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Pension accounting and research: a review

Martin Glaum*

Abstract—This paper provides a review of empirical research on pension accounting. Empirical research on pension accounting has focused mainly on two issues, the value-relevance of pension accounting information and earnings management in pension accounting. Further work has been done on the information efficiency of capital markets with regard to pension accounting information. I outline how research in these areas has evolved over the past decades and discuss the results that have been obtained. I also point out methodological issues. Furthermore, this review reveals that almost all existing studies on pension accounting are based on US accounting and capital-market data. I therefore discuss which effects national or regional differences in, for instance, pension regulation, taxation and funding, have on the production of pension accounting information by preparers, and on the processing of this information by analysts, investors and other users. Finally, I highlight that national institutional differences as well as ongoing changes to pension accounting standards raise interesting opportunities for future empirical research on pension accounting.

Keywords: pensions; pension accounting; value-relevance; earnings management

1. Introduction

In 2006, the International Accounting Standards Board (IASB), closely coordinated with the US Financial Accounting Standards Board (FASB), started a project with the purpose to fundamentally review all aspects of its current rules for post-employment benefit (pension) accounting. In March 2008, the IASB published a discussion paper (IASB, 2008a) that summarises tentative decisions taken so far and considers further changes to its standard IAS 19 *Employee Benefits*. More precisely, the IASB has tentatively decided that companies in the future will have to recognise fully their net pension liabilities in their balance sheets. All changes to pension assets and pension liabilities will have to be recognised in the period in which they occur. Thus, the planned revision of the standard will abolish the current option for companies to delay recognition of components of their pension liabilities in the balance sheet and in the income statement as long as they do not exceed certain thresholds, the so-called ‘corridor approach’. The IASB has yet to decide on how companies will be mandated to present the components of the changes to pension assets and pension liabilities in comprehensive income (see IASB, 2008a: para. PV2-5).

Given the history of standard-setting in the area of pension accounting, one can easily predict that

the IASB’s proposal will be controversial, both conceptually and politically. Pension accounting has caused controversies ever since standard-setters started to regulate the recognition and valuation of pension-related liabilities, assets, and costs. For instance, in the US, both the Committee on Accounting Procedures of the American Institute of Certified Public Accountants in the 1950s and its successor, the Accounting Principles Board, in the 1960s had to concede that ‘improvements in pension accounting were necessary beyond what was considered practical at those times’ (FAS 87, Summary). In the 1970s and 1980s, the FASB’s attempt to introduce an accounting standard fully based on the accrual principle again met with strong resistance from the corporate sector (Francis, 1987; Saeman, 1995; Klumpes, 2001). Similarly, the deliberations of the International Accounting Standard Committee (IASC) on a revised version of IAS 19 in the 1990s also proved to be contentious (Camfferman and Zeff, 2007). Finally, when the UK Accounting Standards Board (ASB) in 2000 published a new pension accounting standard that endorsed a strict requirement for companies to recognise immediately and fully their net pension liabilities in their balance sheets, this again sparked off a heated debate during which critics held the ASB’s standard responsible for changes, or the termination, of corporate pension schemes (Chitty, 2002; Slater and Copeland, 2005).

There are several reasons why the accounting for corporate pension systems causes so much controversy. First, there has not always been a consensus on the economic and legal nature of corporate pension promises and obligations (Klumpes, 2001; Napier, 2007; Blake et al., 2008). Second, the nature of corporate pension promises and obligations

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can be different in different regulatory environments. In addition, in many countries, regulation on corporate pensions has evolved, and changed substantially, over time (Whiteford and Whitehouse, 2006; Ebbinghaus, 2007; Barr, 2009). Third, many companies have accumulated large pension obligations. Changes to accounting standards can therefore profoundly influence their balance sheets and earnings. Fourth, estimating the values of pension obligations is challenging because they tend to be long term and depend on many financial and demographic factors. Because of their long-term nature, small changes in assumptions used to estimate pension obligation values can cause large changes in estimates. In fact, one of the most critical aspects of pension accounting is how to account for the valuation effects of changes in assumptions, so-called actuarial gains or losses. Finally, corporate pension systems are not only a matter of interest to company management, shareholders, creditors, analysts, and other capital-market participants, but also to millions of employees whose well-being in retirement depends on the occupational pension system. This latter aspect has the potential to turn the accounting for pensions into a political issue (Klumpes, 1994; Saeman, 1995).

It can be argued that the debate about pension accounting reflects the broader discussion about the purpose and objective of accounting in general (Fasshauer and Glaum, 2008). According to the conceptual frameworks of IASB and FASB, the primary objective of financial reporting is to provide decision-useful information to equity investors, creditors, and other users of financial reporting.¹ To promulgate accounting standards that lead to decision-useful reporting, the two standard-setters for many years have been following the so-called asset-liability approach which gives precedence to the complete recognition and precise valuation of assets and liabilities in the balance sheet at the reporting date. Meanwhile, the more traditional revenue-expense or income approach which focuses on the determination of an informative, persistent earnings figure has taken backstage. The orientation of the IASB and the FASB towards the asset-liability approach, and the far-reaching use of fair-value accounting that follows from it, is strongly contested. This also holds in pension accounting. As in other areas of accounting, the use of fair values for pension assets

and liabilities is subject to criticism because of the uncertainty surrounding the estimations of such values and because of the volatility they induce into companies' income statements and balance sheets.

Thus, on various levels pension accounting appears to be entangled in discussions on complex practical and conceptual issues. For this reason, it is of great interest to ask which answers academic research may be able to give in response to the questions raised by standard-setters and other participants in the on-going debate. It is the purpose of this paper to provide a systematic review of research on pension accounting. Systematic reviews are useful because they accumulate and integrate previous findings in a given field. In doing so, they can help researchers to identify research questions, to formulate hypotheses, to assess and refine models, and to become aware of methodological issues. However, the present review should not only be of interest to academics, but also to executives who are responsible for preparing financial reports, to analysts and investors who try to ascertain the financial consequences of corporate pension plans from published reports, and to standard-setters who need to decide how current pension reporting standards can be improved upon.

Since a companion paper by Napier (2009) will address conceptual issues in the accounting for pensions, in conducting this review I will concentrate on empirical research. However, in my review, I will not cover research on tax accounting,² nor work on the funding of pensions.³ Furthermore, it is sometimes claimed that changes in the accounting for pensions can have repercussions on the way occupational pension schemes are set up and run by companies. The question whether such claims have merit is addressed in another companion paper by Kiosse and Peasnell (2009). For this reason, studies that address the influence of accounting on changes in corporate pension provision, i.e. on pension plan closures or conversions, and on pension asset allocation, will not be within the scope of this review.

Empirical research on pension accounting has focused on two issues, which are, however, inter-related: the value-relevance of pension accounting information, and earnings management in pension accounting. Further work has been done on the information efficiency of capital markets with regard to pension accounting information. I will outline how research in these areas has evolved over the past two to three decades and discuss the results that have been obtained. Furthermore, I will point out that almost all existing studies on pension accounting are based on US accounting and capital-market data. Given that pension systems, as well as other important aspects of legal and financial systems, differ markedly across countries, it needs

¹ See SFAC 1 (FASB, 1978), para. 34; IASC Framework (IASC, 1989), para. 10; IASB, 2008b, para. OB2.

² On the taxation of corporate pensions, e.g. Black (1980), Tepper (1981), Thomas (1988), Frank (2002).

³ On the funding of pensions, see, e.g. Sharpe (1976), Treynor (1977), Tepper (1981), Feldstein and Seligman (1981), Francis and Reiter (1987), Ippolito (2001), Rauh (2006), Shivdasani and Stefanescu (2008).

to be discussed to which degree the US findings can be generalised.

The paper proceeds as follows. In the next section (Section 2), I provide a brief overview of institutional forms of corporate pension plans. In Section 3, I summarise the main conceptual issues in the accounting for pensions and explain how international pension accounting standards deal with these issues. Sections 2 and 3 are to provide the necessary institutional and conceptual background for the subsequent sections on empirical research. In Section 4, the core section of the paper, I present and discuss the extant empirical literature on pension accounting. In Section 5, I return to the above-mentioned fact that existing empirical research on pension accounting is focused on the US pension and capital market system. To explore this issue further, I highlight important differences between the pension systems of the US and select European countries and discuss which issues these differences raise for empirical research. The paper closes with a short summary and an outlook for further research.

2. Corporate pension schemes

As noted above, there has not always been a consensus on the nature of pension promises and claims. Until the 1960s or 1970s, in the US, the UK, and in other countries, pension payments were often regarded as voluntary, gratuitous payments by companies to loyal employees (Napier, 2007; Blake et al., 2008). Obviously, viewing corporate pensions in such a way has important implications for their accounting. For instance, if pension payments are voluntary, i.e. if companies are free to terminate such payments at any time, they cannot give rise to liabilities. Instead, it then appears consistent to account for pension payments on a cash basis, as was the practice until the introduction of accrual-based standards in the 1980s.

The discussion on the nature of corporate pensions has evolved over time, as has legislation and regulation in many countries (Ebbinghaus, 2007). As a consequence, today it appears widely accepted to view pensions as a form of deferred compensation (PAAinE, 2008). Based on contracts, and often encouraged by tax incentives, employees agree to temporarily forego part of the remuneration owed to them for services rendered in a given period, in exchange for a promise to receive pension payments in later periods, usually after retirement.⁴ Pension obligations are thus as a form of

debt, owed by the company, or a third party on behalf of the company, to the employees. Viewing pensions as deferred compensation directly leads to the need for accrual accounting. Claims to future pension payments that are earned by employees for the services they provide are part of a company's labour cost in any given period, and employees' already accumulated pension claims are a liability (Blake et al., 2008).

Pension arrangements between companies and employers can take many forms. Traditionally, the literature distinguishes defined contribution and defined benefit plans. With a defined contribution plan, companies promise to pay regular contributions into accounts held for participating employees. The amount accrued in a pension account at retirement is then usually used to pay a lifelong annuity to the employee, possibly followed by payments to surviving relatives. The amounts of future pension payments depend on the contributions paid in by the employer, and on the returns earned by the contributions over time. In a pure defined contribution pension scheme, the employer has no legal or constructive obligation beyond the regular contributions; in particular, it does not guarantee the amounts of future pension payments. In practice, defined contribution plans often involve arrangements with external pension providers such as insurance companies. The employing company sponsors the pension plan, i.e. it commits itself to regular contributions, but the obligation for the future pension payments lies with the insurance company who manages the fund. In such schemes, it thus is the insurance company who has a liability towards the employees, not the employer.

In a defined benefit plan, the company promises to make pension payments to employees after their retirement. The amounts of the promised future pension payments depend on the precise contractual arrangement between the company and the employees, the 'benefit formula'. Usually the amounts depend on the years of service the employees render, and on their compensation levels in the years immediately before retirement (career-end salary plans), or on average compensation levels during their careers (career-average salary plans). With defined benefit plans, it is the company, not the employees, or a third-party insurance company, that bears the financial and the longevity risks of the scheme.

In practice, pension arrangements can combine elements of pure defined contribution and defined benefit pension schemes (hybrid pension plans) (Webbroom and Reay, 2005). For instance, defined contribution pension plans are often combined with minimum guarantees on the investment returns on the contributions.⁵ Furthermore, there can be multi-employer pension plans where two or

⁴ See McCarthy (2006) for a discussion of occupational pensions from an economics point of view.

⁵ Accounting issues pertaining to hybrid pension schemes are addressed in the current IASB discussion paper; see IASB, 2008a, ch. 4.

more companies, sometimes all companies in a sector, jointly sponsor a pension scheme.⁶

The prevalence of pension plans differs across countries. For instance, in the US and in the UK voluntary occupational pension schemes are widespread, and both defined contribution and defined benefit pension plans have traditionally been used. However, the usage of defined benefit plans has diminished in recent years (Munnell, 2006). In Continental Europe, the picture is heterogeneous. In some countries, occupational pensions do not play much of a role (e.g. Italy). In other countries, pension plans are common, either on a voluntary basis (e.g. Germany), or due to collective industrial-relations agreements (e.g. the Netherlands), or because of legal requirements (e.g. Switzerland). At a later point of the paper (Section 5), I will return to the differences between national pension systems and their possible implications for empirical research on pension accounting.

An important aspect of pension schemes is their funding. One can distinguish between funded and unfunded schemes. With funded schemes, assets – so-called plan assets which are intended to finance the future pension payments – are set aside, either by the sponsoring company itself or by a third party on its behalf. For defined contribution plans involving external pension providers, this is achieved through the sponsoring company's regular payments and their reinvestment.⁷ For defined benefit plans, companies may or may not set aside plan assets. If a company does not (fully) fund its pension obligations, future pension payments have to be financed from the company's cash flow when they are due (pay-as-you-go schemes). In some countries, at least a minimum level of funding of pension plans is legally required. However, it is important to note that funding does not relieve the company from its obligations towards the beneficiaries of the plan. If the plan assets do not suffice to pay for the defined benefits, the company is required to make up the deficit (McGill et al., 2005). For the accounting, funding of pension obligations raises the question of how plan assets should be accounted for. In addition, if plan assets are held by separate legal units, it must be decided whether the sponsoring company is required to consolidate these entities.

Funding practices differ across countries (Orszag and Sand, 2006). As mentioned, in some countries minimum or full funding is required by law (e.g. in the US, the UK, and in the Netherlands), and companies in these countries therefore typically have high funding ratios. In other countries (e.g. in Germany), funding is not mandatory and companies may therefore have little or no plan assets at all. In Section 5 of the paper, I will discuss possible consequences of differences in funding ratios for empirical research on pension accounting.

3. Pension accounting: conceptual issues and the development of accounting standards

In the following section, I will provide an overview of the main conceptual issues in the accounting for pensions and summarise how international pension accounting standards deal with these issues. In doing so, I will highlight questions that are contentious and are therefore of particular interest for empirical research (for a more detailed discussion, see Napier, 2009).

The accounting for defined contribution systems is rather simple: contributions companies make in a given period to pension plans must be expensed as pension costs.⁸ If at a balance-sheet date contributions relating to services already rendered by employees are not fully paid, the company has to book a liability for accrued expenses. If, conversely, a higher sum has been paid, an asset for prepaid expenses is recognised. Apart from this, in 'pure' defined contribution schemes, where companies have no further legal or constructive obligations no matter what the performance of the pension fund, by implication there are no further costs or liabilities to account for.

Accounting for defined contribution plans, on the other hand, is complex. It involves, first, the estimation of the values of liabilities for pension claims at balance sheet dates. Second, the periodic cost of the pensions has to be estimated; that is, the total cost of the pension claims has to be allocated to the periods in which they are earned by the employees. Third, any plan assets that might exist also need to be valued.

Estimating the values of pension liabilities requires actuarial assumptions. Demographic assumptions are related to expected employee turnover and mortality rates. Financial assumptions are needed in order to model expected future salary and benefit trends. In addition, an interest rate is needed in order to discount the future benefits to their present value at the balance sheet date. IAS 19, para.72, stipulates that all assumptions be 'unbiased and mutually compatible'; financial assumptions have to be 'based on market expectations, at the balance sheet date, for the period over which the obligations are to be settled'. More specifically, IAS 19, para. 78, prescribes that market yields for high quality corporate bonds have to

⁶ For a more detailed discussion of multi-employer pension plans and their implications for accounting, see PAAInE, 2008, ch. 10.

⁷ Defined contribution plans where obligations to beneficiary employees remain with employers are also usually funded. The plan assets are mostly held by trusts or other separate legal entities. In principle, such pension plans can be unfunded. The sponsoring company then maintains notional accounts for beneficiary employees.

⁸ See IAS 19, para. 43–47.

be used as discount rates. Similar requirements pertain to FAS 87.⁹

It should be noted that the question of which discount rate should be used in pension accounting is contentious. Traditionally, actuarial valuations have been based on long-term average rates of return on pension investments. This, however, implicitly reflects a funding, not a valuation perspective. Another position holds that future pension payments should be discounted at the company's cost of capital, since pension liabilities are a claim, like any other liabilities, on companies' total assets (Slater and Copeland, 2005). Others, however, argue that companies' own credit risk should (generally) be excluded from the valuation of (pension) liabilities. The recent discussion paper by the ASB and other European standard-setters, after reviewing these and other arguments, concedes that conceptually the discount rate should comprise a premium for the riskiness of pension liabilities. However, the paper further argues that this premium cannot be estimated with any reliability and that, thus, a risk-free rate of interest should be used to discount expected future pension payments (PAAinE, 2008: 124).

Both IAS 19 and FAS 87 prescribe that companies apply the so-called projected-credit-unit method to attribute pension benefits and the related pension cost to the periods of employee service. This method is based on the notion that pension liabilities accrue over time, as employees render services to the company. Thus, with each year of service, employees earn additional 'units' of benefit entitlement. The liability that is so estimated, the defined benefit obligation (DBO), is the present value of the expected future pension payments that have been earned by a company's employees up to the balance sheet date (IAS 19, para. 7).¹⁰

It is important to note that the DBO measure is based on expectations concerning future pension payments. Following the going-concern assumption, expected future salary increases and future increases in the level of pension benefits enter the valuation. This is not undebated. Critics argue that the present value of benefits attributed to employee service rendered to date, based solely on current and past compensation levels (i.e. the accumulated benefit obligation, ABO), correctly represents a company's obligation at the balance sheet date. Expected salary increases and other future events should not impact the valuation of current pension liabilities, but should be accounted for in the period in which they occur.¹¹ The IASB is aware of this debate; it plans to reconsider whether pension liabilities should be valued based on projected future benefits in a future phase of its pension project (IASB, 2008a).

Another issue that has caused discussions in the literature is whether pension claims give rise to li-

abilities before they 'vest'. Pension arrangements often include clauses that specify that retirement benefits earned for past service vest, i.e. become unconditional on further employment, only after a minimum period of employment. If, conversely, an employment contract is terminated before reaching the minimum vesting period, the employee will receive no pension benefits. According to IAS 19, para. 69, unvested benefits do give rise to pension obligations (also see FAS 87, para. 42, and Basis for Conclusion, para. 149).

Pension plan assets mainly consist of financial assets (as well as investment property), and one could argue that the 'normal' accounting standards pertaining to these assets could be applied to them (PAAinE, 2008). However, IAS 19 and FAS 87 define a specific category of 'plan assets' to which specific valuation rules apply. According to IAS 19, para. 7, plan assets are assets held by a separate legal entity that exists solely to fund employee benefits; the assets must be available only for this purpose; in particular, they are not available to the company's own creditors, even in bankruptcy. Plan assets are to be valued at their fair value at the balance sheet date (IAS 19, para. 54(c) and 102; FAS 87, para. 49).

Generally, IFRS and US GAAP do not allow the offsetting of assets and liabilities. IAS 19 and FAS 87, however, allow for the offsetting of pension obligations and plan assets in the balance sheet.¹² (Similarly, pension cost components are netted against the return on plan assets in the income statement.) The IASB justifies the offsetting with the argument that companies do not control plan assets that satisfy the above-mentioned 'separability' conditions, and that the obligation to pay the full liability is rather a matter of form when plan assets exist. However, the IASB also concedes that the exception is a 'pragmatic' solution that continues prior practice but is inconsistent with other IFRS. The IASB has decided to redeliberate on the

⁹ FAS 87, para. 44, prescribes the use of a discount rate at which the pension effectively could be settled. In para. 44A, the FASB suggests that this could be the rate of return of high-quality fixed income investments.

¹⁰ In FAS 87, the term projected benefit obligation (PBO) is used synonymously; see FAS 87, para. 17.

¹¹ For instance, Slater and Copeland (2005: 5) argue forcefully: 'The accountants' prescription that future salary increases must be allowed for in the assessment of the pension liability is plain wrong. ... [T]here is no contractual obligation on a company to provide pay increases. Yes, in the long run a company would be expected to give salary increases in line with inflation in order to stay in business. But any salary increases in excess of inflation can be financed only from future profit and are under the control of the company.'

¹² See IAS 19, para. 54; FAS 87, para. 35. Offsetting takes place on the basis of individual pension plans, i.e. a company can show both a pension asset and a pension liability on its balance sheet if it operates several plans, some of which are overfunded while others are underfunded.

offsetting of pension assets and liabilities in a later stage of its pension project (IASB, 2008a: para. 1.11). The discussion paper by PAAinE (2008: 79) comes to the conclusion that the arguments behind the current offsetting exception are not convincing and that a gross presentation of pension liabilities and pension assets would be appropriate.¹³

In the income statement, companies have to present periodic pension costs which consist primarily of service cost and interest cost. Service cost is the increase of the present value of future pension benefits arising from employee services rendered in the period. Interest cost is the increase in the present value caused by the unwinding of the discounting over time.¹⁴ As mentioned, pension costs are presented net of the return on plan assets. More precisely, it is not the realised return of the period that is deducted from pension costs, but an *expected* long-term average return on plan assets.¹⁵ This particular regulation is based on an actuarial perspective according to which it is the purpose of plan assets to fund long-term pension obligations; thus, it is argued, average, smoothed long-term returns reflect more appropriately the economic nature of the assets than short-term returns which are more volatile. However, the usage of an expected return figure instead of actually realised returns in profit and loss is controversial (Napier, 2009), and empirical studies strongly suggest that managers exploit the scope inherent in the estimation of expected returns to manipulate earnings (see, for instance, Amir and Benartzi, 1998; Bergstraesser et al., 2006).¹⁶ In the PAAinE discussion paper, the ASB and other European standard-setters suggest that in the future, companies should report the actual, rather than the expected return on plan assets (PAAinE, 2008: 176).

The assumptions used in the valuation of pension liabilities reflect available data and management expectations at a given point in time. As time passes, new information becomes available, and differences between prior assumptions and financial and demographic developments may occur. Such differences as well as changes in assumptions give rise to so-called actuarial gains and losses. As has been mentioned, the treatment of actuarial gains and losses is one of the most contentious aspects of pension accounting. From the view point of the asset-liability approach, it would be consistent to recognise pension assets and liabilities at their fair value at the balance sheet date, and to recognise actuarial gains and losses immediately in the income statement (Fasshauer and Glaum, 2008). However, this would introduce volatility into balance sheets and income statements. Furthermore, pension liabilities are not normally actively traded (Webster, 2008; Pension Capital Strategies, 2008), so that their fair values

have to be estimated. Some plan assets are also not traded actively, making further estimations necessary. Since some valuation inputs are not observable in markets, the resulting fair values correspond to 'level 3' of the hierarchy defined in FAS 157. Because of this, critics of the asset-liability approach fear that earnings would be influenced strongly by short-term, transitory fluctuations, by measurement error, and possibly by managerial manipulation. This criticism weighs heavily, in particular, for followers of the income approach who hold that it is the primary purpose of financial accounting to determine a measure for company income that is persistent and has, therefore, predictive power.

During the deliberations for FAS 87 in the early 1980s, as a response to the above arguments, the FASB developed the corridor approach which allowed companies to delay the recognition of actuarial gains and losses in the balance sheet and in the income statement as long as they did not exceed a certain threshold (the greater of 10% of the DBO or the fair value of plan assets, respectively). Even if accumulated gains and losses exceeded the corridor, companies could recognise the excess over the remaining work-life of the employees that participate in the pension plan.¹⁷ The corridor approach, which in 1998 was also adopted by the IASC in a revised version of IAS 19, thus comprises a two-stage mechanism that effects a strong smoothing of pension liabilities and pension costs over time. It should be mentioned that both IAS 19 and FAS 87 allowed for faster, or indeed full immediate, recognition on a voluntary basis.¹⁸ In addition, companies had to disclose information about the DBO and the fair value of plan assets, and hence the funding status of their pension plans, in the notes to the financial statements.¹⁹

Due to their long-term nature, pension positions are sensitive to assumption changes, and the accumulated amounts of actuarial gains and losses kept

¹³ Gerke et al. (2003) argue, and demonstrate with the help of a simulation study, that only a gross presentation of pension obligations and pension assets delivers accurate information about companies' financial risks and allows analysts and other users of financial statements a meaningful comparison of companies with different pension funding strategies.

¹⁴ Other pension cost components can result from plan settlements and curtailments (see IAS 19, para. 109–110), and from acquisitions, divestments, and exchange rate effects.

¹⁵ See IAS 19, para. 105–106. Under US GAAP, a further smoothing mechanism exists in this context. According to FAS 87, para. 30, the expected rate of return may be multiplied with either the fair value of plan assets or with a 'smoothed fair value', i.e. a moving average of plan asset fair values.

¹⁶ These and other studies on earnings management in pension accounting will be discussed in more detail below; see Section 4.2.

¹⁷ See IAS 19, para. 93; FAS 87, para. 32.

¹⁸ See IAS 19, para. 93; FAS 87, para. 33.

¹⁹ See IAS 19, para. 120A; FAS 132(R), para. 5.

outside the main financial statements can therefore become large (Amen, 2007).²⁰ For this reason, over recent years the corridor approach has drawn sharp criticism. In particular, financial analysts have pointed out that this regulation allows for financial reporting that is incomplete and not fully transparent.²¹ As a reaction, the IASB in 2004 promulgated a revised version of IAS 19 which now gives companies a new, third option for the treatment of actuarial gains and losses. In addition to the corridor approach and to voluntary faster or full recognition through the income statement, companies can now also fully and immediately recognise actuarial gains and losses through the 'statement of recognised income and expense', that is, effectively in shareholders' equity, thereby bypassing the income statement. Furthermore, in 2006 the FASB published FAS 158 which amends FAS 87 so that US companies are now required to fully and immediately recognise actuarial gains and losses through shareholders' equity. However, in contrast to IAS 19, US GAAP requires that the gains and losses will not remain in equity; instead they are 'recycled' through the income statement over time, using the corridor approach.

As mentioned, the IASB and the FASB are currently working towards further reforms of their pension accounting standards. According to a discussion paper published in March 2008, the IASB has tentatively decided to abolish the corridor approach and to require full and immediate recognition of net pension liabilities in balance sheets. The IASB has yet to decide on how the components of changes to pension assets and liabilities will have to be presented. Three approaches are considered: (i) to require that all changes in the DBO and in the value of plan assets must be presented in profit or loss in the period in which they occur; (ii) to require only the costs of service to be presented in profit or loss while other changes are to be presented in comprehensive income; or (iii) to require that measurements arising from changes in financial assumptions are reported in comprehensive income while other changes in the DBO and in plan assets are presented in profit or loss (IASB, 2008a: para. PV5).

Finally, it should be mentioned in this context that currently the IASB (together with the FASB) also has a project on financial statement presentation under way (IASB, 2008c). In a recent discussion paper emanating from this project, it is proposed that companies in the future should publish a single integrated statement of comprehensive income. In this statement, income and expenses will be disclosed separately for operating activities, for financing, and for other performance. Anticipating these changes to financial statement presentation, the ASB and other European standard-setters suggest in their recent working paper

on pension accounting that pension cost components should be separated in the following way. Service cost should be reported within operating activities; interest cost, the effects of changes in interest rates, and the actual (not the expected) return on plan assets should be reported as part of financing costs; and actuarial gains and losses (other than those from changes in interest rates) should be reported within other financial performance, i.e. outside operating activities (PAAinE, 2008: ch. 8).

4. Pension accounting research

The intensive debate that has surrounded the development of pension accounting standards and their application in practice over the past decades has stimulated a multitude of empirical studies. In this review, I concentrate on capital-markets oriented empirical research. A lot of work in this area has focused on two issues, the value-relevance of pension accounting information and earnings management in pension accounting. Other studies have analysed to which degree capital markets are efficient with regard to pension accounting information. Pension accounting is very complex, and in addition reported pension accounting amounts may be distorted by earnings management. Thus, it is of interest whether investors can cope with the complexity and fully understand and incorporate published pension accounting information in their investment decisions. Closely linked to this is the question – what effect does earnings management have on the value-relevance of pension accounting information. In the following, I will first give an overview of the development of research on value-relevance; then I will address studies on earnings management. Subsequently, I discuss studies on information efficiency and on the effects of earnings management on the value-relevance of pension information.

4.1. The value-relevance of pension accounting

Value-relevance studies, also called association studies, are one way of investigating whether financial statement information is decision-useful to capital market participants, as intended by international standard-setters. By regressing financial statement data on share prices, researchers attempt to gauge whether financial statement data are reflected systematically in stock market valuations. Depending on the precise research question and

²⁰ For instance, at the end of 2004, Bayer, a large German chemical company, had accumulated total unrecognised actuarial losses amounting to €2.0bn. The unrecognised amounts represented 14.4% of Bayer's total pension liabilities; see Bayer, 2004. (In 2005, Bayer decided to adopt the new option provided by IAS 19 to recognise actuarial gains and losses fully through equity.)

²¹ See, for instance, Credit Suisse First Boston (2005) or JP Morgan (2006).

model, different studies investigate whether particular accounting amounts (e.g. intangible assets) are associated with share prices, whether alternative accounting amounts (e.g. amounts prepared under different national or international GAAP) are more or less strongly associated with share prices (relative association studies), or whether specific accounting numbers (e.g. fair values disclosed in the notes) contribute to the explanation of shares prices, given other published information (e.g. corresponding book values recognised in the balance sheet; incremental association studies) (Barth, 2000; Holthausen and Watts, 2001; Barth et al., 2001).

It has to be emphasised that value-relevance studies can only provide indirect evidence of the decision-usefulness of financial statement information. Value-relevance tests indicate whether there is a significant correlation between share prices and financial statement information over a given test period, or, to put it differently, whether the financial statement information is consistent with the information set that has determined the stock market valuation. However, the methodology does not test for whether investors have actually made use of the respective balance sheet, income, or cash flow data in the formation of their investment decisions. In fact, it is possible, and in many cases probable, that investors will have had access to the respective information through other information channels before they were published in the financial statements (Beaver, 2002). More direct tests of the decision-usefulness are provided by the event-study methodology (Barth, 2000). However, this methodology which is extensively used in other areas of accounting research has so far only played a minor role in pension accounting research.

Value-relevance research is controversial. Holthausen and Watts (2001) contend, in particular, that standard-setters can gain only little insight from this type of research because it focuses exclusively on stock market valuation and thus neglects other purposes of financial reporting (contracting). The authors also criticise the indirect nature of the test that does not allow inferences on the actual use of accounting information by decision makers. Furthermore, they argue that value-relevance studies rest on the assumption of markets being informationally efficient, and they, finally, point out econometric problems. Proponents of value-relevance research (e.g. Barth, 2000; Barth et al., 2001; Beaver, 2002), on the other hand, hold that the orientation on stock market valuation is justified by the prominent role standard-setters ascribe to equity investors as users of financial reporting. They point out that value-relevance research is but one research method that attempts to operationalise the standard-setters' concept of decision-

usefulness; it should be combined with other methods to gain deeper insights into the usefulness of financial reporting. As to the assumption of market efficiency, Barth et al. (2001) explain that value-relevance research can be of interest even in the absence of market efficiency as long as stock market valuations reflect investors' expectations.²² Finally, it is argued that 'most, if not all, of the econometric issues faced here are common to other areas of accounting research' (Beaver, 2002: 464).

In the following, I first address earlier value-relevance studies that have used earnings discount models and balance sheet models, then I focus on more recent studies that apply empirical variants of the Ohlson model. In a subsequent section, I briefly refer to related work on the 'credit-relevance' of pension accounting and on the value-relevance of post-retirement benefits other than pensions. Lastly, I summarise and critically evaluate the results of the research on value-relevance.

Earnings discount models

Two early studies in the finance literature by Oldfield (1977) and Feldstein and Seligman (1981) were motivated by changes in US pension legislation in the 1970s.²³ The researchers use variants of earnings discount models based on Modigliani and Miller (1958, 1966) and, controlling for growth and risk factors, test for samples of US stock-listed companies in the 1970s whether companies unfunded pension obligations are reflected in share prices. They find that accounting measures for unfunded vested pension benefits (which US companies had to disclose under ABP 8) are systematically reflected in share price valuations.

Daley (1984) is the first in this line of research who explicitly adopts an accounting perspective. He seeks to find out whether alternative pension accounting measures that US companies were required to disclose during the 1970s are associated with stock market valuations. Daley also uses an earnings discount model to explain companies' market value of equity (MVE). He disaggregates the earnings variable into earnings before pension

²² Also see Aboody et al. (2002) who discuss in more detail the potential impact of market inefficiencies on inferences from value-relevance studies. Looking at market inefficiencies with regard to financial accounting information, they conclude that value-relevance studies based on return regressions are seriously affected by market values of stocks not fully reflecting publicly available information; level regressions (which are commonly used in studies on pension accounting) are not materially affected.

²³ The introduction of the Employee Retirement Income Security Act (ERISA) in 1974 is generally seen as a cornerstone in US pension regulation; the implications of ERISA for pension accounting are discussed further in Bulow (1982) and Fortune (2005).

cost (EbPC) and pension cost (PC). Thus, ignoring control variables for risk and growth, and suppressing company and time subscripts, the model has the following structure:²⁴

$$MVE = \alpha + \beta_1 EbPC + \beta_2 PC + \varepsilon \quad (1)$$

Daley finds for his sample of US companies for the years 1975–1979 that pension expenses are value-relevant, i.e. estimations for the regression coefficient, β_2 , which can be interpreted as a valuation multiple for pension costs, turn out to be significantly negative. Furthermore, the absolute magnitude of the estimates are statistically indistinguishable from those of β_1 , suggesting that pension expenses are priced equivalently to other income and expenses. Daley's results are less consistent for models where pension expenses are replaced by the two pension obligation measures. Overall, Daley's results should be interpreted with caution due to a relatively small sample size and to possible measurement error in his pension accounting data, given that ABP 8 allowed pension accounting measures to be computed using several alternative actuarial cost methods.

The value-relevance of pension costs has been investigated in more depth by Barth et al. (1992). FAS 87, issued in 1985, required companies to use the projected-credit-unit method to estimate pension costs and pension liabilities, and to disclose separately several components of pension costs, most notably service cost (SVC), interest cost (INT), and the expected return on plan assets (RPLNA). Barth, Beaver and Landsman first use a basic model similar to Equation (1). In contrast to Daley (1984), they find that the estimated regression coefficient for total pension cost (β_2) is significantly larger than the estimated coefficient for revenues and non-pension expenses (β_1). This is consistent with the market expecting a higher persistency for pension cost than for other income and expenses, or, in other words, with a lower discount rate being applied to pension cost. In a further step, Barth et al. (1992) disaggregate the pension cost components in order to allow the regression coefficients to differ from one another. Thus, their full empirical model has the following structure:

$$MVE = \alpha + \beta_1 EbPC + \beta_2 SVC + \beta_3 INT + \beta_4 RPLNA + \beta_5 Other PC - Components + \varepsilon \quad (2)$$

Barth et al. find, as expected, that the coefficient on interest cost is significantly negative and that the coefficient on the return on plan assets is significantly positive. Contrary to expectations, the coefficient on service cost is measured with a positive sign, significantly so in some model specifications. This puzzling result, that has also turned up in later studies, could be attributable to multicollinearity between the pension cost components.

Another possibility is that service costs are not viewed by the market as a measure for the pension liability. In a more recent paper, Hann et al. (2007a) suggest that the positive relation between service cost and stock prices could be attributable to service cost serving as a proxy for value created by human capital. In their empirical model (see below), they add the number of employees (size of workforce) and research and development cost (intangible asset creation) as control variables and find that the service cost coefficient then becomes negative. This is an interesting finding because it could denote that corporate pension systems do not only have a financial nature, as implied by the usual valuation models. By focusing exclusively on financial aspects, most models ignore that from a labour economics perspective, pension plans can be interpreted as 'implicit contracts' that serve the purpose to bind employees to their companies, to provide incentives for increased productivity, and to generally improve the long-term relationship between employees and their employees (Ippolito, 1985; Klumpes, 2001).

Balance sheet models

Landsman (1986) was the first to use a balance-sheet model to examine the value-relevance of pension accounting, i.e. he regresses the market value of companies' equity on accounting measures for assets and liabilities. In order to find out whether pension assets and pension liabilities are valued by the stock market like other corporate assets and liabilities, he splits up companies' total assets into pension assets (PLA) and other, non-pension assets (NPA), and companies' total liabilities into pension liabilities (PL) and other, non-pension liabilities (NPL). Hence, his model has the following structure:

$$MVE = \alpha + \beta_1 NPA + \beta_2 NPL + \beta_3 PLA + \beta_4 PL + \varepsilon \quad (3)$$

If the model is correctly specified and if investors view pension assets and pension liabilities as corporate assets and liabilities, β_3 should be 1, and β_4 should be -1, that is, an increase of plan assets by one dollar should increase the market value of equity by one dollar, and an increase in pension liabilities by one dollar should decrease MVE by one dollar. Landsman finds for his sam-

²⁴ Here and in the following, I ignore the scaling of variables that authors undertake in order to deal with possible problems related to heteroscedasticity. Daley scales all variables with total assets. In other studies, variables are scaled with sales (e.g. Landsman, 1986), and in more recent studies, variables are often scaled by shares outstanding, resulting in per-share valuation models. I will briefly return to the scaling of variables, and other methodological issues, in a later section of the paper.

ple of US companies for the years 1979–1981 that the regression coefficient on pension liabilities is significantly negative and the coefficient on pension assets is (in most model specifications) significantly positive. He concludes that the information on pension assets and pension liabilities (ABO), which US companies at that time had to disclose according to FAS 36, is value-relevant in the same way as information on other corporate assets and liabilities. However, it should be noted that the coefficients of Landsman's model are measured with relatively high standard errors, and that their absolute values are often markedly lower or higher than their theoretical values of 1 or -1. Furthermore, Landsman's estimations of equation (3) result in relatively large and statistically significant intercept terms. Theoretically, based on the simple balance sheet identity, the intercept should be zero.

Landsman's overall conclusion that disclosed accounting measures for pension assets and liabilities are valued similarly to recognised assets and liabilities is supported through related research by Dhaliwal (1986). He examines the impact unfunded pension obligations have on companies' systematic risk. He develops a model that links companies' systematic risk to operational risk and financial risk (leverage), and he shows, based on a sample of US companies for the years 1976–1979, that investors take information on unfunded pension liabilities into consideration when assessing financial risk. A more recent study by Jin et al. (2006) that uses a more sophisticated methodology and more recent data (1993–1998) also comes to the conclusion that equity betas appear to accurately reflect the betas of their pension assets and liabilities, 'despite the practical difficulties of deciphering corporate pension accounts'.²⁵

As noted above, the rules for the recognition and measurement of pension assets and liabilities have been, and continue to be, contentious. Following the introduction of FAS 87 in the US, companies in the second half of the 1980s were required to either recognise or disclose several different measures for both pension assets and liabilities. Barth (1991) investigates which of the measures are most closely associated with share price valuations, that is, which are most consistent with those implicitly utilised by investors. She develops an empirical procedure that allows her to determine the error with which pension accounting amounts are measured, i.e. the differences between book values and market values of pension assets and liabilities. She finds for a sample of US companies for the years 1985–1987 that the fair values of pension assets and the ABO and PBO for pension liabilities, which are only disclosed in the notes, are measured with less error than recognised net pen-

sion assets or liabilities. When focusing on companies where pension benefit formulas depend strongly on salary progression, the PBO exhibits less measurement error than the ABO.

The results of Barth (1991) with respect to pension liabilities are corroborated by Gopalakrishnan and Sugrue (1993). They extend the model of Landsman (1986) and investigate whether the unvested part of the pension obligation (UNVEST) and the expected future salary progression (SALARY, i.e. the difference between ABO and PBO) are value-relevant. This leads to the following model structure:

$$\begin{aligned} \text{MVE} = & \alpha + \beta_1\text{NPA} + \beta_2\text{NPL} + \beta_3\text{PLA} \\ & + \beta_4\text{VBO} + \beta_5\text{UNVEST} + \beta_6\text{SALARY} + \varepsilon \end{aligned} \quad (4)$$

Gopalakrishnan and Sugrue find for a sample of US companies for 1987 and 1988 that the estimates of β_4 , β_5 and β_6 are all significantly negative. Gopalakrishnan and Sugrue's regression estimates, like those of Landsman (1986), also differ from the expected values. Furthermore, β_5 and β_6 are considerably larger than those for β_4 . An F-test rejects the hypothesis that the three estimates are equal to each other. Gopalakrishnan and Sugrue suggest that this could be because investors perceive the unvested and the salary progression components of the PBO as inherently more noisy than the vested benefit obligation component.

Ohlson models

Most recent studies on the value-relevance of pension accounting information are based on empirical variants of the Ohlson (1995) model. According to the Ohlson model, firm value can be explained as the sum of the book value of equity and the present value of expected future abnormal earnings.²⁶ If companies' assets and liabilities were completely recognised and valued at their 'true' economic values at the balance sheet date, the book value of equity would be equal to its market value. However, accounting standards prohibit large parts of companies' intangible assets from being recognised, and they often require that assets that are recognised are carried at book values lower than current market values. Ohlson (1995) shows that under certain conditions the portion of the value of a company not captured by book value of equity is reflected in expected future abnormal earnings, i.e. in residual income.

The Ohlson model has become very influential as it provides a direct link between accounting measures and firm value (Kothari, 2001; Beaver, 2002). In empirical versions, the expected future abnormal returns are usually approximated by

²⁵ Jin et al. (2006: 22).

²⁶ See Ohlson (1995), Feltham and Ohlson (1995).

analysts' earnings forecasts or, more simply, by realised earnings.²⁷ As will be shown below, practically all recent studies on the value-relevance of pension accounting make use of the Ohlson model. The empirical models, although different in detail, have the following common basic structure:

$$\begin{aligned} \text{MVE} = & \alpha + \beta_1\text{NPE} + \beta_2\text{EbPC} + \beta_3\text{PLA} \\ & + \beta_4\text{PL} + \beta_5\text{PC} + \varepsilon \end{aligned} \quad (5)$$

where NPE is companies' owners' equity plus net pension liabilities, EbPC is earnings before pension costs, PLA is plan assets, PL is pension liabilities, and PC is pension costs. By taking into consideration balance sheet and income measures simultaneously, these models are thought to be generally better specified than pure balance sheet (or income) models.

Furthermore, the models allow one to address more directly research questions that are at the heart of the current debate on pension accounting. First, it can be examined whether the complementarity of balance sheet and income data underlying the Ohlson model applies to pension accounting measures. This would not be the case if pension assets and liabilities are purely financial in nature, that is, if there are no synergies with other corporate assets and liabilities, if there are no other intangibles attached to them, and if their fair values can be measured with sufficient reliability. If these conditions are fulfilled, Equation (5) is overspecified and either the balance sheet amounts or the income amounts are redundant (Barth et al. 1993). Based on these considerations, it can then be asked whether pension assets and liabilities or, alternatively, pension costs are more closely associated with stock market valuations, and thus potentially more decision-useful to investors. A related, second question is whether pension information is more decision-useful when assets or liabilities, and associated costs, are measured on a fair-value basis, or when the measures are smoothed with the corridor and other smoothing mechanisms. Empirical studies that jointly examine the two above questions basically test whether the asset-liability approach or the income approach lead to more decision-useful information for investors.

A further aspect has to be taken into consideration. When comparing the value-relevance of smoothed corridor pension amounts and fair-value pension amounts, researchers often effectively compare information that is recognised in balance sheets or income statements with information that is disclosed in the notes. For instance, according to FAS 87, US companies until recently were allowed to recognise smoothed net pension values in their balance sheets and smoothed pension costs in their income statements, while fair values of pension assets and liabilities were disclosed in the

notes. In other words, in empirical studies the research question regarding the superiority of the asset-liability and the income approach is intertwined with a further, 'classical' accounting question, the question whether recognition and disclosure are perfect substitutes, or whether financial statement users give more weight to information that is recognised in comparison to information that is merely disclosed.

The first study to use the Ohlson model to investigate the value-relevance of pension accounting was Barth et al. (1993). The study is based on data for 300 US companies for the years 1987–1990. Their major finding is that the fair value of pension assets and the fair value like PBO, which are disclosed in the notes, are significantly correlated with share price valuations, whereas the incremental explanatory value of pension cost components (also disclosed in the footnotes) are not significantly different from zero. The authors conclude:

'Tests reveal that pension cost component information is largely redundant in explaining share prices, once pension balance sheet variables are included.'²⁸

A study conducted ten years later by Coronado and Sharpe (2003) follows a very similar research design. They compare the value-relevance of the funding status of pension plans, i.e. the difference between the PBO and the fair value of plan assets (disclosed in the notes), with the value-relevance of pension costs (recognised in the income statement, and smoothed due to the corridor approach and other mechanisms). Interestingly, Coronado and Sharpe arrive at a result that is in sharp contrast to that of Barth et al. (1993). For their sample of US companies comprising the S&P 500 index in the years 1993–2001 it is not the funding status of pension plans, but pension income and expenses that turn out to be relevant for the explanation of share prices. As Coronado and Sharpe (2003: 324) point out, 'the market appears to pay more attention to the flow of pension induced accruals reported in the body of the income statement than to the marked-to-market value of pension assets and liabilities reported in the footnotes.' In a recent working paper, Coronado et al. (2008) extend the investigation to the years 2002–2005 and find the same results.

Coronado and Sharpe (2003) and Coronado et al. (2008) surmise that their results are a reflection of investors' earnings fixation. During the second half of the 1990s, the pension plans of S&P 500

²⁷ For empirical versions of the Ohlson model, see Dechow et al. (1999); Lo and Lys (2000); Barth et al. (1998); Collins et al. (1999). Also see Landsman et al. (2007) who discuss theoretical values for regression coefficients in empirical versions of the Ohlson model.

²⁸ Barth et al. (1993: 25).

companies were, on average, overfunded, and companies reported, on average, pension income rather than pension expenses because expected returns on plan assets exceeded pension costs. In fact, because of the income smoothing mechanisms of FAS 87, companies continued to report pension income even in the first years of the 2000s, although S&P 500 pension plans by then were underfunded, following the deterioration of the stock markets. Coronado and Sharpe argue that investors are misled by the smoothing of pension accruals which signal a higher persistency of pension induced income than is economically justified. Because of this, according to the authors, investors tend to overvalue companies that sponsor defined benefit pension plans (also see Franzoni and Marín, 2006; Picconi, 2006).

An interesting further finding in this context is provided by Wiedman and Wier (2004). Their study is based on data for 128 Canadian companies for the years 2000 and 2001. Wiedman and Wier investigate whether stock market investors treat net assets from overfunded pension plans and net liabilities from underfunded plans equivalently. In 2000, 72% of the sample companies had overfunded plans, and in 2001 the ratio was 41%. Wiedman and Wier's main empirical model is derived from Equation (5), with an indicator variable denoting companies with overfunded plans. Their findings suggest that the funding status is more closely associated with stock prices for companies with underfunded plans than for companies with overfunded plans. More precisely, the net pension asset of companies with overfunded plans appears not to be impounded in stock market valuations at all. According to Wiedman and Wier (2004: 238) this suggests that 'investors view deficits arising from plan under-funding as liabilities of the sponsoring firm, but do not appear to view surpluses arising from plan over-funding as assets of the firm.'

Other studies that examine the effects of pension assets and liabilities on bond ratings (see below) also produce asymmetric results. These results indicate that unfunded pension liabilities reduce debt ratings more strongly than pension assets increase them (Maher, 1987; Carroll and Niehaus, 1998). A reason for this seemingly puzzling result could be that, under the going-concern assumption, companies are required to fund pension deficits over time, while it is not fully clear whether companies actually control net pension assets. Despite possible adverse effects on labour relations (Klumpes, 2001), pension plan 'reversions', i.e. terminations by sponsoring companies with the intent to claim the plan surplus, often took place in the US in the early 1980s (Ippolito, 1985; Stone, 1987).²⁹ However, reversions may be more difficult to achieve in other countries, and they have also been

made much more difficult in the US by new regulatory hurdles and tax disincentives (Ippolito, 2001; Fortune, 2005).

Hann et al. (2007a) also address basically the same research question as Barth et al. (1993) and Coronado and Sharpe (2003). They compare the value-relevance of recognised pension amounts that are smoothed according to FAS 87 with the value-relevance of fair-value pension amounts that are disclosed in companies' footnotes. Using data for more than 2,000 US companies for the years from 1991 to 2001, Hann et al. first document that immediate and full recognition of actuarial gains and losses greatly increases the volatility of pension costs, and, hence, decreases the persistency of earnings. Their full empirical model corresponds to Equation (5), however with pension assets and liabilities netted (NetPAL), and pension expenses disaggregated into a recurring component (RecPC, equal to service cost plus interest cost less expected return on plan assets) and a gains/losses component (PGL).³⁰

$$\text{MVE} = \alpha + \beta_1 \text{NPE} + \beta_2 \text{EbPC} + \beta_3 \text{NetPAL} + \beta_4 \text{RecPC} + \beta_5 \text{PGL} + \varepsilon \quad (6)$$

Hann et al. estimate the equation twice, once with FAS 87 amounts, once with fair-value amounts. They find that the explanatory power of both estimations is not statistically different, based on a Vuong (1989) test. However, pension cost components are less persistent and hence less value-relevant under fair-value accounting.

In a recent working paper, Kiosse et al. (2007) arrive at similar results. The authors also use US data; their sample comprises 3,388 firm-years for 1998–2005. Using a version of the Ohlson model, they compare the value-relevance of recognised FAS 87 pension costs and their components with the value-relevance of two alternative measures, fair-value changes and a 'core pension cost measure' developed by Standard & Poor's (2002).³¹ Kiosse et al. (2007) find that the smoothed pension costs are more closely correlated with stock mar-

²⁹ Also see Mittelstaedt (1989), Thomas (1989), and Mittelstaedt and Regier (1993) who investigate the motivations behind and the financial consequences of pension plan terminations.

³⁰ In the 'FAS 87 model', of Hann et al., PGL corresponds to the amortisation of unrecognised amounts. In their fair-value model version, it consists mainly of actuarial gains and losses. Furthermore, the above model description ignores that Hann et al. (2007a), as already discussed above, add companies' numbers of employees and R&D costs to control for intangible assets created by human capital.

³¹ Standard & Poor's argues that the return on plan assets should not increase companies' earnings because the sponsoring companies do not have control over the assets. Concurrently, they only add interest costs to pension costs in as far as they exceed the return on plan assets. See, Standard & Poor's (2002).

ket valuations than fair-value pension cost measures, or the Standard & Poor's 'core pension cost measure' (which is not significant at all).

Under FAS 87, companies, until recently, had the option to delay recognition of actuarial gains and losses over long horizons, and under IAS 19 this option still exists. If the option is used, the recognised pension position in the balance sheet does not include 'the most current and most relevant information'³² concerning the valuation of pension plans. However, as critics of the asset-liability approach would point out, actuarial gains and losses may reflect short-term, transitory fluctuations of market parameters and may be subject to measurement error and managerial manipulation. As explained above in Section 3, FAS 87 was amended in 2006 and now requires full and immediate recognition of all actuarial gains and losses in the balance sheet; the IASB is also considering making full recognition mandatory in a further revision of IAS 19. Therefore, it is of particular interest to investigate whether the new approach will lead to more decision-useful information to capital market participants. More precisely, it should be investigated whether within the balance sheet (net) pension assets or liabilities that are smoothed, or pension assets or liabilities that are measured at fair value, are more decision-useful to investors. A closely related question is whether actuarial gains and losses are incrementally value-relevant over and above that of smoothed pension assets and liabilities.

This aspect has received only scant attention in the literature so far. One reason for this could be that all studies discussed above have been based on US data, with the exception of Wiedman and Wier (2004) who use Canadian data. Under US GAAP (and under Canadian GAAP), companies are allowed to offset plan assets and pension liabilities, and given high funding ratios, the net balances of US companies are typically very small in relation to total pension assets and liabilities. Thus, most previous studies have concentrated either on the value-relevance of pension costs and their components (Barth et al., 1992; Kiosse et al., 2007), or on the question whether fair-value pension assets and liabilities or pension costs, either smoothed or at fair value, are dominant for stock market valuations (Barth et al., 1993; Coronado and Sharpe, 2003).

The only US study that compares, inter alia, the value-relevance of alternative balance sheet pension amounts is Hann et al. (2007a). In their estimations of Equation (6), the coefficient on net pension assets/liabilities (β_3) is somewhat larger in the fair-value model specification than in the model with smoothed FAS 87 measures; however,

the difference between the two estimates is statistically insignificant. A study that sheds more light on the issue is Fasshauer and Glaum (2008). This study is an exception as it is based not on US data, but on data for German companies that prepare financial statements according to IFRS or US GAAP. Unlike US companies, German companies are not required to fund defined benefit plans. Therefore, in comparison to US companies, the average funding level of pension plans is much lower, resulting in substantial recognised net pension liabilities. For their sample of 101 companies for the time from 1999 to 2005, the average funding ratio is 26.14% (median 10.06%). Fasshauer and Glaum apply variants of the Ohlson model in which they disaggregate the funding status into the recognised liability (RecPAL) and unrecognised amounts (UNREC), the latter consisting mainly of actuarial gains and losses that are deferred following FAS 87 or IAS 19. Their main model thus has the following structure:

$$\begin{aligned} \text{MVE} = & \alpha + \beta_1 \text{NPE} + \beta_2 \text{EbPC} + \beta_3 \text{RecPAL} \\ & + \beta_4 \text{UNREC} + \beta_5 \text{PC} + \varepsilon \end{aligned} \quad (7)$$

Fasshauer and Glaum find, first, that in the German context pension balance sheet amounts appear more important for stock market valuation than pension costs. That is, while the estimates for β_3 and β_4 have the expected signs and are statistically significant, the estimate for the pension cost coefficient (β_5) turns out to be insignificant. In that respect, their findings support the earlier results of Barth et al. (1993) and are in contrast to those of Coronado and Sharpe (2003). Second, Fasshauer and Glaum find that unrecognised amounts (actuarial gains and losses) are incrementally value-relevant. Furthermore, when splitting up their sample into companies with unrecognised gains and those with unrecognised losses, estimations for β_4 have the expected signs and are significant in both subsamples, i.e. they are positive for gain-companies and negative for loss-companies.

Further value-relevance research

In the following, I will refer to research in two 'neighbouring' areas of the value-relevance of pension accounting, the 'credit'-relevance of pension accounting and the value-relevance of the accounting for post-employment benefits other than pensions.

The conceptual frameworks of both FASB and IASB state that financial reporting should provide information that is decision-useful not only to equity investors, but also to creditors (IASB, 2008b: para. OB2). In accordance with this, it is interesting to investigate whether pension accounting helps creditors to forecast default on future debt payments (predictive value), or to review earlier

³² FAS 87, para. BC104.

such forecasts (confirmatory value) (IASB, 2008b: para. QC3). While the actual decision-making of creditors is difficult to observe, several empirical studies address whether pension accounting information has explanatory power for corporate bond ratings. These studies apply probit models, with Moody's or Standard and Poor's ratings being explained by pension accounting information, controlling for key financial ratios such as liquidity, leverage, profitability, which have been found helpful in the explanation of credit ratings in prior research.

Early studies by Martin and Henderson (1983) and Maher (1987) for US companies in the late 1970s and early 1980s produce only weak results. A later study by Carroll and Niehaus (1998) using US data for 1987–1994, however, comes to the conclusion that accounting information on pension assets and pension liabilities significantly influences bond ratings and is, in this sense, 'credit-relevant'. Maher (1996) obtains similar results for accounting information on post-retirement benefits other than pensions. Hann et al., (2007a) also examine the relative credit-relevance of smoothed FAS 87 accounting measures and fair-value pension measures. Similar to the same study's results on equity value-relevance (see above), in the context of an Ohlson model that combines balance sheet and income data, the explanatory power of smoothed FAS 87 pension amounts and fair-value pension amounts are statistically not different from each other.

All of the above mentioned studies use bond ratings as the dependent variable. A study by Cardinale (2007) analyses credit spreads for US corporate bonds. Based on data for more than 12,000 'bond-years', he finds that the size of the unfunded pension liability, scaled by company value, is significantly associated with bond spreads. Further analysis shows that the sensitivity of spreads to pension deficits is much larger for high-yield bonds (i.e. for companies more likely to default) than for investment grade bonds. Another finding is that although unfunded liabilities increase credit spreads, overfunded liabilities do not appear to improve the spreads. This corresponds with the already mentioned asymmetric relationship between pension assets and liabilities and bond ratings found by Maher (1987) and Carroll and Niehaus (1998). Possible reasons for these ob-

servations have been discussed above.

Several empirical studies have investigated the value-relevance of post-employment benefits other than pensions. Other post-employment benefits (OPEB) are primarily health-care benefits companies provide for their employees either for free or on subsidised terms. Health-care benefits are particularly important in the US where employees are not automatically covered by the public (social security) health insurance system. US companies' obligations for OPEB can be very large.³³ US companies are not required to fund their OPEB obligations (in that sense, they are similar to pension obligations in some Continental European countries where pension funding is not mandatory). Estimating the value of OPEB is highly complex. As for pension benefits, they are long term, and their value depends on demographic assumptions concerning employee turnover, retirement age, mortality, and on the discount rate used to determine the present value of the expected future benefit. In addition, the value of the benefits depends on estimations of future health-care costs (and reimbursements from the public health insurance system, Medicare) which are very difficult to estimate. These additional uncertainties are the reason why the reliability of OPEB liability estimates is often thought to be even lower than that of pension benefits (Choi et al., 1997).

Because of this, it was highly controversial when the FASB in 1990 issued FAS 106 'Employers' accounting for post-retirement benefits other than pensions' which for the first time required companies to account for OPEB obligations on the basis of the accrual principle. The basic principles of FAS 106 are the same as those for FAS 87. That is, after both standards have been amended by FAS 158, companies are obliged to report the funding status of OPEB obligations on the balance sheets; OPEB costs, on the other hand, continue to be smoothed due to the deferred recognition of, inter alia, actuarial gains and losses.³⁴

Studies on the value-relevance of OPEB obligations address similar questions and use similar methods as those on the value-relevance of pension obligations. Early studies by Mittelstaedt and Warshawsky (1993) and Amir (1993) use data relating to the time before FAS 106 when US companies accounted for OPEB benefits on a cash basis. Using financial statement information on these cash payments and other assumptions, the authors estimate companies' OPEB obligations and then investigate whether the estimations are impounded in stock market valuations. Both studies conclude that the stock market does value OPEB obligations.

In a later study that makes use of FAS 106 mandated disclosures, Amir (1996) finds only recognised OPEB amounts to be value-relevant,

³³ For instance, General Motors (GM), at the end of 2007 had OPEB obligations of \$64.0bn, in addition to its PBO of \$109.0bn. Since most of the OPEB obligations are not funded, GM showed an OPEB liability of \$47.4bn on the face of its balance sheet. GM's pension plans, on the other hand, were overfunded at the end of 2007, resulting in a net asset position of \$8.3bn on the balance sheet; see General Motors (2007).

³⁴ Under IFRS, the same rules apply to OPEB obligations as to pension obligations; see IAS 19, para. 24.

whereas amounts that are unrecognised because of deferral mechanisms are not. A further result from this study is that within the context of an Ohlson model, income statement data on OPEB costs proves to be more important for stock market valuation than OPEB balance sheet data. However, when measurement error associated with OPEB balance sheet amounts is controlled for using sensitivity measures (which companies are required to disclose according to FAS 106), balance sheet data becomes more value-relevant than the income data.

Choi et al. (1997) also use data for US companies from the early 1990s and confirm, on the basis of a balance sheet model, that OPEB amounts are incrementally value-relevant over other non-pension and pension assets and liabilities. They find, however, that the estimated coefficient on the OPEB regressor is lower than that for liabilities (the same result is reported by Mittelstaedt and Warshawsky (1993)). The authors interpret this finding as an indication that OPEB measures are perceived by the market as less reliable. Choi et al. then adopt the Barth (1991) approach to estimate the measurement error ('noise ratio') with which OPEB obligations are impounded in the cross-sectional valuation models. They find that the OPEB measure exhibits a significantly higher noise ratio than those of pension obligation measures.

In the early 1990s, the SEC mandated US companies to disclose OPEB liability estimates before the SFAS 106 recognition requirement took effect from 1993 onwards. Davis-Friday et al. (1999) take advantage of this setting and investigate whether the value-relevance of OPEB measures is different when they are only disclosed as opposed to when they are recognised. Their results give evidence that both disclosed and recognised amounts are valued by the stock market. However, the correlations between the OPEB accounts and share prices are somewhat stronger for recognised amounts than for disclosed amounts.

In a subsequent paper, Davis-Friday et al. (2004) further investigate possible differences in the stock market impact of disclosed and recognised OPEB obligations. They apply the methodology of Barth (1991) and Choi et al. (1997) and compute noise ratios separately for disclosed and for recognised OPEB obligations. They find that measurement errors are significantly higher for disclosed than for recognised amounts, implying that the former are perceived as less reliable by stock market participants. They conjecture that imprecise disclosures during the early phase of application of the FAS 106 disclosure requirements may have contributed to the higher measurement error. OPEB amounts that are disclosed but not recognised exhibit higher measurement error than pension liabilities. However, this difference becomes insignificant

once the OPEB obligations are recognised. This latter finding contrasts with the earlier results of Choi et al. (1997). Davis-Friday et al. (2004) suggest that this discrepancy may be explained by the fact that the sample used by Choi et al. contains both companies that had already adopted FAS 106, and thus recognised OPEB liabilities, as well as companies that had not adopted the standard and therefore only disclosed the obligation.

Value-relevance of pension accounting – summary and critical evaluation

In the following, I will summarise what we can learn from the multitude of empirical studies on the value-relevance of pension accounting. I will also address econometrical issues and point out limitations of the studies. Finally, I will highlight some areas for further research.

The evidence accumulated so far allows the general conclusion that pension accounting measures as well as measures for OPEB are value-relevant.³⁵ Moreover, related research has shown that pension accounting measures are also systematically associated with corporate bond ratings and spreads (credit-relevance). Furthermore, it appears that investors regard not only vested pension claims as value-relevant but also unvested claims as well as expected future increases of claims due to salary increases. However, pension obligations appear to be priced differently from other, 'normal' liabilities. The lower estimates of pricing multiples for pension obligations in some studies are consistent with pension accounting measures being less reliable (Barth et al., 2001). This is in line with Barth (1991), Choi et al. (1997) and Davis-Friday et al. (2004) who find that the markets perceive pension and OPEB obligation measures as inherently noisy.

Overall, the results from value-relevance studies thus support the view that investors perceive companies' net pension obligations as corporate liabilities, that is, they assume that the obligations from pension plans lie with the sponsoring companies, not with legally and economically separate funds. In that sense, the results support the 'economic substance perspective' on pension plans rather than the narrower 'legal form' interpretation (Barth, 1991; Gopalakrishnan and Sugrue, 1993). However, studies on value-relevance as well as on credit-relevance also indicate that while the capital market ascribes net pension obligations to sponsoring companies, it does not view pension surpluses as corporate assets.

Important issues in the debate on pension ac-

³⁵ For summaries of the research on the value-relevance of other balance sheet or income statement positions, see Barth, 2000; Beaver, 2002. Also see Wyatt (2008) who presents a comprehensive review of the research on the value-relevance of financial reporting information on intangible assets.

counting have been whether balance sheet or income pension measures are more strongly related to share price valuations, and whether pension obligations should be measured at fair value or on a smoothed, long-term basis. With regard to the first question, empirical studies arrive at conflicting results. As far as the valuation of pension obligations is concerned, there is some evidence to support the view that balance sheet pension measures are more value-relevant if they are valued at fair value than if they are smoothed using the 'corridor' approach. Linked to this is the observation that actuarial gains and losses appear to be incrementally value-relevant, despite concerns about their reliability. Thus, the results of empirical research are supportive of recent changes in US GAAP pension accounting (and of the IASB's plans to adopt similar measures) which have made full recognition of companies' pension obligations in the balance sheet mandatory.

At the same time, Hann et al. (2007a) document that fair-value based pension cost measures are highly volatile. Moreover, their study and the recent work of Kiosse et al. (2007) show that recurring pension cost components – service costs, interest costs, expected returns on plan assets – are systematically correlated with stock market valuations, whereas the much more volatile fair-value changes of pension assets and liabilities are not. Furthermore, according to anecdotal evidence and survey studies, analysts typically focus more strongly on income data than on balance sheet data when estimating companies' fundamental values and developing buy or sell recommendations (e.g. Glaum and Friedrich, 2006). Analysts therefore have a strong interest in a transparent presentation of income components that allow them to derive earnings figures that are persistent and, therefore, have predictive value (Penman, 2007). All of this demonstrates that it is important to coordinate further changes to US GAAP or IFRS pension accounting rules with the standard-setters' project on financial statement presentation.³⁶ In particular, standard-setters should be concerned not to promulgate rules that would result in persistent pension cost components being mixed up with transitory components since this would reduce the decision-usefulness of the pension cost information and of earnings in general.³⁷

As with all empirical research, studies on the value-relevance of pension accounting face econometric and other methodological problems and their results therefore have to be interpreted with care. As has been mentioned, the estimates of re-

gression coefficients in the empirical studies often do not correspond closely to their theoretical values (Wagenhofer, 2008). Furthermore, the estimations of the empirical models often result in large and statistically significant intercept terms even though the theoretical models do not allow for this. This indicates that the empirical models are not correctly specified, possibly due to measurement error or to missing variables. If missing variables were correlated with the models' independent variables, estimations would be distorted.

A major problem that bedevils value-relevance studies is the strong multicollinearity of the independent variables. While multicollinearity does not cause biased results, it leads to high standard errors for regression coefficients whose estimation thus becomes unreliable, especially when sample sizes are relatively small. The bivariate correlations between pension and non-pension variables, between equity and income, between pension liabilities and pension assets (especially in countries like the US where funding levels are high), and between pension cost components (service costs and interest costs), often exceed 0.9. A standard treatment for multicollinearity is to either drop or to aggregate variables, and in many studies pension assets and pension liabilities are, therefore, replaced with net pension assets/liabilities or the net funding status. However, in doing so, it is implicitly assumed that pension assets and pension liabilities have coefficients that are different in sign, but identical in their absolute magnitude. This assumption is questionable (Landsman, 1986). Furthermore, if pension assets and liabilities must be netted in the models due to multicollinearity, value-relevance studies, at least with regard to US companies, cannot provide any answers to one of the most important and intriguing question in pension accounting – whether a gross or a net presentation of pension assets and liabilities would produce more decision-useful information.

Other typical problems arising in value-relevance studies are biased coefficient estimates or heteroscedastic regression errors caused by size differences between sample companies. In the presence of heteroscedasticity the standard errors of coefficients are underestimated, leading to inflated *t*-values. In value-relevance studies, researchers mostly scale independent variables in order to reduce or avoid these econometric issues. Different scales have been used (sales, total assets, number of shares outstanding), which makes direct comparisons of results across studies difficult. Furthermore, simulations conducted by Barth and Kallapur (1996: 529) have shown that deflating variables with size proxies has 'unpredictable effects on coefficient bias, heteroscedasticity, and estimation efficiency'. Their conclusion is that econometric problems related to cross-sectional

³⁶ The IASB acknowledges that both projects are connected but has decided to treat them separately for practical reasons; see IASB, 2008a, para 1.21.

³⁷ See PAAinE, 2008, ch. 8, for further discussion on this point.

size differences should be treated by using scale proxies as control variables and by reporting inferences based on White (1980) standard error estimates rather than by deflating.

A further issue, which researchers have not yet fully disentangled, is the influence of taxation on the regression coefficients of pension amounts in value-relevance studies. The impact of taxes on pension funding decisions and other pension-related aspects of corporate finance has been the subject of several studies (Black, 1980; Tepper, 1981; Thomas, 1988, Clinch and Shibano 1996; Frank, 2002; Rauh, 2006; Shivdasani and Stefanescu, 2008). However, no consensus has yet emerged as to how taxes precisely affect the valuation of pension liabilities or, for that matter, corporate debt in general within an equilibrium model of asset pricing (also see Fama and French, 1998; Graham, 2000, on this point), or within the framework of the Ohlson model (Hand, 2001). Only few value-relevance studies discuss the impact of taxes on regression results in any detail (see, for instance, Landsman, 1986; Coronado and Sharpe, 2003). In most studies, tax effects on pension costs are considered (without deeper discussion) by multiplying companies' pre-tax pension costs by one minus the tax rate. For tax benefits of pension obligations usually no explicit adjustments are made (an exception is Coronado and Sharpe, 2003), even though some authors point out (again mostly without deeper discussion) that the expected regression coefficient on pension liabilities should fall between 1 and $(1-t)$, t being the effective marginal tax rate. Failure to model the tax implications of pensions explicitly, and likely cross-sectional differences in the marginal tax benefits associated with pension costs, may result in measurement error and ultimately in biased coefficient estimates.

Another aspect not considered in extant studies are possible non-linearities in the relation between pension liabilities and company value that are introduced by pension guarantees provided by the US Pension Benefit Guarantee Corporation (PBGC) or the UK Pension Protection Fund.³⁸ The PBGC (or similar institutions in other countries³⁹) guarantees pension payments from defined benefit pension plans (often subject to some limits) if they terminate without sufficient funds and sponsoring companies fail on their obligations. Effectively, the PBGC thus sells a 'put option' to the companies' owners (Sharpe, 1976). This comes in addition to owners' general abandonment option. In situations of extreme financial distress, they can exercise a put on the companies' assets and walk away from their commitments. As companies come closer to financial distress, the value of these options increases and the amounts of pension liabilities (or other liabilities) are no longer linearly

associated with company value. It follows that findings from value-relevance studies could be distorted if samples included non-trivial numbers of companies that are in, or close to, financial distress (Warshawsky, 2003; also see Jin et al. 2006, on this point). As Barth et al. (1998) have shown, the value-relevance of balance sheet and income statement information is influenced by companies' financial health. For companies approaching financial distress, the incremental value-relevance of balance sheet information increases, while that of income statement information decreases.

Further limitations of value-relevance studies are inherent in their methodology. It is not always clear how to interpret insignificant results. In order to be value-relevant, accounting information has to be both relevant and reliable (Barth, 2000; Barth et al., 2001). If a study comes to the conclusion that a particular accounting item is not significantly associated with share prices this can have several reasons: (i) the item may not be relevant to investors; (ii) it may be relevant, but investors find the accounting measure to be too unreliable; or (iii) the accounting measure lacks both relevance and reliability. It is not easy in empirical studies to distinguish between these reasons (Wyatt, 2008). However, some studies specifically focus on the degree of measurement error inherent in the value-relevance relationship (Barth, 1991; Choi et al., 1997; Davis-Friday et al., 2004), and in other cases, as Barth (2000: 17) points out, 'relevance is a maintained assumption and failure to find that the item is significantly associated with value is attributed to lack of reliability'.

Another conceptual problem which makes it difficult for researchers, standard-setters, or other interested parties to interpret results of relative or incremental association studies is that they are not based on independent observations. In reality, it is not possible to create laboratory situations where investors in one market trade on the basis of only smoothed pension accounting information, while in another clearly separated market another group of investors interact on the basis of fair-value information only, holding everything else constant. Instead, what we observe are share prices influenced simultaneously by both types of information (Holthausen and Watts, 2001; Wagenhofer, 2008). Finally, results from empirical studies may indicate that a particular accounting item is incrementally value-relevant. However, this does not necessarily mean that the production and disclo-

³⁸ Holthausen and Watts (2001) also discuss non-linearities in the relationship between income statement information and company value arising from conservatism in accounting.

³⁹ Similar institutions exist in other countries, too (e.g. the *Pensionsversicherungsverein* in Germany). For an overview of alternative national pension guarantee schemes, see Stewart (2007).

sure of this information is desirable because the information costs incurred by companies are not taken into account (Wagenhofer, 2008).

4.2. Managerial discretion and earnings management in pension accounting

Estimations of net pension obligations and periodic pension costs are based on demographic and financial assumptions: expectations concerning employee turnover, mortality rates of pension beneficiaries, future salary and benefit trends, as well as the interest rate used to discount future pension payments, and the expected rate of return on plan assets. It has been noted above that pension liabilities are highly sensitive to changes in actuarial assumptions. Changing the assumption about employees' life expectancy by one year, on average leads to a 3–4% change in the value of pension liabilities (Coughlan et al., 2007: 7; Blake et al., 2008: 39). Moreover, a 1% change of the discount rate will on average decrease or increase the value of the liability by 15% (May et al., 2005: 1229; Gohdes and Baach, 2004: 2571). Bayer, a German chemical company, reports in the notes to its financial statements 2007, that a reduction of the discount rate of 0.5% would have increased its total pension obligations by 8.08%, or €1.1bn (Bayer AG, 2007: 162).

Following FAS 87 (as amended by FAS 158), companies book actuarial gains and losses against equity, and under IAS 19 the option still exists to defer actuarial gains and losses that do not exceed the corridor. Hence, under the current accounting standards changes in demographic assumptions or in the discount rate affect income only over the long run; immediate income effects are rather modest. For instance, Bayer reports that a 0.5% reduction in the discount rate would increase earnings per year by €12m. A parameter that has a more pronounced direct impact on earnings is the expected rate of return on plan assets. Taking once more Bayer as an example, a raise in the expected rate of return by 0.5%, multiplied with the company's pension assets of just under €10bn, leads to a non-trivial increase in earnings of about €50m per annum (Bayer AG, 2007: 162).

The above numbers demonstrate that the potential impact of actuarial assumptions on companies' balance sheet and income figures is economically significant. Insofar as the accounting for pensions is tied to funding decisions, changes in actuarial assumptions can also have cash flow consequences. Determining the actuarial assumptions involves judgment. In other words, company management enjoys a certain degree of discretion to set these parameters and thereby to influence key financial figures such as debt-equity ratios and earnings. This raises the obvious question whether managers use, or even abuse, their discretion over

pension accounting to influence earnings and other accounting figures.

Over the past two decades, a large body of literature has developed that deals with earnings management. Previous research has identified capital-market, contracting, regulatory, and taxation motivations as important reasons for earnings management (Healy and Wahlen, 1999). For obvious reasons, it is not easy to document when and how earnings management takes place in reality. One approach to investigate possible earnings management behaviour is to analyse whether managers exercise discretion and explicit accounting choices in non-neutral ways (Fields et al., 2001). The approach taken in most studies on accounting choice is to analyse whether choices can be explained by cross-sectional differences in company characteristics linked to incentives for earnings management. In the context of pension accounting, two areas have been researched intensively, namely motives for the early adoption of FAS 87 in the US in the 1980s and determinants of cross-sectional differences in actuarial assumptions. In the following, I will address these two fields of research. In a subsequent section, I will then discuss some other recent studies that attempt to link the research on earnings management with that on market efficiency and on value-relevance.

Early adoption of FAS 87 and actuarial method changes

The introduction of FAS 87 in the second half of the 1980s fundamentally changed US GAAP pension accounting. With the adoption of accrual accounting for pension obligations, companies with underfunded pension plans had to recognise a (minimum) pension liability. Furthermore, previously APB 8 had allowed US companies to use alternative methods to calculate pension liabilities and periodic pension costs. FAS 87 changed this by prescribing the application of the projected-credit-unit method. The deliberations of the FASB's pension project took more than a decade, and even when FAS 87 was issued in 1985, the FASB allowed for an extended adoption period. In general, the standard became effective in 1987, but the application of some provisions (the recognition of a minimum liability) became mandatory only in 1989. The extended adoption period gave companies a choice; they could adopt the regulation early, or postpone adoption until the mandatory date.

A number of studies investigate the motives behind companies' early adoption of FAS 87. Pre-FAS 87, in most US companies the accounting for pension costs was linked to pension contributions, and companies usually applied 'cost allocation methods' recommended by actuaries (Ghicas, 1990). These methods typically arrived at conservative estimates of pension costs and contribu-

tions, because they aimed for a high degree of security for pension beneficiaries. Thus, in comparison to the projected-credit-unit method (a 'benefit allocation method'), pension costs tended to be higher, resulting in the accumulation of plan assets larger than the present value of expected future benefits (Ghicas, 1990). In other words, for most companies the adoption of FAS 87 lead to lower pension costs and, therefore, increased earnings.

In an early study, Ghicas (1990) identifies 45 companies that between 1980 and 1983 (i.e. before FAS 87 was issued) switched from a cost allocation method to a benefit allocation method, an accounting policy change that anticipates FAS 87. Ghicas matches the 'switch companies' with non-switching companies from the same industries and develops hypotheses predicting which companies are more likely to switch. He expects that companies facing liquidity and financing constraints are more likely to take advantage of the lower pension costs associated with a benefit allocation method. He also expects companies with high funding ratios to adopt the new method so as to lower future pension contributions. Further, he predicts that companies with low earnings growth and low cash flows from operations will attempt to benefit from lower pension expenses and contributions. According to another hypothesis, smaller companies are more prone to switch methods than larger ones, given that the latter are subject to more intensive public and regulatory scrutiny. Finally, given that pension contributions can generate tax benefits, Ghicas predicts that switching companies have lower effective tax rates than their non-switching counterparts. Applying a multivariate logit model, Ghicas finds support for several of his hypotheses. High funding ratios, high leverage, and low working capital significantly predict the pension accounting method switch. He also finds that switching companies have lower rates of investment. These findings are consistent with financing constraints being a driver of the method change. Company size, proxying for political and regulatory costs, is also significant, albeit only marginally. The effective tax rate, on the other hand, does not appear to influence the switching decision.

Subsequent studies by Scott (1991), Langer and Lev (1993), Ali and Kumar (1994), and Tung and Weygandt (1994) investigate companies' motives for the early adoption of FAS 87.⁴⁰ Since companies could delay the recognition of a minimum liability even if they adopted other provisions of FAS 87, these studies also concentrate on the income effect of the early adoption. Consequently, the research questions addressed, and the basic methods applied, are essentially the same as those of Ghicas (1990). Scott (1991) refines some of the theoretical arguments. He finds strong support for

political determinants of early adoption (company size, regulated industries and legal proceedings). In addition, companies were more likely to adopt FAS 87 early if the absolute magnitude of the income effect was large and if they had experienced earnings decreases in prior years. If, on the other hand, a company's performance was negative, it was less likely to adopt early, a finding Scott attributes to so-called 'big bath' earnings management. Furthermore, he finds that companies were more likely to adopt FAS 87 early if they had bonus plans with management compensation being tied to accounting income. Contrary to the results of Ghicas (1990), Scott finds only weak evidence for debt constraints to explain companies' accounting choice.

Ali and Kumar (1994) demonstrate that the magnitude of the income effect is a strong moderator for other determinants of companies' choice to adopt FAS 87 early (also see Scott, 1991, on this point). In Ali and Kumar's basic model, debt constraints and political arguments do not appear to be linked significantly with companies' adoption choice. However, once the interaction of these variables with the magnitude of the income effect of early adoption is included in the models, these determinants turn out to be significant. The magnitude of the income effect also moderates other determinants such as regulatory costs (regulated industries) and agency costs (earnings-linked management bonus plans).

The studies referred to so far investigate the early adoption of pension accounting standards (or related accounting policy switches) in the US. Klumpes and Whittington (2003) look into the determinants of UK companies' pension accounting method changes. As with US companies in pre-FAS 87 times, UK companies could, until the introduction of IFRS and IAS 19, choose between different pension valuation methods. Building on Ghicas (1990), Klumpes and Whittington survey UK companies over the years 1994–1998 and identify 45 companies which switch actuarial firms, defer reporting of their funding status, or change from cost-based to market-based valuation of pension assets. They match these firms with companies that do not report comparable accounting method changes and, like earlier US studies, apply logistic regression to explain companies' accounting policy changes. However, the performance of their models is not very strong. As Forker (2003) points out, this may be attributable to conceptual and methodological problems inherent in the research design.

Overall, the research on the early adoption of

⁴⁰ Also see the related study by Amir and Ziv (1997) on the determinants of the early adoption of FAS 106 by US companies in the years 1991 and 1992.

pension accounting standards primarily in the US provides evidence that is consistent with companies exercising the inherent accounting choices based on economic incentives. Important determinants appear to be the self-interests of managers whose remuneration is tied to key financial accounting indicators, debt constraints, and political and regulatory costs. The importance of these determinants appears to be moderated by the magnitude of the earnings effect of the accounting choice.

Finally, it should be recalled in this context that current IFRS pension accounting rules present companies with an option regarding the treatment of actuarial gains and losses. IAS 19 allows companies to (i) defer and smooth recognition of actuarial gains and losses in the balance sheet and in the income statement by using the corridor approach; or (ii) to recognise actuarial gains and losses faster or even fully through the income statement; or – this is a new option – (iii) to recognise them fully and immediately through equity, without any income effect. Fasshauer et al. (2008) survey the 2005 IFRS financial statements of large stock-listed companies from 20 European countries. For 265 companies with material defined benefit pension plans, they find that 136 companies use the corridor approach, 122 companies use the new equity recognition option, and seven (mostly relatively smaller) companies use the income recognition option (also see Morais, 2008a). Fasshauer et al. show that for companies currently using the corridor approach a switch to the equity recognition option would, on average, result in material balance sheet effects, i.e. recognised pension liabilities would increase and shareholders' equity would decrease materially. The income effect of the switch, on the other hand, would in most cases be immaterial. It would be very interesting to study further the determinants of companies' choice with regard to this important accounting policy option. In contrast to previous studies on the early adoption of FAS 87, studies on the IAS 19 option should focus on the balance sheet effects, not on the earnings effects.⁴¹

Determinants of actuarial assumptions

Several studies attempt to investigate whether managers of sponsoring companies exploit the scope they enjoy when setting actuarial assumptions in the valuation of pension obligations and costs. Earlier studies do this by inspecting companies' assumptions, and changes of assumptions over time, and by comparing them to benchmark variables. More recent studies attempt to explain

the cross-sectional variance in pension valuation assumptions with company characteristics that are related to earnings management incentives.

Blankley and Swanson (1995) refer to allegations in the business press and to criticism raised by the SEC that company management in the US abuse the discretion inherent in FAS 87 pension accounting rules. They compare US companies' pension discount rates and expected rates of return for the years 1987–1993 with benchmark rates. They observe that companies do not change discount rates as often as could be expected on the basis of FAS 87 requirements. Overall, however, they find discount rates to be in line with benchmarks. As regards expected rates of return, Blankley and Swanson conclude that these capture 'to a surprising degree' sample companies' actual returns. Godwin (1999) also examines trends in US companies' actuarial assumptions. He uses data for 1987–1996 and, unlike Blankley and Swanson, finds some evidence that companies set assumptions to manipulate accounting measures. More precisely, in nine out of the ten sample years companies with underfunded pension plans had, on average, higher discount rates than overfunded companies, consistent with the former choosing rates that inflate their funded status.

Godwin et al. (1996) investigate whether company characteristics that proxy for earnings management motives explain changes in actuarial pension assumptions over time. The data of this study relates to US companies during the years 1981–1983. Based on note disclosures required by FAS 36, the authors categorise companies according to the earnings impact of actuarial rate changes. This categorical variable is then explained in a cross-sectional setting using ordered logit regression. Godwin et al. find that companies are more likely to change assumptions so as to increase earnings when they have experienced earnings decreases in previous years. Furthermore, earnings increasing assumption changes were significantly related to higher leverage, to dividend constraints, and to declines in taxpayer status (resulting in lower tax benefits of pension expenses).

Amir and Gordon (1996) focus on the assumptions US companies apply in the estimation of their post-employment benefits other than pensions (OPEB). Similar to Godwin et al. (1996), they derive hypotheses on the determinants of the cross-sectional differences in companies' health-care trend assumptions and discount rates. Their study is based on data for the years 1991–1993. The results of the study are not fully consistent, but the authors find some support for their hypotheses that actuarial assumptions are influenced by the relative size of OPEB obligations, leverage, and the existence of extreme earnings.

Amir and Benartzi (1998) investigate whether

⁴¹ A first working paper on this issue has been presented by Morais (2008b). She finds for a sample of European companies that the IAS 19 option is determined by companies' country of origin, size, leverage, and industry.

cross-sectional variance in companies' expected rates of return on pension assets can be explained by differences in pension fund investment strategies (differing percentages of equity investments). They argue that, if managers' assumptions are unbiased, cross-sectional differences in expected returns can only be explained by differences in the riskiness of companies' portfolios. However, based on a sample of US companies from 1988 to 1994 they find that the correlation between the expected rate of return and the proportion of equities in pension funds is rather weak. In contrast to Blankley and Swanson (1995) according to Amir and Benartzi's results, expected rates of return are not correlated to future returns of pension portfolios even though future returns can be predicted by the asset composition of funds.

The results of Amir and Benartzi (1998) suggest that managers use the expected rate of return on plan assets in biased and possibly opportunistic ways. The study by Bergstraesser et al. (2006) takes the investigation one step further and examines possible incentives for opportunistic behaviour. This study also focuses on the expected rate of return on plan assets. The reason given by the authors is that companies have more leeway in their choice of this variable than in setting the discount rate (or the salary and benefit progression rates) for pension liabilities because accounting rules on the latter are more prescriptive.⁴² Their comprehensive study is based on a total of 20,598 firm-year observations representing 3,350 US companies for the years 1991–2002. They first investigate the determinants of companies' expected rates of return. Unlike Amir and Benartzi (1998), they find assumed returns to be correlated with realised, or lagged realised, returns. However, this effect appears to be rather small. Controlling for actual returns, Bergstraesser et al. can partially explain the cross-sectional variation in expected returns with companies' sensitivities to pension assumptions, i.e. companies with large amounts of pension assets (relative to operating earnings or operating assets) on average are found to have higher expected returns, all else being equal. Furthermore, the researchers find evidence consistent with companies making more aggressive return assumptions in years before, and in years in which, they engage in merger and acquisition (M&A) transactions. Companies also appear to set higher expected rates of return on plan assets in periods in which seasoned equity offerings take place and in periods in which CEOs exercise stock options. The findings of Bergstraesser et al. moreover indicate that managers are more aggressive with return assumptions if their companies are close to failing to meet important earnings thresholds (positive earnings, previous years' earnings, median industry earnings). Finally, the authors

find a negative correlation between a 'corporate governance index' and companies' expected rates of return on plan assets, that is, managers that are least constrained by their shareholders appear to set the highest return assumptions.

Two further studies may be mentioned in this context. A working paper by Li and Klumpes (2007) examines the determinants of UK companies' expected rates of return on plan assets. Consistent with the results of US studies they find that companies' expected rates of return are significantly associated with, *inter alia*, leverage and pension funding levels, suggesting that contracting and funding constraints systematically influence rates of return. Asthana (1999) analyses filings of US pension funds with the Internal Revenue Service. Her extensive study is based on 6,040 filings from 2,419 pension plans sponsored by 1,813 companies for 1990–1992. Her evidence is consistent with companies exercising discretion over actuarial choices (i.e. choices of actuarial cost methods and of actuarial assumptions) in order to manage pension funding and to maximise tax benefits. According to Asthana's findings, companies make more conservative (aggressive) choices when funds become overfunded (underfunded). As pension contributions increase (decrease) and come close to maximum tax deductible (minimum required) contributions, companies make more conservative (aggressive) choices. The funding-related actuarial choices are also determined by companies' profitability, cash flow from operations, leverage, and tax payer status.

To summarise, managers have scope for discretion when setting actuarial assumptions in pension accounting. Overall, the results of the above-discussed studies suggest that they exercise the discretion in opportunistic ways. The evidence from the studies is consistent with managerial choices regarding pension accounting assumptions being influenced by funding consequences and related debt and dividend constraints, tax benefits, and companies' efforts to smooth earnings.

⁴² Another argument for focusing on the expected return on pension assets is that it is difficult to appraise assumptions on salary progression rates, benefit trends and discount rates without knowledge about the age structure and other demographic details (e.g. gender structure) of companies' current and future pension beneficiaries. These characteristics are important determinants of the amounts and the timing of future pension (or health-care) payments, and cross-sectional differences in companies' pension assumptions may at least partially reflect differences in the demographics of companies' workforces. Thus, failure to control for these variables in studies on the determinants of actuarial assumptions may lead to weak or biased results (Landsman, 1996). Unfortunately, current reporting standards do not require companies to disclose information on the demographics of current and past employees.

4.3. *Managerial discretion in pension accounting, market efficiency and company valuation*

It has been pointed out in the literature that scope for discretion in financial reporting is not necessarily a bad thing. If managers use discretion afforded to them by accounting standards to convey private information about the current state and the future expected course of the business, this can improve the information value of financial statements (Schipper, 1989; Dye and Verrechia, 1995; Healy and Whalen, 1999). However, as shown in the preceding section, empirical evidence suggests that managers take advantage of the latitude in pension accounting standards so as to systematically manage earnings and other key reporting numbers. Earnings management can have consequences for different parties and on different levels (e.g. contracting, taxation, regulation). Given the pivotal role international standard-setters attach to the decision-usefulness of accounting information for capital market participants, it is of particular interest to ask whether earnings management impairs this function of financial reporting. If companies were required to fully disclose how they exercise accounting policy choices, investors could 'see through' opportunistic reporting behaviour, unravel its effects, and value companies on the basis of appropriately adjusted accounting measures (Dechow and Skinner, 2000). If, on the other hand, disclosures are incomplete or not fully transparent, or if investors for other reasons fail to take into account the consequences of biased accounting choices, earnings management is likely to reduce the decision-usefulness of financial accounting information.

In the following, I will summarise and discuss empirical studies that investigate, first, to which degree capital markets are informationally efficient with regard to pension accounting and, second, what effect earnings management has on the value-relevance of pension accounting information. Studies that address the latter aspect provide a link between the two strands of research discussed separately in prior sectors of this review, the research on the value-relevance of pension accounting and the research on managerial discretion in pension accounting.

Pension accounting and information efficiency

The accounting for pensions is complex, and international pension accounting standards have been criticised by analysts because they lead to 'opaque', 'confusing' and 'misleading' reporting.⁴³ Despite this, as shown above, numerous empirical studies have demonstrated that pension accounting

information is significantly associated with share prices. This seems to imply that pension accounting information is sufficiently relevant and reliable to be processed by investors. In fact, some authors explicitly conclude that share prices appropriately reflect corporate pension accounting information. For instance, Jin et al. (2006: 22) contend that 'the stock market seems to process the available information without bias despite the practical difficulties of deciphering corporate pension accounts.' Other studies, however, raise some doubts whether capital market participants make full use of the information available to them and completely understand its implications. For instance, Coronado and Sharpe (2003) find evidence consistent with investors naively extrapolating US companies' 'pension earnings' in the second half of the 1990s; they conclude that investors are misled and hence 'do not appropriately discount pension earnings'.⁴⁴

A study by Landsman and Ohlson (1990) produces further evidence which suggests that financial markets are not fully efficient with regard to pension accounting information. Their study is based on data for US companies from 1975–1986. Controlling for size and several risk factors (betas, market-to-book, price-earnings ratio), they construct yearly hedge portfolios that are long in companies with large net pension assets (difference between pension assets and pension liabilities) and short in companies with small net pension assets. They find that the portfolios generate significantly positive returns over subsequent years. The fact that pension accounting information predicts future stock returns is inconsistent with the concept of market efficiency. Unless the abnormal returns are, in fact, a premium for unknown risk factors not taken into account in Landsman and Ohlson's study, it appears that investors systematically misprice information about companies' net pension assets or liabilities.

This latter interpretation is supported by more recent papers by Franzoni and Marín (2006) and Picconi (2006). Franzoni and Marín (2006) use a large dataset of 36,651 company-years, relating to more than 1,200 US companies for the years 1980–2002. Over most of these years, US companies were, on average, overfunded. However, about 40% of the companies per year were underfunded. The authors concentrate on these companies and, for each year, assign them to ten portfolios according to their degree of underfunding. Adjusting for commonly used risk factors, they find that the most underfunded companies earn significantly lower returns over several subsequent years than companies with less underfunded or overfunded pension plans, even though their returns experience higher standard deviations. The risk-adjusted discount in the return is of the order of 10% p.a., i.e. it is economically

⁴³ See Merrill Lynch (2002); Credit Suisse First Boston (2005); JP Morgan (2006).

⁴⁴ Coronado and Sharpe, 2003: 351.

highly significant. Franzoni and Marín find further that companies with extreme underfunding are, on average, underperforming and financially constrained small companies with high book-to-market ratios (in actuality, one would expect both factors to be associated with higher, not lower, returns). Franzoni and Marín believe their findings point to a previously unknown ‘anomaly’ in the finance literature. They write (Franzoni and Marín, 2006: 953):

‘We interpret this evidence as being due to investors not paying enough attention to the implications of the current underfunding for future earnings and cash flows. The low returns we predict are, in our view, a consequence of the fact that investors are systematically surprised by the negative impact of the pension underfunding on earnings and cash flows.’

Franzoni and Marín’s findings and conclusions are reinforced by Picconi (2006). Picconi’s work is based on 15,553 company-years for US companies with pension plans for the years 1988–2001. Using information on changes in PBO, plan assets, and actuarial assumptions, all of which are disclosed in companies’ footnotes, Picconi computes expected future pension cost changes. He then shows that these ‘informed pension costs changes’ are predictive of future analyst forecast errors. This finding indicates that analysts fail to immediately incorporate available information on pension cost changes in their earnings forecasts. Picconi moreover demonstrates that hedge portfolios constructed on the basis of ‘informed pension costs changes’, i.e. taking long (short) positions in companies with income increasing (decreasing) pension cost changes, generate significant abnormal returns, implying that investors also fail to take into account the publicly available information. Finally, Picconi regresses future stock market returns on pension liability measures and standard control variables. He finds that the PBO and the off-balance-sheet component of the funding status are significantly predictive of future returns. That is, *ceteris paribus*, companies with high PBOs and high off-balance-sheet liabilities experience significant negative returns in subsequent periods. On-balance-sheet liabilities, on the other hand, do not predict future stock returns. Picconi (2006: 951) concludes that ‘investors can completely process the pension information that has already been recognised in income, but fail to fully impound the valuation impact of pension liabilities disclosed only in footnotes’.

To summarise, the empirical studies provide strong evidence consistent with stock markets not being fully efficient with regard to pension accounting information. In particular, analysts and investors seem to have difficulties processing in-

formation about changes in US companies’ pension positions that is not recognised but only disclosed in the notes.

Managerial discretion and value-relevance of pension accounting information

As explained before, accounting information can only be value-relevant if it is both relevant and reliable. The above-discussed results from studies on earnings management in pension accounting raise the question of whether the discretion managers are afforded impairs the reliability of pension accounting information and, hence, its value-relevance.

Several comments can be made regarding this point. First, it is important to note that managerial discretion and possible biases arising from earnings management are not the only source of concern for the reliability of pension accounting information. The measurement of pension liabilities, pension assets, and pension costs relies on financial and demographic assumptions which require judgment by management. Pension measures are also subject to short-term market parameter changes (discount rates, fair values of pension assets). In practice, these factors cause measurement error and uncertainty, thus also reducing reliability.

Second, relevance and, especially, reliability are no absolute concepts. That is, accounting information can be more or less reliable, and measures may still be decision-useful when their reliability is less than perfect. However, one would expect more reliable measures to be more decision-useful and thus more strongly associated with stock market valuations than less reliable measures. Thus, holding everything else constant, in standard empirical models one would expect the standard deviation of estimated coefficients to be smaller for more reliable measures, hence their significance level to be higher. Furthermore, in relative association studies estimations with more reliable measures should have higher explanatory power than estimations with less reliable measures, again all else being equal (Hann et al., 2007b).

Third, however, in reality ‘all else’ is usually not equal. In particular, as standard-setters point out there can be trade-offs between relevance and reliability in accounting. For instance, fair-value measures are often thought to be more relevant to decision-makers than traditional cost measures, while being less reliable. Therefore, differences in estimated coefficients in value-relevance studies can be attributable to differences in relevance, reliability, or both. As Wyatt (2008) points out, it is difficult to disentangle the separate effects in empirical studies. This holds even more for efforts to single out the reliability effect of managerial discretion in value-relevance studies. Thus, it is not

surprising that only few studies directly address this issue.

In a paper unrelated to pension accounting, Marquardt and Wiedman (2004) analyse the value-relevance of financial accounting information for a sample of companies that issue secondary stock and therefore face strong incentives to manage earnings. The authors first document evidence consistent with SEO companies managing their earnings. Furthermore, they find that the value-relevance of companies' accounting information is significantly lower for years in which they offer stock than in prior or later years; in the SEO year, coefficients on net income, and adjusted R^2 s of valuation equations, are lower than in other years. These findings are consistent with investors being aware of companies' earnings management and correcting for the perceived bias in published accounting figures. Marquardt and Wiedman's findings are corroborated by another paper by Baber et al. (2006). These authors apply an event-study methodology and also find evidence consistent with capital-market participants taking earnings management into account when using financial accounting data.⁴⁵

There is one published paper and two as yet unpublished working papers that directly investigate the effects of managerial discretion on the value-relevance of pension accounting information. Hann et al. (2007b) estimate a 'non-discretionary' PBO (PBO-X) measure for a sample of US companies by replacing companies' actual discount rates and expected rates of salary progression with respective industry medians. They define the difference between companies' reported PBOs and PBO-X as estimates of the discretionary PBO component (PBO-D), and they investigate whether PBO-D is value-relevant. Their empirical analysis is based on a sample of 12,567 company-years related to 1,707 US companies for the years 1991–2003. Using an empirical version of the Ohlson model (augmented with additional control variables), they find that valuation equations with reported PBO and with the estimated non-discretionary PBO measure have the same explanatory

power, and the two estimated regression coefficients are not statistically different. Moreover, further tests indicate that PBO-D is incrementally value-relevant over PBO-X and that the coefficients on PBO-X and PBO-D are not statistically different.⁴⁶

As Hann et al. themselves point out, there are at least two interpretations for these findings. First, they may be due to the fact that managers do not abuse the discretion inherent in US GAAP pension accounting and that their choices of assumptions instead convey value-relevant information to stock market participants. Alternatively, it could also be that investors uncritically fixate on published pension accounting figures without properly evaluating the differing value-relevance of non-discretionary and the discretionary components of the PBO. Hann et al. (2000b) lean towards the first interpretation, and they provide additional robustness checks that appear to refute alternative explanations.

A working paper by Brown (2006) arrives at different results. His work is also based on a large sample of US companies for the years 1991–2001. He compares companies' discount rates and salary progression rates with respective benchmarks; the sum of the two differences can be thought of as a measure for the aggressiveness of companies' pension assumptions. Using a cross-sectional balance sheet valuation model (augmented with further control variables), Brown finds that the coefficient on the aggressiveness measure is significantly negative, indicating that share prices of companies with aggressive pension assumptions are systematically reduced. In a further model specification similar to that of Hann et al. (2007b), Brown regresses both reported PBO and PBO-D (as well as other balance sheet and control variables) on share prices. He finds PBO-D to be incrementally value-relevant over the reported PBO. He concludes that investors see through managers' opportunistic pension accounting choices and adjust company valuations accordingly. Brown's results are in conflict with those of Hann et al. (2007b). One possible reason for the discrepancy may be differences in the methods used in the two studies. In fact, Coronado and Sharpe (2003) argue that Brown's results should be interpreted with caution because they are based on a pure balance sheet model that does not take into account information on companies' pension costs.

Davis-Friday et al. (2007) concentrate on a special feature of FAS 87 that allows companies to smooth their reported returns on plan assets. According to FAS 87, para. 30, the expected rate of return may be multiplied with either the fair value of plan assets or with a 'smoothed fair value', i.e. a moving average of plan asset fair values. Davis-Friday, Miller and Mittelstaedt show

⁴⁵ A study by Barth et al. (1996) on the value-relevance of fair values of financial instruments in the banking industry presents another example for the importance investors attach to the reliability of reported accounting information. They find that fair values of loans are value-relevant only for banks with above-median levels of regulatory capital, not for banks with below-median levels, i.e. where managers have an incentive to bias estimates of loan fair values upwards.

⁴⁶ One can point out again a related finding from the study of Fasshauer and Glaum (2008) who show that for their sample of German companies the non-recognised parts of companies' funding status, i.e. mostly actuarial gains and losses not recognised because of the corridor approach, are incrementally value-relevant over recognised smoothed corridor net liabilities.

for their sample of about 200 US companies for the years 1998–2001 that most companies use smoothed fair values in the calculation of expected returns on plan assets. However, the degree of smoothing, i.e. the deviation from fair-value-based returns, differs across companies. Davis-Friday et al. show that the use of smoothed fair values can have material effects on companies' earnings, and they investigate whether investors detect and correct for the smoothing. They calculate the difference between reported returns on plan assets (calculated on the basis of smoothed fair values) and returns on the basis of fair values. Using a version of the Ohlson model, they then analyse whether this difference is incrementally value-relevant. They find mixed results. For the pooled sample, the difference between smoothed expected returns and fair-value expected returns is significantly associated with share prices. However, in annual regressions the relationship is significant only in some years and for some of the regression techniques applied. In an additional model, annual changes in the differences between smoothed and fair-value expected returns are not significantly associated with annual stock returns. The authors conclude that overall their results provide 'mixed to limited support' that investors see through companies' earnings smoothing and appropriately adjust share valuations.

Taken together, the evidence on the effect managerial discretion has on the value-relevance of pension accounting is inconclusive. Hann et al. (2007b) find that investors do not discriminate between the non-discretionary and the discretionary components of the PBO. They interpret this as indicating that managers use their discretion in pension accounting to 'provide valuable information to the market about the underlying economics of the pension obligation' (Hann et al. (2007b: 119). This interpretation appears to be in conflict with above-discussed studies that suggest that managers' pension accounting choices are influenced by opportunistic incentives. In direct contrast to Hann et al. (2007b), Brown (2006) finds that investors do discriminate between the non-discretionary and the discretionary PBO components, i.e. place a lower value on companies if managers choose aggressive, obligation-reducing pension accounting assumptions. Finally, Davis-Friday et al. (2007) find only weak support for their hypothesis that investors adjust for companies' smoothing of expected returns on plan assets. The basic assumption underlying all three studies is that investors are able to 'see through' managers' opportunistic pension accounting choices and accordingly adjust the valuation of shares. This assumption, however, seems to conflict with the findings of Landsman and Ohlson (1990), Franzoni and Marín (2006), and Picconi (2006)

which suggest that markets are not fully efficient with regard to pension accounting information, presumably because current pension accounting rules are highly complex and investors are not able to adequately process the detailed disclosures in the notes to companies' financial statements. Clearly, further research is needed to shed more light on the impact of managerial discretion on the usefulness of pension accounting information.

5. Research on pension accounting: an international perspective

As this review has shown, the existent empirical research on pension accounting is almost completely based on US data. Only a handful of studies have been conducted with non-US data, and these are mostly based on UK or Canadian data – in other words, they also relate to Anglo-Saxon countries with accounting standards, pension systems and capital market institutions similar to those of the US. This raises the question whether the evidence from US-based studies on value-relevance and on earnings management can be generalised to other countries, especially to non-Anglo-Saxon countries.

There are several reasons why results from US-based pension accounting research may not hold for other countries. One can differentiate general factors impeding the comparability of capital-markets-oriented accounting research across countries, and factors specific to pension accounting. Starting with general factors regarding the relation between accounting information and securities valuation, it is conceivable that capital markets are not fully integrated globally and price formation varies across regional segments as a result of, for example, differing risk attitudes or time preferences, differential taxation, or other legal differences (e.g. La Porta et al., 2002; Kwok and Tadesse, 2006; Hail and Leuz, 2006).

Second, over time and in response to historical and other institutional factors, accounting systems have developed differently in different countries. National accounting standards diverge with respect to recognition, valuation and disclosure rules, and this is likely to be reflected in the relationship between accounting data and share prices. For instance, Joos and Lang (1994) show that reported accounting profitability measures, and multiples applied to them in the stock markets, differ considerably for French, German and UK companies over the course of the 1980s, despite European efforts to harmonise accounting.

Furthermore, it is increasingly recognised in the literature that the 'quality' of financial accounting information is not only determined by accounting standards, but also by companies' legal and other institutional environments (e.g. Bushman and Piotroski, 2006). Differences in legal systems, in

taxation, or in remuneration practices, can give rise to different incentives for earnings management across countries. Limitations put on managerial discretion also vary. For instance, in the US the application of accounting standards by listed corporations is enforced by the SEC, a public institution endowed with far-reaching legal, administrative and judicial rights. In Europe, capital market oversight is a national matter and therefore heterogeneous. In some European countries where stock markets traditionally play a relatively minor role, enforcement mechanisms until recently were not highly developed (FEE, 2001). A number of empirical studies provide evidence consistent with the degree of earnings management differing between countries (e.g. Leuz et al., 2003; Glaum et al., 2004; Burgstahler et al., 2006; Daske et al., 2006). On a more general level, results from several other studies suggest that important properties of companies' earnings, such as timeliness, conservatism, and value-relevance, also differ across countries, in particular depending on the origin of countries' legal systems and the degree of investor protection that is associated with it (e.g. Ali and Hwang, 2000; Ball et al., 2000; Hung, 2001).

So far, I have mentioned general factors, i.e. factors not specific to pension accounting, that may prevent the generalisation of US-based capital-markets-oriented accounting research. Table 1 is an attempt to summarise national accounting standards for the accounting for pension benefits in the US, the UK, and in six Continental European countries.⁴⁷ The overview documents that national pension accounting rules vary (also see Morais, 2008a, on this point). While UK and Dutch pension accounting rules are similar to IAS 19 and FAS 87, French, German, Italian, Spanish and Swiss rules are clearly different. For example, in German accounting law, there are no explicit rules for the valuation of pension obligations,⁴⁸ and French and Swiss accounting standards do not generally require the recognition of pension liabilities. Furthermore, disclosure rules also vary across countries, with requirements generally being much less extensive in Continental Europe

than in Anglo-Saxon countries, or in comparison to IFRS. The lack of precise rules for the recognition and valuation of pension obligations and pension costs, combined with relatively lenient disclosure requirements, opens up wide scope for managerial discretion and earnings management. As a consequence, it is likely that both the relevance and the reliability of pension accounting information will vary across countries.

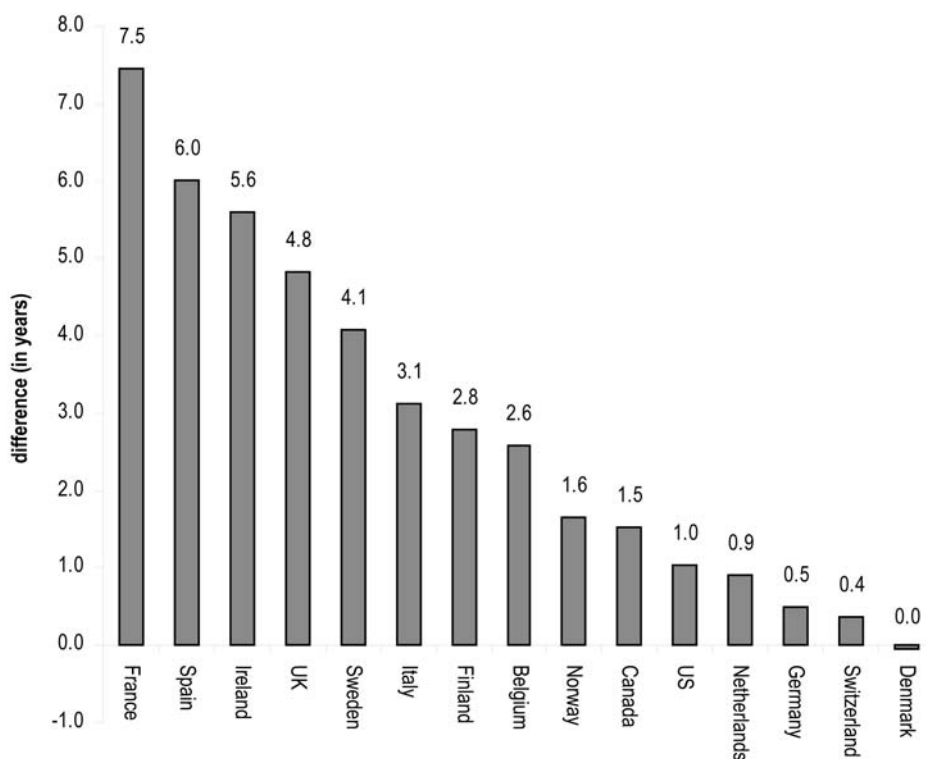
Following the European Union's IFRS Regulation of 19 July 2002, all publicly traded companies in the European Union are required, in most cases since 2005, to prepare their consolidated financial statements in accordance with IFRS. Hence, the above-discussed national accounting standards have lost their importance for stock listed companies, the focus of most empirical studies. Hence, since IAS 19 is very similar to FAS 87, one could expect pension accounting, in particular, to have become homogeneous, or at least very similar, for European and US stock-listed companies. However, as pointed out by Ball (2006) and Nobes (2006), there are serious reasons to expect that the very different institutional environments across Europe will continue to bring about country-specific accounting practices, despite the introduction of a single set of accounting standards. These concerns appear to be corroborated by Glaum et al. (2007). In a working paper, they provide evidence that suggests that the degree of compliance with IFRS mandated disclosures differs systematically across European countries. An earlier survey study by Ernst & Young (2006) also concluded that IFRS implementation across Europe is heterogeneous and country-specific.

An interesting example of heterogeneity pertaining to pension accounting has been identified by Verrall et al. (2005). The authors analyse life expectancy assumptions used by actuaries in corporate pension liability calculations in the US, in Canada, and in 14 European countries. International pension accounting standards are silent on which mortality assumptions companies should use; moreover, there is no requirement for companies to disclose which assumptions they do use. The study by Verrall et al. reveals that mortality assumptions vary systematically across countries, much more so than actually observed life expectancies. In some countries, different mortality tables are used; in other countries only one table is accepted. While differing life expectancies of men and women are mostly taken into account, Danish and Swedish actuaries apply 'unisex' tables. A further, important difference lies in the fact that some mortality tables do incorporate projections of expected future improvements in life expectancy, while tables used in other countries (e.g. Belgium, Norway) only relate to past mortality, without any improvement allowance. As depicted in Figure 1,

⁴⁷ The information presented in Table 1 must be interpreted with caution. Pension accounting rules are complex, and any attempt to summarise and compare national pension accounting rules necessarily leads to a loss of detail and precision. Hence, Table 1 can only provide a general overview of the most salient properties of the respective national GAAP.

⁴⁸ Traditionally, companies that prepare financial statements according to German GAAP follow pension accounting rules stipulated by the German tax code. Hence, they discount expected future benefits with a rate of 6% p.a.; expected future salaries are not taken into account. The German government has recently introduced a bill that would change the German Commercial Code and require a market-oriented valuation of pension obligations. It is estimated that, as a consequence, pension liabilities reported under German GAAP might increase by more than 50%. See Pellens et al. (2008).

Figure 1
Difference between observed general population future life expectancy and typically assumed future life expectancy of company pension scheme members (male, aged 65)



Source: Verrall et al. (2005: 190).

the assumed life expectancy in the calculation of pension liabilities in Denmark is equal to the observed national population life expectancy, that is, no allowance is made for improvements in life expectancy or longevity risk. Assumed life expectancies in Switzerland, Germany, the Netherlands, and in the US, are also not much higher than currently observed mortality rates. On the other hand, in the UK, Ireland, Spain and France, rather high life expectancy assumptions are used. As a result, estimations of corporate pension liabilities differ systematically across countries – PBOs are systematically higher in the UK, Ireland, Spain, and especially, in France, and lower in the US, in the Netherlands, Germany, Switzerland, and Denmark – even though on the surface all companies follow the same (or very similar) pension accounting rules (IAS 19, FAS 87).⁴⁹

It would be interesting to investigate whether investors are aware of these systematic differences and adjust company valuations accordingly. If so, one would expect to find country-specific valuation multiples attached to pension liabilities in cross-country value-relevance studies. All else

being equal, regression coefficients on pension liabilities should be higher for Danish, Swiss, German, Dutch and US companies than for UK, Irish, Spanish and French companies. However, given that companies do not disclose mortality assumptions, it seems questionable whether investors can correct for these differences. Hence, in an international context, the differences may contribute to measurement error and noise in the relation between pension accounting information and stock market valuations.

Finally, as noted before, corporate pension systems differ across countries. This may affect how companies account for pension obligations, and it may have bearings on the way pension accounting information is processed by investors and other users of financial statements. Table 2 summarises

⁴⁹ The differences in mortality rates have material valuation effects. Based on further assumptions, Verrall et al. calculate that the difference between the low mortality rates applied in Denmark and the much higher ones in France are equivalent to a difference in the pension accounting discount rate of more than 2%; see Verrall et al., 2005: 195–196.

Table 1
National pension accounting rules: overview

	<i>France</i>	<i>Italy</i>	<i>Netherlands</i>	<i>Spain</i>
1. <i>Specific standard for pension accounting</i>	no; recommendation, but no obligation to apply IAS 19 (however: application of SoRIE option not allowed)	no; Codice Civile, paragraph 21.20 applies only to severance payments (TFR); no specific rules for defined benefit obligations (which are uncommon in Italy)	Dutch Accounting Standard (RJ 271); alternatively, companies may opt to apply IAS 19 or FAS 87; it is also allowed to adopt IFRS completely on a voluntary basis; DB pensions in multi-employer funds may be accounted for as DC plans; new Dutch standard 271 to be published in 2009	yes, new rules to be applied as of January 2008; special rules for financial institutions
2. <i>Recognition in the balance sheet</i>				
2.1. Recognition of liability mandatory	recognition of liability for pension obligations is not mandatory; if companies recognise a liability, application of IAS 19 is recommended (without SoRIE option); in case of voluntary recognition, IAS 19 defines minimum liability	n.a. (see 1)	yes	yes
2.2. smoothing mechanism for balance sheet	n.a. (see 2.1)	n.a. (see 1)	corridor approach (optional; SoRIE option not allowed under RJ 271)	until 2007: same as IFRS, immediate recognition in P&L was common practice; since January 2008: only SoRIE option allowed
2.3. Presentation in balance sheet (gross/net)	n.a. (see 2.1)	n.a. (see 1)	net	net
3. <i>Valuation of liabilities</i>				
3.1. Specified method	n.a. (see 2.1)	n.a. (see 1)	yes; projected unit credit method	no; recommended; projected unit credit method
3.2. Guidance on assumptions	n.a. (see 2.1)	n.a. (see 1)	yes	no
3.3. Interest rate	n.a. (see 2.1)	n.a. (see 1)	yes, market based	no, actuarially determined
3.4. Salary rate	n.a. (see 2.1)	n.a. (see 1)	yes	no, actuarially determined
3.5. Benefit rate	n.a. (see 2.1)	n.a. (see 1)	yes	no, actuarially determined
3.6. Mortality rate	n.a. (see 2.1)	n.a. (see 1)	no, actuarially determined	no, actuarially determined
4. <i>Valuation of assets</i>	same as IAS 19: fair value	n.a. (see 1)	fair value, or allocated fair value for joint, multi-employer pension funds	fair value
5. <i>Pension costs</i>				
5.1. Explicit rules	n.a. (see 2.1)	n.a. (see 1)	yes	yes (but only SoRIE approach for actuarial gains and losses)
5.2. Smoothing mechanism	n.a. (see 2.1)	n.a. (see 1)	corridor (optional)	only for prior service costs

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<i>Switzerland</i>	<i>UK</i>	<i>Germany</i>	<i>IFRS</i>	<i>US</i>
yes, FER 16 and 26	FRS17 'Retirement Benefits'	currently only rudimentary rules in German Commercial Code (HGB), paragraph 249 and paragraph 253; reform of HGB in preparation, planned: market-based valuation of pension obligations	IAS 19 'Employee Benefits'	FAS 87/158 'Employers' Accounting for Pensions'
no; only if pension fund is actuarially underfunded	yes	yes, if internally financed (except for liabilities originated pre-1985); optional for funding deficits in case of external financing	yes	yes
yes, due to actuarial valuation	no	no	corridor (optional)	no
net	net in case of plan assets	gross (net in case of funding through separate legal units)	net in case of plan assets	net in case of plan assets
no, actuarially determined	yes, projected unit credit method	no, mostly entry age normal cost method ('Teilwertverfahren') or projected unit credit method	yes; projected unit credit method	yes; projected unit credit method
no	yes	yes	yes	yes
no, actuarially determined	yes, market-based, high quality corporate bonds	no explicit rule; traditionally adoption of interest rate specified in tax code 6% p.a.	yes, market-based, high quality corporate bonds	yes market-based, high quality corporate bonds
no, actuarially determined	yes	no projections required	yes	yes
no, actuarially determined	yes	no projections required	yes	yes
no, actuarially determined	no, actuarially determined	no, actuarially determined	no, actuarially determined	no, actuarially determined
fair value	fair value	cost; fair value or actuarial value in case of external financing	fair value	fair value
no	yes	no	yes	yes
yes, implicit in actuarial valuation	no	yes, implicit in traditional (tax-based) valuation practices	corridor (optional)	corridor (optional)

Table 2
National pension systems: overview

	<i>France</i>	<i>Germany</i>	<i>Italy</i>
Public pension systems ¹	two-tier pension system; earnings-related public pension as part of the basic social security system plus mandatory industry-wide pension schemes, based on a points system, financed through contributions of employers and employees	private sector employees are covered by earnings-related pension as part of the basic social security system, financed through contributions of employers and employees; civil servants receive a state pension, based on final-pay level	most private sector employees are covered by Italian social security system (INPS); public pension system was radically reformed in 1995; traditionally, at the time of termination of employment, all Italian employees were entitled to a severance payment (TFR), based on career-long earnings, protected against inflation, for which companies had to set up book reserves; following pension reform, employees can transfer TFR funds to new pension plans
Supplementary occupational pension systems ²	voluntary, supplementary company pension systems are not widespread; in most cases, they are for top executives only, in some cases they are extended to all executives, in only a few cases to all employees; most plans are DC; due to tax restrictions, DB benefits cannot vest before retirement; DB plans do not have to be externally financed; DC plans have to be financed through insurance policies	supplementary company pension systems are common, in some industries based on collective agreements; traditionally, only DB plans were allowed, in most cases on career-average or on final-year basis; since 2001, hybrid DC forms with minimum guaranteed returns are allowed and in many cases replace DB plans; traditionally, most DB plans were not externally funded (book reserves only); in recent years external funding through contractual trust arrangements have become common for larger companies; national insurance system for vested rights (PSV)	voluntary, supplementary company pension systems are not widespread; recent law changes (fiscal incentives) are expected to foster corporate pension systems; all new schemes are DC plans
Prevalence of supplementary occupational pension plans ³	10%	57%	8%
Distribution of occupational pension systems ⁴	DC: 45% DB: 15% Hybrid: 40%	DC: 10% DB: 50% Hybrid: 40%	DC: 100% DB: 0% Hybrid: 0%
Funding status of DB plans (average for leading stock-listed companies, 2005) ⁵	65%	50%	30%
Distribution of retiree income ⁶	Pillar 1: 51% ⁷ Pillar 2: 34% Pillar 3: 15%	Pillar 1: 82% ⁸ Pillar 2: 5% Pillar 3: 13%	Pillar 1: 75% ⁹ Pillar 2: 2% Pillar 3: 23%

Sources and explanations:

- 1 DIA (1999); Natali (2004); Börsch-Supan and Wilke (2006); OECD (2007)
- 2 Natali (2004); Mercer (2006); OECD (2007); personal enquiries
- 3 OECD (2007)
- 4 Mercer (2006)
- 5 Fashauer, Glaum and Street (2008); for US (2006 data); Standard and Poor's (2007)
- 6 Pillar 1: public pension system, Pillar 2: occupational pension system, Pillar 3: private pension system
- 7 Deutsche Bank Research (2003a) (Pillar 2: including mandatory occupational pensions)
- 8 DIA (1999); Deutsche Bank Research (2003a)
- 9 Deutsche Bank Research (2003b)
- 10 Deutsche Bank Research (2003a)
- 11 DIA (1999); Deutsche Bank Research (2003a); Deutsche Bank Research (2003b)
- 12 Deutsche Bank Research (2003a); Deutsche Bank Research (2003b)

<i>Netherlands</i>	<i>Spain</i>	<i>Switzerland</i>	<i>UK</i>	<i>US</i>
all employees are covered by basic, flat-rate public pension system	all employees are covered by earnings-related public pension as part of the Spanish social security system	public pension as part of the basic social security system, flat-rate plus career-average earnings-related benefit	complex pension system mixing public and private components; first-tier: flat-rate basic state pension as part of social security system; second tier: earnings-related public pension, but will shortly transition to a flat-rate top-up to the basic state pension; companies are allowed to establish private pension plans and contract their employees out of the second tier of the public system; employees are also allowed to contract out to join private pension schemes	most employees are covered by earnings-related public pension as part of the social security system
based on industrial-relations agreements, most employees are covered by industry-wide or company-specific occupational schemes; mostly plans are career-average DB plans, in some cases (increasingly) DC or hybrid; according to law, DB plans must be fully funded; most DB plans are financed through industry-wide (in some cases, occupational) pension funds; by law, companies in the industry are required to participate unless they set up a company-specific plan that offers employees better terms than industry-wide scheme	supplementary company pension plans are sponsored mainly by large, multinational companies with high proportions of highly paid employees; in some cases, corporate pension plans are provided based on industry-wide collective agreements; traditionally, pension plans were DB; more recently adopted plans are often DC or hybrid; in the past, DB plans often were not externally funded (book reserves only); since 2002, with few exceptions, all DB plans have to be funded through qualifying pension funds or insurance policies	by law, all employers have to provide pension plans; some pension plans are DB, but most (and increasingly) plans are hybrid DC plans, with guaranteed minimum interest rate set by Federal Council; pension plans must be funded on actuarial basis; financing mostly through separate funds (foundations), sometimes on multi-employer basis; often companies provide pension plans with benefits that exceed the mandatory benefits, pension benefits are insured through public guarantee fund (BVG)	a high proportion of employees, especially those of larger companies, are covered by company pension plans, many of which are contracted out of the second-tier public system; traditionally, most plans were final-salary DB; recently, many DB plans have been closed for new entrants, plans for new entrants are mostly DC; financing is mostly through trusts, sometimes contract-based (but, from 2012, contracting-out on a DC basis will cease and members of affected plans will automatically rejoin state second-tier system); since 1997, minimum funding for DB plans required; since 2004, DB obligations are insured through national pension protection fund (PPF)	supplementary company pension systems are common; traditionally, most plans were final-salary-related DB; recently, many companies have closed DB plans for new entrants; plans for new entrants are mostly DC; financing of DB plans mostly through trustees (mostly banks); since 1974, minimum funding required by law (ERISA), DB obligations are insured through national pension benefit guarantee company (PBGC)
> 90%	10%	> 90%	43%	47%
DC: 8% DB: 82% Hybrid: 10%	DC: 80% DB: 10% Hybrid: 10%	DC: 0% DB: 14% Hybrid: 86%	DC: 18% DB: 18% Hybrid: 64%	DC: 60% DB: 30% Hybrid: 10%
73%	81%	63%	95%	98%
Pillar 1: 50% ⁸ Pillar 2: 40% Pillar 3: 10%	Pillar 1: 92% ¹⁰ Pillar 2: 4% Pillar 3: 4%	Pillar 1: 42% ¹¹ Pillar 2: 32% Pillar 3: 26%	Pillar 1: 65% ¹² Pillar 2: 25% Pillar 3: 10%	Pillar 1: 45% ¹² Pillar 2: 13% Pillar 3: 42%

important features of the public and occupational pension systems of the US, the UK, and of six Continental European countries.⁵⁰ The overview shows that occupational systems play very different roles in different countries. In some countries, corporate pensions are widespread, either on a voluntary basis (e.g. Germany, the UK), or due to collective industrial-relations agreements (e.g. the Netherlands), or because of legal requirements (e.g. Switzerland); their importance is much lower in other countries (France, Italy, Spain), at least traditionally. In the Netherlands, in Switzerland, in the UK and, to a lesser degree, in the US, occupational pensions contribute substantially to retiree incomes.

More importantly from the viewpoint of accounting, characteristics of occupational pension systems differ across countries. Traditionally, defined benefit arrangements have been dominant in most countries, even though more recently they are often replaced by defined contribution or hybrid schemes (Kiosse and Peasnell, 2009). However, in some countries (e.g. Germany, Switzerland) pure defined contribution plans are legally not possible because sponsoring companies must at least guarantee a minimum investment return on contributions. Thus, according to IAS 19, pension schemes in these countries are defined benefit schemes.⁵¹

There are pronounced differences in funding practices across countries. In particular, US and UK corporate pensions plans, on average, are highly funded, often overfunded. For instance, in 2006, the average funding ratio for companies comprising the S&P 500 index was 98% (see Table 2), and in the 1990s, average funding ratios at times even

exceeded 100% (e.g. Coronado and Sharpe, 2003). In other countries, funding ratios are often much lower. For example, as shown in Table 2 the average funding ratio of large German companies was 44% in 2005, and Fasshauer and Glaum (2008) find even lower ratios for a broader sample of German companies for the late 1990s and early 2000s (average: 26.14%; median: 10.06%).⁵²

Variation in funding ratios is partly a result of differences in pension fund regulation: some countries require pension plans to be funded, either fully or at some minimum level (e.g. US, UK, the Netherlands, Spain), whereas such requirements do not exist in other countries (e.g. France, Germany). Another driving factor is taxation. For instance, in the US only contributions to funded pension schemes are tax deductible (McGill et al., 2005), and incentives exist for companies to fund pension plans fully. This is because firms' contributions to funds are tax deductible, whereas earnings in pension funds are tax exempt (e.g. Francis and Reiter, 1987). Tax regulation can be different in other countries, setting different funding incentives. For example, until recently tax and other regulations in Germany actually discriminated against external funding. This particular legal setting, purposefully designed to foster internal financing, helps to explain why corporate pensions traditionally have been, and in some cases continue to be, completely unfunded in German companies.

Institutional differences between national occupational pension systems can have consequences for how pension obligations are accounted for by preparers of financial statements and for how investors process reported pension accounting measures. Previous studies have shown that US companies' pension accounting choices (early adoption of FAS 87, demographic and financial assumptions) are influenced, inter alia, by taxation motives and by liquidity and debt constraints (Ghicas, 1990; Ali and Kumar, 1994; Godwin et al., 1996; Asthana, 1999). However, differences in national taxation and funding regulations may result in different incentives for pension-related earnings management. For instance, while underfunding in the US under certain conditions obliges companies to increase pension contribution over subsequent years, this is not the case if funding is not mandatory. Hence, short-term liquidity constraints are unlikely to be a determinant of German or French companies' pension accounting behaviour.

Findings from the study by Franzoni and Marín (2006) indicate that investors may not fully understand the consequences of pension underfunding for future earnings and cash flows of US companies and that, therefore, prices of strongly underfunded US companies are systematically biased.

⁵⁰ The same caveat applied to Table 1 also applies here: National pension systems are complex, and any attempt to compare them in a table is bound to lead to a loss of detail and precision. In particular, the data on the distribution of retiree income must be treated cautiously. It is compiled from various sources that are based on different methods and time periods. It can, therefore, only provide a general sense of the relative importance of public pensions, occupational pensions, and retiree income from private savings, in the respective countries.

⁵¹ According to IAS 19, para. 7, all pension plans that do not meet the strict definition of a defined contribution plan are defined benefit plans (also see para. 24–27, in particular, para. 26(b), on guaranteed minimum returns on contributions). In its recent pension accounting discussion paper, the IASB admits that this simple distinction is not adequate. The IASB considers developing a new set of definitions and new rules for the recognition and valuation for defined contribution pension promises which, broadly speaking, will be based on the fair-value principle. For details, see IASB, 2008a, in particular ch. 7.

⁵² It should be pointed out that the average funding ratios shown in Table 2 are based on data for large, multinational corporations. These companies often operate pension plans not only in their respective home countries but in many countries around the world. Therefore, it is likely that the average funding ratios displayed actually downplay existing cross-country differences.

The same study reveals that strongly underfunded US companies tend to be small underperforming companies with high book-to-market ratios. As with the funding-related results from earnings management studies, these findings may be specific to a regulatory environment with mandatory funding of pension plans, i.e. they may not hold in countries where funding is not mandatory and where underfunding, therefore, has no immediate cash flow consequences.

Finally, institutional differences, e.g. differences in pension taxation, guarantee schemes, and funding regulation, may also influence the association between pension accounting measures and securities prices. As has been discussed above, the failure of most previous pension value-relevance studies to take tax benefits into consideration is likely to have led to measurement error and, possibly, to biased results. This problem would be exacerbated in an international context where tax benefits associated with pensions can be very heterogeneous. The same holds for pension guarantee schemes that cause non-linearities in the relation between pension liabilities and company value.

Finally, the pronounced differences in funding levels may also influence the results of value- (or credit-) relevance studies. The US-based study by Coronado and Sharpe (2003) indicates that investors put more emphasis on the income effects of US companies' pension schemes than on pension assets and pension liabilities (see also Coronado et al., 2008). Coronado and Sharpe believe their finding points to irrational earnings fixation of investors who are fooled by smoothed and, hence, seemingly persistent pension-induced earnings components. As noted, in some Continental European countries defined benefit pension plans tend to be strongly underfunded. Hence, most companies in these countries do not report positive pension income. Furthermore, when funding levels are low, companies have much less leeway to smooth, or otherwise influence, pension income through expected returns on plan assets. Moreover, one would expect that investors are concerned about the financial risk the often very substantial net pension liabilities pose for companies' long-term stability. For these reasons, it appears reasonable to expect that in countries with low funding levels balance sheet pension information plays a more important role in the valuation of companies than pension income information. The above-mentioned study by Fasshauer and Glaum (2008) provides support for this line of arguments. However, further research is required to investigate in more depth the value-relevance of pension accounting information in low-funding countries or, more generally, in different institutional environments.

6. Summary and opportunities for further research

This paper provides a review of empirical research on pension accounting. A number of empirical studies investigate the value-relevance of pension accounting information. Taken together, the results from this line of research indicate that reported pension accounting information is reflected in both share prices and in bond ratings and bond spreads, suggesting that it is informative to equity and debt investors. Results on the relative merits of fair-value pension measures and smoothed pension measures are not fully conclusive. However, there are indications that fair-value measures of pension assets and liabilities within the balance sheet may be more informative to investors than measures that are smoothed with the 'corridor approach' that was previously allowed under FAS 87 and still is allowed under IAS 19. This supports recent changes in US GAAP, and similar plans of the IASB, which have made full recognition of companies' pension obligations in the balance sheet mandatory.

With regard to the income statement, studies indicate that recurring pension cost components – service costs, interest costs, returns on plan assets – are systematically associated with stock market valuations, whereas the much more volatile fair-value changes of pension assets and liabilities are not. This highlights that further changes of US GAAP or IFRS pension accounting standards that concern the presentation of actuarial gains and losses need to be coordinated with the FASB's and IASB's project on financial statement presentation. In order to be decision-useful, it is important that persistent and transitory components of pension costs are reported separately in the statement of income from transitory components.

A second focal point of the empirical pension accounting research are studies on managerial discretion and earnings management. Managers have scope for discretion, in particular, when setting actuarial assumptions. Findings from research suggest that managers exercise this discretion in opportunistic ways. Managerial choices regarding pension accounting appear to be influenced by financing constraints, tax benefits, companies' efforts to smooth earnings, political and regulatory costs, as well as managerial self-interest.

Results from further studies suggest that stock markets are not fully efficient with regard to pension accounting information. Analysts and investors seem to have difficulties processing the relatively complex information about changes in US companies' pension positions, in particular information that is not recognised but only disclosed in the notes to financial statements. Finally, empirical studies on the effects of managerial discretion on the value-relevance of pension accounting ar-

rive at partly conflicting and inconclusive results.

This review is an attempt to aggregate and critically evaluate what we can learn from extant empirical research on pension accounting. Looking ahead, what are the issues and questions that future research should focus on? I believe the question whether fair-value measures or smoothed, longer-term actuarial measures are more decision-useful to investors and other users of financial statements will continue to be of central importance to the field of pension accounting. As mentioned, results of previous studies on this point are not fully consistent and further research is required. Furthermore, given that full recognition of companies' pension obligations in the balance sheet has become mandatory under US GAAP, and will likely become mandatory under IFRS, it would be interesting to develop research strategies, for instance, based on experiments, that would allow to assess the decision-usefulness of alternative forms of presentation of valuation changes in comprehensive income.

Further opportunities for research in pension accounting follow from the fact that extant research is almost exclusively based on US data. As I have shown in the preceding section, it is not a given that US-based research can be generalised to other institutional environments. Hence, it would be interesting to analyse which effects national or regional differences in, for instance, pension regulation, taxation and funding, have on the production of pension accounting information by preparers, and on the processing of this information by analysts, investors and other users. As discussed above, it is likely that such differences lead to different incentives, and different limitations, for earnings management, and they may also influence the value-relevance of pension accounting information in different countries or regions of the world.

As for other areas of accounting, the transition of thousands of companies from their respective local accounting standards to IFRS in Europe, and in other countries across the world, opens up opportunities for empirical research on pension accounting. For instance, it would be interesting to look into the ways companies exercise options when adopting IFRS and implementing IAS 19 for the first time (also see IFRS 1, para. 20). It would also be of interest to compare the value-relevance of pension accounting amounts previously reported

under national GAAP with those reported under IFRS, or the incremental value-relevance of pension-related transition amounts (Horton and Serafeim, 2008).⁵³

Finally, one can observe that previous studies on pension accounting, at least studies published in high-level academic journals, have applied only a limited range of methods. I believe it would be very valuable for research to gain a deeper understanding of how decisions on recognition, valuation and disclosure with respect to corporate pensions are actually taken in reality, i.e., how company management, pension fund managers and trustees, actuaries, and auditors interact, when and where possible conflicts arise, and how much scope managers actually have to pursue possible earnings management goals. By the same token, it would be interesting to understand better how pension accounting information is processed in reality by analysts, investors, and other interested parties. Value-relevance studies and other studies based on archival data can only provide indirect answers to these questions. Thus, it would be interesting and helpful to complement these currently dominant forms of research with other methods, such as survey studies, clinical studies, or experiments.

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⁵³ Horton and Serafeim (2008) investigate the market reaction to, and the value-relevance of, information contained in UK companies' IFRS 1 transitional documents, i.e. the reconciliation between companies' UK GAAP accounts to IFRS. They also analyse the value-relevance of reconciliation components. Regarding pension accounting, their findings are not fully conclusive, i.e. they depend on model specifications. This may be because transition effects depend on which standard companies had previously reported under (SSAP 24 or FRS 17) and whether or not they had adopted the corridor option.

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