assets to be measured at fair value;

actuarial gains and losses to be recognised in the profit & loss account, spread forward over the expected average remaining service lives of

the employees, to the extent that they exceed the 10% corridor. Faster recognition of actuarial gains and losses is allowed but not required;

past service cost to be recognised immediately the benefits vest, and otherwise amortised on a straight line basis over the average period until the amended benefits vest;

the charge to income for a period to comprise the current service cost, the interest charge, the expected return on plan assets, actuarial gains and losses, to the extent recognised, and past service cost, to the extent recognised; and

the balance sheet figure relating to a defined benefit plan to be the net total of: the present value of the defined benefit obligation; plus actuarial gains and less actuarial losses not yet recognised; less past service cost not yet recognised; and less the fair value of plan assets.

The amount of any surplus is restricted so as not to exceed the net total of unrecognised actuarial losses and past service cost plus the present value of available refunds and reductions in future contributions to the plan (determined by using the discount rate for pension liabilities).

IAS 19 (paragraph 95) explains that in the long term, actuarial gains and losses may offset one another. Therefore, estimates of pension liabilities are best viewed as a range (or "corridor") around the best estimate. Actuarial gains and losses that do not breach the 10% limits described above need not be recognised – although the company may choose to do so.

IAS 19 was modified in January 2005, to accommodate FRS 17, by allowing actuarial gains and losses to be recognised immediately in a (new) "statement of recognised income and expense". As a consequence, IAS 19 now permits three alternative pension accounting methods.

UK listed companies are required, by EU regulations, to adopt International Financial Reporting Standards as adopted for use in the EU for consolidated accounts for accounting periods beginning on or after 1st January 2005.

The standards also require detailed disclosures of a company's pension arrangements to be made in the notes to the accounts.

SSAP 24 disclosure requirements include those of: the nature of the plan; the accounting policy; the actuarial valuation method and major assumptions; the pension cost; any expected significant changes in future costs; any outstanding or prepaid contributions at the balance sheet date; details of the most recent actuarial valuation including the market value of the plan assets and the level of funding.

IAS 19 disclosure requirements include those of: the accounting policy for recognising actuarial gains and losses; the nature of the plan; a reconciliation of the opening and closing balances of the present value of the defined benefit obligation; a reconciliation of the opening and closing balances of the fair value of plan assets; a reconciliation of the assets and liabilities recognised in the balance sheet to the surplus/deficit; a reconciliation showing the movements during the period in the net liability or assets recognised in the balance sheet;

an analysis of the total expense recognised in the income statement; the actual return on plan assets; the main assumptions underlying the plan, including the expected return on plan assets; an estimate of the contributions expected to be paid to the plan during the annual period beginning after the balance sheet date; and a five year history of the values of plan assets and pension liabilities.

SFAS 87 is concerned with the measurement and recognition of pension plans. Disclosure requirements in respect of a company's pension plans are set out in a separate accounting standard SFAS 132 *Employers' Disclosures about Pensions and Other Postretirement Benefits*. SFAS 132 was issued in 1998 and amended in 2003. Its disclosure requirements include: reconciliations of the pension liability and the plan assets showing the movements in the period; information describing the types of plan assets and the investment strategy; a statement of the funded status of all company pension plans; the ABO; details of the net period benefit cost recognised, including service cost, interest cost, expected return on plan assets, amortization of unrecognized transition assets or liabilities, recognized gains or losses, prior service cost recognized, gain or loss recognized due to settlement or curtailment; the discount rate, rate of compensation increase, and expected long-term rate of return on plan assets; details of the benefits expected to be paid in each of the next five fiscal years, and in the aggregate for the five fiscal years thereafter; and a best estimate of contributions expected to be paid to the plan during the next fiscal year.

In December, 2006, the ASB issued an amendment to FRS 17 (ASB, 2006) which brought its disclosure requirements into line with those of IAS 19.

In January 2007, the ASB published a Reporting Statement "*Retirement Benefits – Disclosure*" (ASB, 2007a) designed to help users of accounts understand how pension liabilities are calculated. The Reporting Statement aimed to achieve its objective by setting out best practice for additional disclosures to be given by preparers of either UK GAAP or IFRS accounts. As part of the fourth principle, the reporting statement recommends that the amount required to buy out pension plan liabilities should be disclosed, where it has been disclosed to plan trustees or members.

Table A sets out a comparative summary of the approach of the accounting standards to the key accounting issues of defined benefit plans.

**Table A: Accounting Standards' Approach to Key Issues of Defined Benefit Plans.**

ISSUE	SSAP 24	SFAS 87/SFAS158	FRS 17	IAS 19
Nature of the company's obligation	Company has ongoing pension funding obligation, the cost of which is recognised systematically and rationally. Changes in the plan deficit/surplus are recognised systematically and gradually over subsequent periods.	Pension liabilities and plan assets are those of company but shown as net item.	Company's liability/asset is plan deficit/recoverable surplus.	Plan assets reduce (but do not extinguish) the entity's pension obligation and result in a single net liability or surplus.
Service cost	Accruals basis. Actuarially valued using any method which systematically and rationally recognises the cost of providing pensions, including the cost of expected future salary increases. No discount rate specified.	Accruals basis. Actuarially valued (Projected Unit Method) using high quality bond discount rate.	Accruals basis. Actuarially valued (Projected Unit Method) using AA bond discount rate.	Accruals basis. Actuarially valued (Projected Unit Method) using high quality bond discount rate.
Past service cost	Amortised	Recognised in other comprehensive income and subsequently amortised.	Recognised in P&L over period until benefits vest. If benefits vest immediately, the cost is recognised immediately.	Recognised in P&L over period until benefits vest. If benefits vest immediately, the cost is recognised immediately.
Gains & losses	Amortised	Recognised in net periodic cost; or in other comprehensive income and subsequently amortised.	Immediately recognised in STRGL.	Excess over 10% corridor amortised. Faster recognition permitted including immediately recognised in P&L or in Statement of Recognised Income & Expense.
Total pension charge / credit (service cost, interest charge, investment return, past service cost and actuarial gains/losses).	Single net amount in operating costs.	Single net periodic cost amount and single comprehensive income charge (analysed in notes).	Split between P&L and STRGL. P&L split between operating and finance costs/income. (Further analysed in notes).	Allows three approaches including both old SFAS 87 and FRS 17 approaches.

Outstanding pension benefits	Actuarially valued using any method which systematically and rationally recognises the cost of providing pensions.	Actuarially valued (Projected Unit Method) using high quality bond discount rate.	Actuarially valued (Projected Unit Method) using AA bond discount rate.	Actuarially valued (Projected Unit Method) using high quality bond discount rate.
Plan assets	Actuarially valued or valued at market value.	Fair value (Market value where available).	Fair value (Market value where available).	Fair value (Market value where available).
Plan deficit/surplus	Recognised in company balance sheet only to the extent that cumulative charges exceed cumulative contributions. Surplus/deficit creates a change in the company's funding obligations, which changes the pension charge.	Immediately recognised in company balance sheet	Immediately recognised in company balance sheet.	Immediately recognised in company balance sheet or recognised less unrecognised gains/losses and past service cost.

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## Acknowledgements

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## The Institute of Chartered Accountants in England and Wales

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The team at Cass Business School that has written this 'state of the art' report on Pensions Accounting offers a unique combination of accounting, actuarial and financial economics expertise. The issue is topical given the ASB's current project on pension accounting. The report raises issues both about the objectives of corporate financial reporting (including e.g. the roles of 'objective' and 'subjective' information) and considers in particular how far any accounting deficits or surpluses can represent the underlying economics of the risks and long-term financial status of the company's pension promise.

The report should be of interest not only to those who are interested in the problems associated with accounting for pension scheme assets and liabilities, including preparers, trustees, and standard-setters, but more widely to all who are interested in the current debates over the conceptual framework of financial accounting and reporting generally, where similar issues are endemic.

The report is targeted primarily at intelligent and informed but non-academic readers, including potential policy makers and pension fund members. It also provides a 'state of the art' review that any future researcher in the area will need at least to refer to and preferably to engage with.

The Institute of Chartered Accountants in England and Wales (ICAEW) is keen to promote high quality research and the research for this report was undertaken with the help of a grant from the ICAEW's charitable trusts.

The ICAEW operates under a Royal Charter, working in the public interest. As a world leading professional accountancy body, the ICAEW provides leadership and practical support to over 129,000 members in more than 140 countries, working with governments, regulators and industry in order to ensure that the highest standards are maintained. The ICAEW is a founding member of the Global Accounting Alliance with over 700,000 members worldwide.

The views expressed in this report are those of the authors and are not necessarily those of the ICAEW.

## About the Pensions Institute

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The objectives of the Pensions Institute ([www.pensions-institute.org](http://www.pensions-institute.org)) are to undertake high quality research in all fields related to pensions, to communicate the results of that research to the academic and practitioner community, to establish an international network of pensions researchers from a variety of disciplines, and to provide expert independent advice to the pensions industry and government.

We take a fully multidisciplinary approach. For the first time disciplines such as economics, finance, insurance, and actuarial science through to accounting, corporate governance, law and regulation have been brought together in order to enhance strategic thinking, research and teaching in pensions.

As the first and only UK academic research centre focused entirely on pensions, the Pensions Institute unites some of the world's leading experts in these fields in order to offer an integrated approach to the complex problems that arise in this field.

### *Objectives*

The Pensions Institute undertakes research in a wide range of fields, including:

#### **Pension Microeconomics**

The economics of individual and corporate pension planning, long-term savings and retirement decisions.

#### **Pension Fund Management and Performance**

The investment management and investment performance of occupational and personal pension schemes.

#### **Pension Funding and Valuations**

The actuarial and insurance issues related to pension schemes, including risk management, asset-liability management, funding, scheme design, annuities, and guarantees.

#### **Pension Law and Regulation**

The legal aspects of pension schemes and pension fund management.

#### **Pension Accounting, Taxation and Administration**

The operational aspects of running pension schemes.

#### **Marketing**

The practice and ethics of selling group and individual pension products.

#### **Macroeconomics of Pensions**

The implications of aggregate pension savings and the impact of the size and maturity of pension funds on other sectors of the economy (e.g., corporate, public and international sectors).

#### **Public Policy**

Domestic and EU social policy towards pension provision and other employee benefits in the light of factors such as the Social Chapter of the Maastricht Treaty and the demographic developments in Europe and other countries.

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