



Accounting and Business Research

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rabr20>

Is fair value accounting information relevant and reliable? Evidence from capital market research

Wayne R. Landsman ^a

^a Kenan-Flagler Business School, University of North Carolina, USA E-mail:
Published online: 28 Feb 2012.

To cite this article: Wayne R. Landsman (2007) Is fair value accounting information relevant and reliable? Evidence from capital market research, *Accounting and Business Research*, 37:sup1, 19-30, DOI: [10.1080/00014788.2007.9730081](https://doi.org/10.1080/00014788.2007.9730081)

To link to this article: <http://dx.doi.org/10.1080/00014788.2007.9730081>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

Is fair value accounting information relevant and reliable? Evidence from capital market research

Wayne R. Landsman*

Abstract—In financial reporting, US and international accounting standard-setters have issued several disclosure and measurement and recognition standards for financial instruments. The purpose of this paper is to review the extant capital market literature that examines the usefulness of fair value accounting information to investors. In conducting my review, I highlight findings that are of interest not just to academic researchers, but also to practitioners and standard setters as they assess how current fair value standards require modification, and issues future standards need to address. Taken together, evidence from the research suggests that disclosed and recognised fair values are informative to investors, but that the level of informativeness is affected by the amount of measurement error and source of the estimates – management or external appraisers. I also provide a discussion of implementation issues of determining asset and liability fair values.

1. Introduction

Accounting standards setters in many jurisdictions around the world, including the United States, the United Kingdom, Australia, and the European Union, have issued standards requiring recognition of balance sheet amounts at fair value, and changes in their fair values in income. For example, in the US, the Financial Accounting Standards Board (FASB) requires recognition of some investment securities and derivatives at fair value. In addition, as their accounting rules have evolved, many other balance sheet amounts have been made subject to partial application of fair value rules that depend on various ad hoc circumstances, including impairment (e.g., goodwill and loans) and whether a derivative is used to hedge changes in fair value (e.g., inventories, loans, and fixed lease payments). The FASB and the International Accounting Standards Board (IASB) are working jointly on projects examining the feasibility of mandating recognition of essentially all financial assets and liabilities at fair value in the financial statements.

In the US, fair value recognition of financial assets and liabilities appears to enjoy the support of the Securities and Exchange Commission (SEC). In a recent report prepared for a Congressional committee (SEC, 2005), the Office of the Chief Accountant of the SEC states two primary benefits of requiring fair value accounting for financial

instruments. First, it would mitigate the use of accounting-motivated transaction structures designed to exploit opportunities for earnings management created by the current ‘mixed-attribute’ – part historical cost, part fair values – accounting model. For example, it would eliminate the incentive to use asset securitisation as a means to recognise gains on sale of receivables or loans. Second, fair value accounting for all financial instruments would reduce the complexity of financial reporting arising from the mixed attributed model. For example, with all financial instruments measured at fair value, the hedge accounting model employed by the FASB’s derivatives standard would be all but eliminated, making it unnecessary for investors to study the choices made by management to determine what basis of accounting is used for particular instruments, as well as the need for management to keep extensive records of hedging relationships.

But, as noted in the SEC report, there are costs as well associated with the application of fair value accounting. One key issue is whether fair values of financial statement items can be measured reliably, especially for those financial instruments for which active markets do not readily exist (e.g., specialised receivables or privately placed loans). Both the FASB and IASB state in their Concepts statements that they consider the cost/benefit tradeoff between relevance and reliability when assessing how best to measure specific accounting amounts, and whether measurement is sufficiently reliable for financial statement recognition. A cost to investors of fair value measurement is that some or even many recognised financial instruments might not be measured with sufficient precision to

*The author is KPMG Professor of Accounting at Kenan-Flagler Business School, University of North Carolina, USA. E-mail: Wayne_Landsman@unc.edu

He thanks Mary Barth, Stephen Lin, Richard Macve, Ken Peasnell, Brian Singleton-Green, Steve Stubben, Pauline Weetman (editor), Shu Yeh, and an anonymous reviewer for helpful comments and suggestions.

help them assess adequately the firm's financial position and earnings potential. This reliability cost is compounded by the problem that in the absence of active markets for a particular financial instrument, management must estimate its fair value, which can be subject to discretion or manipulation.

The purpose of this paper is to review the extant capital market literature that examines the usefulness of fair value accounting information to investors. In conducting my review, I highlight findings that are of interest not just to academic researchers, but also to practitioners and standard-setters as they assess how current fair value standards require modification, and issues future standards need to address. Taken together, evidence from the research suggests that disclosed and recognised fair values are informative to investors, but that the level of informativeness is affected by the amount of measurement error and source of the estimates – management or external appraisers. I also provide a discussion of implementation issues of determining asset and liability fair values. In doing so, I also look to evidence from the academic literature.

As a prelude to my literature review, I begin by discussing the definition of fair value used in standard setting, and reviewing the accounting standards issued by the FASB and IASB that relate to fair value accounting and have been the subject of study by academic research.

2. Background of fair value accounting in standard setting

2.1. Definition of fair value

The FASB defines 'fair value' as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date' (FASB, 2006a).¹ As the FASB notes, 'The objective of a fair value measurement is to determine the price that would be received to sell the asset or paid to transfer the liability at the measurement date (an exit price).' Implicit in this objective is the notion that fair value is well defined so that an

asset or liability's exchange price fully captures its value. However, in practice, fair value may not be well defined. This occurs when no active market exists for the asset or liability. In this situation, it becomes difficult to disentangle an asset or liability's fair value from its value-in-use to the entity. For example, the estimate of fair value of a non-market traded swap derivative to a bank is likely to depend on the existing assets and liabilities on the bank's balance sheet. I will return to the implications of this problem when discussing fair value estimate implementation issues below.

2.2. Applications to standard setting

In the US, the FASB has issued several standards that mandate disclosure or recognition of accounting amounts using fair values. Among the most significant are those standards that explicitly relate to financial instruments. Two important disclosure standards are Statement of Financial Accounting Standards (SFAS) No. 107, *Disclosures about Fair Value of Financial Instruments* (FASB, 1991) and SFAS No. 119, *Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments* (FASB, 1994). SFAS No. 107 requires disclosure of fair value estimates of all recognised assets and liabilities, and as such, was the first standard that provided financial statement disclosures of estimates of the primary balance sheet accounts, including securities, loans, deposits, and long-term debt. In addition, it was the first standard to provide a definition of fair value reflecting the FASB's objective of obtaining quoted market prices wherever possible. SFAS No. 119 requires disclosure of fair value estimates of derivative financial instruments, including futures, forward, swap, and option contracts. It also requires disclosure of estimates of holding gains and losses for instruments that are held for trading purposes.

Among the most significant fair value recognition standards the FASB has issued are SFAS No. 115, *Accounting for Certain Investments in Debt and Equity Securities* (FASB, 1993), SFAS No. 123 (Revised), *Share-based Payments* (FASB, 2004), and SFAS No. 133, *Accounting for Derivative Instruments and Hedging Activities* (FASB, 1998). SFAS No. 115 requires recognition at fair value of investments in equity and debt securities classified as held for trading or available-for-sale. Fair value changes for the former appear in income, and fair value changes for the latter are included as a component of accumulated other comprehensive income, i.e., are excluded from income. Those debt securities classified as held to maturity are recognised at amortised cost. SFAS No. 123 (Revised) requires the cost of employee stock options grants be recognised in income using grant date fair value by amortising the cost during the employee vesting or service period.² This

¹ The IASB recently issued a discussion paper, *Fair Value Measurements Part 1: Invitation to Comment* (IASB, 2006), that explicitly asks the question of whether the FASB's focus on exit value for fair value measurement is appropriate and under what circumstances exit value or other approaches (i.e., entry value and value-in-use) are more appropriate.

² Although SFAS No. 123 (Revised) requires the cost of option grants be recognised at fair value, it is not strictly a fair value standard. First, amortisation of the cost of option grants is based on the grant date fair value – i.e., the historical cost of the grants. Second, the standard requires vesting features be reflected in the grant date fair value estimate by adjusting the number of options rather than their price. As discussed below, Landsman et al. (2006) advocate also recognising in income changes in fair value of option grants.

requirement removed election of fair value or intrinsic value cost measurement permitted under the original recognition standard, SFAS No. 123, *Accounting for Stock-based Compensation* (FASB, 1995). Until recently, most firms elected to measure the cost of employee stock options using intrinsic value. However, for such firms, SFAS No. 123 required they disclose a *pro forma* income number computed using a fair value cost for employee stock option grants, as well as key model inputs they use to estimate fair values.

SFAS No. 133 requires all freestanding derivatives be recognised at fair value. However, SFAS No. 133 retains elements of the existing hedge accounting model. In particular, fair value changes in those derivatives employed for purposes of hedging fair value risks (e.g., interest rate risk and commodity price risk) are shown as a component of income, as are the changes in fair value of the hedged balance sheet item (e.g., fixed rate loans and inventories) or firm-commitments (i.e., forward contracts). If the so-called fair value hedge is perfect, the effect on income of the hedging relationship is zero. In contrast, fair value changes in those derivatives employed for purposes of hedging cash flow risks (e.g., cash flows volatility resulting from interest rate risk and commodity price risk) are shown as a component of accumulated other comprehensive income because there is no recognised off-setting change in fair value of an implicitly hedged balance sheet item or anticipated transaction.³

Outside the US, standards issued by the IASB are accepted or required as generally accepted accounting principles (GAAP) in many countries. For example, since 2005, the EU generally requires listed companies in member states to issue financial statements prepared in accordance with IASB GAAP. IASB GAAP comprises International Accounting Standards (IAS) issued by its predecessor body, the International Accounting Standards Committee (IASC), as well as those International

Financial Reporting Standards (IFRS) that it has issued since its inception in 2001. The IASB issued two key fair value standards, both of which have been adopted by the IASB, IAS 32: *Financial Instruments: Disclosure and Presentation* (IASB, 2003a), IAS 39, *Financial Instruments: Recognition and Measurement* (IASB, 2003b). The former standard is primarily a disclosure standard, and is similar to its US GAAP counterparts, SFAS Nos. 107 and 119. IAS 39, which has been amended several times since its initial issuance, describes how particular financial assets and liabilities are measured (i.e., amortised cost or fair value), and how changes in their values are recognised in the financial statements. The scope of IAS 39 roughly encompasses accounting for investment securities and derivatives, which are covered under SFAS Nos. 115 and 133, although there are some minor differences between IAS and US GAAP.

The IASB has also issued *IFRS 2, Accounting for Share-based Payments* (IASB, 2004). *IFRS 2* is similar to SFAS No. 123 (Revised) (FASB, 2004) in requiring firms to recognise the cost of employee stock option grants using grant date fair value.⁴

As part of their efforts to harmonise US and international accounting standards, the IASB issued in November 2006 a two-part discussion paper on Fair Value Measurement (IASB, 2006). Part 1 of the discussion paper describes issues and concerns with the FASB's approach to fair value measurement; part 2 reproduces SFAS No. 157. Regarding disclosure, the IASB issued *International Financial Reporting Standard 7, Financial Instruments: Disclosures* (IASB, 2005a). *IFRS 7* requires disclosure of detailed information for recognised financial instruments, both those measured at fair value and those that are not. *IFRS 7* builds on IAS 32 by requiring disclosure of fair value amounts at the end of each accounting period (year, quarter), how the fair values are determined, and the effect on income arising from each particular class of assets or liabilities (i.e., separate disclosure of recognised and unrecognised gains and losses). In addition, *IFRS 7* mandates disclosure of qualitative information relating to financial instruments' liquidity, credit, and market risks.

Regarding recognition, in 2005 the IASB amended IAS 39 by describing conditions under which firms can elect fair value measurement for financial instruments.⁵ Under this so-called fair value option, entities can designate, at the time of acquisition or issuance, a financial asset or financial liability be measured at fair value, with value changes recognised in income. This option is available even if the financial asset or financial liability would ordinarily be measured at amortised cost, but only if fair value can be reliably measured. Once an instrument is designated as a fair

³ The FASB has issued several other standards with elements of fair value recognition or disclosure. For example, SFAS No. 87, *Employers' Accounting for Pensions* (FASB, 1985) requires footnote disclosure of the fair value of pension plan assets and the pension obligation associated with defined benefit plans. However, the standard requires balance sheet recognition of only the net of the unrecognised asset, liability, and equity amounts. The SEC report (SEC, 2005) recommends that pension assets and liabilities be recognised at fair value in the body of the financial statements. Recently, the FASB issued SFAS 158 (FASB, 2006c), partially implementing the SEC's recommendation. Evidence in Landsman (1986) and Barth (1991) is consistent with equity prices reflecting pension asset and liability fair values. See the literature review on pricing effects of financial instruments' fair values in the next section.

⁴ The comment in footnote 2 relating to SFAS No. 123 (Revised) applies also to *IFRS 2*.

⁵ IASB (2005b).

value instrument, it cannot be reclassified. A goal of the fair value option is to mitigate the effects of income volatility arising from the mixed attribute model without having to apply hedge accounting. In 2006, the FASB issued an Exposure Draft, *Proposed Statement of Financial Accounting Standards, The Fair Value Option for Financial Assets and Financial Liabilities* (FASB, 2006b), which largely mirrors the IAS 39 fair value option standard. Critics of the fair value option raise the concern that permitting two different entities to classify the same financial instrument differently will reduce cross-firm financial statement comparability.

As noted earlier, the FASB issued *Statement of Financial Accounting Standards No. 157, Fair Value Measurements* (FASB, 2006a), which provides a definition of fair value.⁶ However, SFAS 157 also establishes a framework for measuring fair value and expands disclosures about fair value measurements. The FASB recognises that active markets may not always exist for a specific asset or liability, and therefore develops a hierarchy of preferences for measurement of fair value. The preferred *Level 1* fair value estimates are those based on quoted prices for identical assets and liabilities, and are most applicable to those assets or liabilities that are actively traded (e.g., trading investment securities). *Level 2* estimates are those based on quoted market prices of similar or related assets and liabilities. *Level 3* estimates, the least preferred, are those based on company estimates, and should only be used if Level 1 or 2 estimates are not available. With its emphasis on market prices, the FASB requires that firms should base their Level 3 estimates on market prices as model inputs wherever possible (e.g., use of equity market volatility estimates when employing the Black-Scholes valuation model to estimate the fair value of employee stock options). Fair value estimates can be constructed using entity-supplied inputs (e.g., discounted cash flow estimates) if other

models employing market inputs are not available.

Critics of SFAS 157 express both conceptual and practical concerns.⁷ The key conceptual concern is that exit value may not appropriately capture the value of an asset (or liability) to a firm's shareholders even if an active market exists for the asset. This can occur if there is a significant divergence between an asset's value-in-use and its exit value. An asset's value-in-use reflects management skill as well as how the asset is used in conjunction with other assets with which it is combined to generate income. The key practical issue is that because active markets may not exist for an asset or liability, much of the time fair value will have to be measured based on Levels 2 and 3 estimates. Level 2 or 3 estimates are subjective, subject to manipulation, and potentially difficult to verify (audit).⁸

3. Are fair values useful to investors? Evidence from research

3.1. US-based research

When assessing the quality of fair value information, a natural question to ask is whether fair value information is useful to investors. For example, when it was deliberating SFAS No. 107, the FASB was concerned with policy questions relating to the relevance and reliability of disclosed amounts. Regarding relevance, the FASB was interested in whether SFAS No. 107 disclosures would be incrementally useful to financial statement users relative to items already in financial statements, including recognised book values and disclosed amounts. Regarding reliability, the FASB was concerned with whether fair values estimates, especially those relating to loans, would be too noisy to disclose.⁹

As Barth et al. (2001) note, policy-based accounting research cannot directly address these questions, but can provide evidence that helps standard-setters assess relevance and reliability questions. A common way to assess the so-called value relevance of a recognised or disclosed accounting amount is to assess its incremental association with share prices or share returns after controlling for other accounting or market information.

Much of the value relevance research assessing the relevance and reliability of fair value information focuses on banks, since banks are largely comprised of financial assets and liabilities.¹⁰ Several studies address the value relevance of banks' disclosed investment securities fair values before issuance of SFAS No. 115 mandating recognition of investment securities' fair values and effects of their changes on the balance sheet and the income statement. For a sample of US banks with data from 1971–1990, Barth (1994)

⁶ As noted above in footnote 1, the IASB has yet to settle on a definition of fair value.

⁷ See, for example, Ernst & Young (2005) and AAA FASC (2005).

⁸ Even though the goal is always, for all estimates, regardless of the level, exit value, Level 3 estimates will, almost by necessity, have a strong value-in-use flavour in that inputs may often be entity-supplied rather than those based on models employing market inputs. In addition, any adjustments that are made to model-based estimates to arrive at exit value are likely to be highly subjective.

⁹ Bank regulators are also interested in these and related questions. See footnote 12 below.

¹⁰ Note that prior to issuance of SFAS 157, 'fair value' was not clearly defined as exit value, nor was the procedure for estimating fair values in the absence of active markets clearly laid-out. Thus, studies examining the value relevance of fair value information are not necessarily based on exit value prices as defined in SFAS 157.

finds that investment securities' fair values are incrementally associated with bank share prices after controlling for investment securities' book values. When examined in an annual returns context, the study finds mixed results for whether unrecognised securities' gains and losses provide incremental explanatory power relative to other components of income. One leading candidate for the ambiguous finding for securities gains and losses is that the gains and losses estimates contain too much measurement error relative to the true underlying changes in their market values.¹¹ Using essentially the same database, Barth et al. (1995) confirm the Barth (1994) findings and lend support to the measurement error explanation by showing that fair value-based measures of net income are more volatile than historical cost-based measures, but the incremental volatility is not reflected in bank share prices.¹²

Barth et al. (1996), Eccher et al. (1996), and Nelson (1996) use similar approaches to assess the incremental value relevance of fair values of principal categories of banks assets and liabilities disclosed under SFAS No. 107 in 1992 and 1993, i.e., investment securities, loans, deposits, and long-term debt. Supporting the findings of Barth (1994) using pre-SFAS No. 107 data, all three studies find

investment securities fair values are incrementally informative relative to their book values in explaining bank share prices. However, using a more powerful research design that controls for the effects of potential omitted variables, Barth et al. (1996) also find evidence that loans' fair values are also incrementally informative relative to their book values in explaining bank share prices. Barth et al. (1996) also provide additional evidence that the fair values of loans reflect information regarding the default and interest rate risk of those loans. In addition, the study's findings suggest that investors appear to discount loans' fair value estimates made by less financially healthy banks (i.e., those banks with below sample median regulatory capital), which is consistent with investors being able to see through attempts by managers of less healthy banks to make their banks appear more healthy by exercising discretion when estimating loans fair values.

Finally, Venkatachalam (1996) examines the value relevance of banks' derivatives disclosures provided under SFAS No. 119 for a sample of banks in 1993 and 1994. Findings from the study suggest that derivatives' fair value estimates explain cross-sectional variation in bank share prices incremental to fair values of the primary on-balance accounts (i.e., cash, investments, loans, deposits, and debt).

3.2. International research

Because Australian and UK GAAP permit upward asset revaluations but, as with US GAAP, require downward revaluations in the case of asset impairments, several studies examine the dimensions of value relevance of revaluations in these countries.¹³ Most studies, including Easton et al. (1993), Barth and Clinch (1996), Barth and Clinch (1998), and Muller and Riedl (2002), focus on tangible fixed asset revaluations. These studies are potentially informative to standard-setters as they consider requiring disclosure or recognition of tangible fixed assets at fair value. Such assets, of course, are likely to fall into the Level 3 category in the fair value measurement hierarchy, and hence are likely to be subject to a greater amount of management discretion than is the case for financial assets.¹⁴

Using a sample of Australian firms with data from 1981–1990, Easton et al. (1993) estimate annual return regressions and find that asset revaluations of tangible long-lived assets have incremental explanatory power relative to earnings and change in earnings. Also using a sample of Australian firms but from a later period, 1991–1995, Barth and Clinch (1998) estimate annual stock price regressions to determine if financial, tangible, and intangible asset revaluations have incremental explanatory power relative to

¹¹ Another equally plausible explanation is that investment securities' fair value gains and losses are naturally hedged by fair value changes of other balance sheet amounts, which are not included in the estimating equations. Ahmed and Takeda (1995), who include other on-balance sheet net assets in the estimating equations, provide support for this explanation by providing evidence of incremental explanatory power for unrecognised securities gains and losses in explaining banks' stock returns.

¹² Of particular interest to bank regulators, Barth et al. (1995) also find that banks violate regulatory capital requirements more frequently under fair value than historical cost accounting, and fair value regulatory capital violations help predict future historical cost regulatory capital violations, but share prices fail to reflect this increased regulatory risk.

¹³ See Black et al. (1998:1,289–1,291) for a brief discussion of accounting standards applicable to asset revaluations in the UK, Australia, and New Zealand.

¹⁴ In response to concerns about the effects of inflation on balance sheets and income statements, the FASB issued SFAS 33, *Financial Reporting and Changing Prices* (FASB, 1979), which mandated disclosure of *current cost* information for tangible assets, principally inventories and plant and equipment. The current cost data are similar to revaluation data. The general conclusion reached by studies assessing the value relevance of the current cost data is the failure to detect, relative to historical cost earnings, incremental explanatory power for stock prices or returns for any of the alternative income measures based on the current cost information (see, e.g., Beaver and Landsman, 1983; Beaver and Ryan, 1985). Reasons for the lack of incremental explanatory power include unbiased estimation error and bias arising from exercise of managerial discretion. Factors contributing to the low data quality were that the data were unaudited and subject to a 'sunset' provision, whereby the disclosure requirement would expire after five years unless the FASB made the provision permanent (it did not). See Barth et al. (2001, section 2.2) for more discussion.

operating earnings and equity book value less the book value of revalued assets. Consistent with US-based research, Barth and Clinch (1998) find revalued investments are incrementally priced. Contrary to the view that intangible asset revaluations are likely to be noisy and uninformative, the study finds a positive association between such revaluations and share prices. However, with the exception of mining firms, they fail to find a significantly positive association between share prices and property, plant and equipment revaluations. Regarding managerial discretion in determination of revaluation amounts, the study also finds little evidence indicating independent appraiser-based revaluations are more relevant than director-based estimates. This finding is of potential importance to the FASB and IASB, as it bears directly on the issue of whether Level 3 fair value estimates will lack value relevance because investors will be concerned about managerial manipulation and measurement error. In particular, the study concludes that the findings suggest that the relevance of directors' private information about asset fair values has the potential to outweigh the effects of self-interest on the estimates.

In contrast to the findings in Barth and Clinch (1998), Muller and Riedl (2002) find evidence that the market finds asset revaluations estimates made by external appraisers are more informative than those made by internal appraisers. Using a sample of UK investment property firms for the period 1990–1999, the study shows that information asymmetry as measured by the adverse-selection component of the firms' average stock price bid-ask spread in the seven months subsequent to fiscal year-end is greater for firms employing internal appraisers. Muller and Riedl (2002) interpret this as evidence that the market finds asset revaluation estimates based on external appraisals to be more reliable. One potential explanation for the difference in findings between the two studies is that the Muller and Riedl (2002) research design is more powerful than the Barth and Clinch (1998) research design. However, this conclusion must be made with caution because the Muller and Riedl (2002) sample of firms is limited to a specialised industry, investment property firms, where external appraisals are an institutional feature. Moreover, the Muller and Riedl (2002) findings do

not suggest that the market finds asset revaluations made by internal appraisers to be uninformative.

Cotter and Richardson (2002) also find that external appraisals are more reliable than those made by directors for a sample of Australian firms from 1981–1994. Their measure of reliability is the amount of subsequent years' reversals of upward asset revaluations. However, Cotter and Richardson (2002) also find that independent appraisers are more likely to be used for revaluations of land and buildings and directors are more likely for investments, plant and equipment and identifiable intangibles. The authors interpret this as evidence of firms relying on directors' superior knowledge of asset values for assets that are more specialised and difficult for outside appraisers to value.

Aboody et al. (1999) examine the performance prediction and pricing implications of fixed asset revaluations for a sample of UK firms from 1983–1995. The study finds that upward revaluations are significantly positively related to changes in future performance, measured by operating income and cash from operations. Regarding pricing, using annual regressions similar to those employed in Easton et al. (1993) and Barth and Clinch (1998), the study finds that current year revaluations are significantly positively related to annual stock returns, and current year asset revaluation balances are significantly positively related to annual stock prices. However, regarding the effects of managerial incentives to manipulate asset revaluation amounts, the study also finds that relations between revaluations and future performance and prices are weaker for higher debt-to-equity ratio firms. That is, managerial manipulation affects the usefulness of asset revaluations made by managers of firms facing the pressures of financial distress.¹⁵

One reason accounting standard setters state in support of fair value measurement is that it mitigates incentives for firms to time asset sales to manage earnings. If gains and losses are recognised in income when assets are revalued and gains on sale are based on fair value rather than historical cost, then the incentive to time asset sales for earnings management purposes evaporates. Black et al. (1998) find evidence in support of this reasoning. In particular, for a sample of UK, Australian, and New Zealand firms in 1985–1995, the study finds no difference in earnings management behaviour for asset revaluing and non-asset revaluing firms. The finding does not hold for UK firms in the pre-1993 period when asset-revaluing firms were permitted to include in income gains and losses based on historical cost, which is further evidence that mandating fair value measurement for gain/loss recognition for firms that elect to use fair value measurement reduces the practice

¹⁵ In the discussion of Aboody et al. (1999), Sloan (1999) states that the study's findings are inconclusive because of the potential confounding effects of other variables unrelated to, but correlated with asset revaluations. Aboody et al. (1999) do include several controls for such omitted variables, although it is never possible to determine whether important controls are absent. This criticism applies, of course, not just to Aboody et al. (1999) but also to all similar pricing studies.

of timing asset sales for income management purposes.^{16,17}

One interesting study of Danish banks, Bernard et al. (1995), focuses on the impact of fair value accounting on bank regulatory capital as opposed to the value relevance of fair values for investors. Denmark is an interesting research setting because Danish bank regulators have used mark-to-market accounting to measure regulatory capital for a long period of time. Bernard et al. (1995) find that although there is evidence of earnings management, there is no reliable evidence that 'mark-to-market' numbers are managed to avoid regulatory capital constraints.¹⁸ In addition, when compared to US banks, Danish banks' mark-to-market net equity book values are more reliable estimates of their equity market values, thereby providing indirect evidence that fair value accounting could be beneficial to US investors and depositors.¹⁹

3.3. US-based stock option research

As noted above, estimates of employee stock options fair values have been required to be disclosed for several years under SFAS No. 123. Several studies examine the value relevance of such disclosures, including Bell et al. (2002), Aboody et al. (2004), and Landsman et al. (2006). Findings in Bell et al. (2002) differ somewhat from those in Aboody et al. (2004), although both studies provide evidence that employee option expense is value relevant to investors. Landsman et al. (2006)

provide theoretical and empirical support for measuring the fair value of employee stock option grants beyond grant date, with changes in fair value recognised in income along with amortisation of grant date fair value.

Because quoted prices for employee stock options typically are not available because of non-tradability provisions, the fair value estimates are based on models that rely on inputs selected by reporting firms. Aboody et al. (2006) find evidence that firms select model inputs so as to manage the pro forma income number disclosed in the employee stock option footnote. This finding is potentially relevant to accounting standard-setters as well as bank regulators in that it is additional evidence that managers facing incentives to manage earnings are likely to do so when fair values must be estimated using entity-supplied estimates of values or model inputs if quoted prices for assets or liabilities are not readily available.²⁰ If managers have the incentive to use discretion when estimating fair values of on- and off-balance sheet asset and liability amounts when such values are not recognised in the financial statements, it is reasonable to assume the incentive will only increase if fair value accounting is used for recognition of amounts on the balance sheet and in the income statement.

4. Fair value implementation issues

Estimating fair value, i.e., exit value, for assets and liabilities is relatively easy if they are actively traded in liquid markets. The problem becomes more complicated if active markets do not exist, which is why the FASB offers Level 2 and Level 3 estimation categories in SFAS 157. Although absence of active markets is an obvious problem for non-financial assets, the problem is no less obvious for financial instruments, particularly if the financial instrument is a compound instrument comprising several embedded option-like features, values for which depend on inter-related default and price risk characteristics.

In this section, I discuss issues relating to implementation of fair value estimates when market prices for particular financial instruments are not readily available by focusing on findings from two related studies by Barth et al. (1998, 2000) on the use of binomial option pricing models to estimate fair values for corporate debt and its components. The issues I discuss should provide some insights to the FASB and IASB regarding the relevance and reliability of Level 3 fair value estimates.

4.1. Binomial option pricing of corporate debt

Barth et al. (1998) uses a binomial option pricing model to estimate the fair values of corporate debt and its components, i.e., conversion, call, put, and sinking fund features, to provide evidence on

¹⁶ In another study using the same sample of firms as that used in Muller and Riedl (2002), Dietrich et al. (2001) find that UK investment property firms in the pre-1993 period appear to select the valuation approach – historical cost or fair value – that results in smoother earnings. Because post-1993 UK firms were required to disclose income from property sales separately on the income statement, the authors interpret this as evidence that changes in disclosure requirements altered manager's use of property sales to smooth earnings. Dietrich et al. (2001) also find evidence that property appraisal estimates of fair value better reflect asset selling prices than historical costs, and interpret this as evidence consistent with greater reliability of fair value estimates, at least with respect to assets that are ultimately disposed.

¹⁷ See Lin and Peasnell (2000) for a discussion of managerial strategic considerations in the timing asset revaluations. The study provides evidence that firms appear to time asset revaluations to offset the effects of so-called equity depletion arising from immediate write-off of goodwill.

¹⁸ The ability to mark-to-market an asset suggests the existence of a reasonably liquid market for the asset. From this perspective, mark-to-market values can be viewed as approximating Level 1 or Level 2 fair value estimates.

¹⁹ Bernard et al. (1995) caution that drawing inferences from the Danish experience with fair value accounting for banks regarding the benefits of requiring fair value accounting for US banks is subject to many caveats. These include differences in the relative size of the US and Danish banking sectors, as well as relative differences in US and Danish banking regulatory systems.

²⁰ See also the discussion above of the Barth et al. (1996) findings relating to loans fair values estimates by banks with lower regulatory capital.

the relevance and reliability of estimated fair values. A companion study, Barth et al. (2000), describes details of how the binomial model is implemented. The 1998 empirical study is based on data from 1990 for a sample of 120 publicly traded US firms that have corporate debt with multiple embedded option features. The binomial model the study implements is based on the models of Cox et al. (1979) and Rendleman and Barter (1979), and considers directly only default risk, but includes information in the interest rate yield curve.

Findings from Barth et al. (1998) reveal component value estimates are relevant in that they represent large fractions of estimated total bond fair value. In addition, implementing a fundamental components approach in which call options are classified as assets, conversion options as equity, and put options as debt, indicates there are material changes to recognised balance sheet accounts and debt-to-equity ratios for sample firms.²¹ The study also finds that estimates of component fair values depend on whether a bond has multiple features. For example, the value of the conversion feature for a convertible, callable bond depends on the value of the call feature and vice versa. In addition, because components' values are interdependent, the order in which components are considered when estimating each bond's total fair value can materially affect each component's estimated fair value. This issue is particularly important if a fundamental components approach is used for separate recognition of bond components as assets, liabilities, and equity.

²¹ See FASB (1990, 2000) for a description of the fundamental components approach to accounting for complex financial instruments. In addition to the FASB, several other standard-setters have considered or require separating compound financial instruments into components, including the CICA (Section 3860 of the *CICA Handbook*, 'Financial Instruments – Disclosure and Presentation') and the AASB (AASB Accounting Standard 1033, *Presentation and Disclosure of Financial Instruments*). Under the revised version of IAS 32 (IASB, 2003a), firms that issue compound financial instruments with debt and equity components must account for, and present separately, the components according to their substance based on the definitions of liability and equity.

²² Relatedly, as noted above, Cotter and Richardson (2002) also suggest managers have superior information about non-investment property values and therefore rely on director estimates of fair value rather than appraisals for these assets. However, this does not preclude requiring managers to disclose assumptions they make as inputs to the valuation process.

²³ This is not to suggest that informational asymmetry is peculiar to fair value estimation by managers. Informational asymmetry arises in accounting whenever managers have discretion regarding the timing or amount of non-market adjustments to amounts arising from past transactions, e.g., allowances bad debt, allowances for loan losses, and impairment charges.

However, additional evidence in Barth et al. (1998) suggests model estimates of total bond value may lack reliability. In particular, when the authors re-estimate bond fair values excluding from the sample those bonds with available market prices (such bonds comprise approximately half of sample bonds), estimated bond values for those bonds that are not publicly traded differ significantly from value estimates when all bonds are included in the estimation procedure. This finding suggests that financial instruments' fair value estimates are sensitive to whether actual market price information from other instruments an entity has on its balance sheet is available for use as model inputs.

Barth et al. (1998) reach several conclusions regarding limitations to implementation of binomial option pricing models for estimating bond fair values that generalise to all financial instruments issued or held by an entity. First, the authors had to make several educated guesses for values of model inputs (e.g., conversion schedules and equity volatility). In principle, managers of the reporting entities likely have access to better information than financial statement users (including academic researchers), and the authors suggest that fair value estimates could improve if firms were required to disclose them.²² Second, models quickly become too complex and difficult to implement if they are to incorporate all of the dimensions of risk and value that can affect an instrument's fair value. For example, presently, few models consider both interest rate and default risk. In addition, financial instruments' fair values are interdependent. For example, the fair value of one debt instrument issued by an entity is dependent upon actions that holders of another debt instrument issued by that entity can take. The model Barth et al. (1998) implement considers some sources of bond value interdependence (e.g., debt priority) but basically ignores the issue because of its complexity. The issue of financial instruments' value interdependence is another illustration of the issue raised by Barth and Landsman (1995) that a financial instrument's fair value – i.e., its exit value – may not adequately capture the value of the instrument to the entity that owns it. When an asset's value-in-use departs significantly from its exit value because of value interdependence, fair value will be less informative to investors who are using the information to value the entity's equity.

4.2. Manipulation of model inputs

Having to rely on managers' estimates of asset and liability fair values introduces the general problem of informational asymmetry.²³ That is, in the case of Level 3 fair value estimates, managers have private information regarding appropriate values to select for model inputs as well the true

underlying economic value of an asset (or liability) to the firm.²⁴ Informational asymmetry creates two somewhat different problems, adverse selection and moral hazard.

An important implication of adverse selection is that the market will tend to value apparently similar, but different, assets held by two firms similarly when assessing their fair values and the values of the firms' equities. Thus, for example, in the absence of credible and verifiable information, two property investment firms that are otherwise equivalent except one has a higher quality portfolio of investments than the other will have their stocks valued similarly by the securities market. How can the firm with the higher quality portfolio of investments signal its fair value estimates are a more reliable indicator of economic value? One solution is for the firm to sell a portion of its portfolio to establish that the selling price is close to the fair value estimate of the property sold. Another solution is to permit the firm to disclose its valuation assumptions, the quality of which can be verified by others. For example, the firm can select a high cost external appraiser to value its properties. Both of these solutions illustrate the same point: for the signal to be credible, it must be costly, but less costly for the property investment firm with the higher quality investment portfolio. The investment firm with the lower quality portfolio could mimic the actions of the higher quality firm, but doing so would be more costly as the market would learn its portfolio of investments was of lower quality.²⁵

The problem of moral hazard is that managers will tend to use their private information to their personal advantage by manipulating the information that they disclose to the securities markets and regulators. For example, under a fair value measurement regime, managers have the incentive to value assets upward to increase income and their bonus-based compensation, and to time any impairments or upward revaluation reversals to minimise the effect on their compensation, e.g., in a period when the firm's income is otherwise depressed and the manager will not get any bonus re-

gardless. This is the so-called 'big bath' problem.

As noted above, the findings in Aboody et al. (2006), which indicate that managers select model parameters to manage estimates of disclosed employee stock option fair values, raise the broader question of whether managers will behave similarly when selecting model parameters for fair value estimates of other financial instruments, including those whose values are recognised in the body of the financial statements. The Barth et al. (1998) conclusion that managers can provide better estimates of bond fair values because they have access to private information, presumes implicitly that managers apply their private information in a neutral fashion – i.e., they do not succumb to the temptation to manipulate bond fair value estimates for private gain.

If fair value accounting for financial instruments or non-financial assets is generally applied for financial statement recognition, accounting standard-setters and securities regulators face the challenge of determining how much latitude to give managers when they estimate fair values, balancing the benefit of permitting managers to reveal private information, thereby mitigating the adverse selection problem, and the moral hazard cost of their exercising discretion to manipulate earnings and balance sheet ratios that affect contracting relationships with lenders and, in the case of financial institutions, financial statement-based regulatory capital used by bank regulators interested in stability of the banking system.

Although the securities market tends to act as a disciplinary force to keep firms and its managers honest, it does so with a lag. One solution advanced here to the problem of balancing the adverse selection and moral hazard problems is to require extensive disclosure of the underlying assumptions used when estimating fair values, whether the fair value estimates be Level 1, 2, or 3. For example, in the case of Level 2 estimates, investors should be provided with sufficient information to determine which assets or liabilities are used as a basis for comparison. In the case of Level 3 estimates, investors should have access to all relevant model inputs. The FASB appears to require ample disclosure in SFAS 157. For example, regarding Level 3 estimates the FASB (FASB, 2006a, p. 12, para. 32) requires that 'the reporting entity shall disclose information that enables users of its financial statements to assess the inputs used to develop those measurements and for recurring fair value measurements using significant unobservable inputs (Level 3).' Whether investors find SFAS 157 disclosures to be useful in assessing the relevance and reliability of the firms' fair value estimates is an empirical matter that will undoubtedly be the subject of much future study by accounting researchers.

²⁴ Managers also have private information regarding appropriate Level 1 or Level 2 fair value estimates (see discussion of Cotter and Richardson, 2002, in footnote 22).

²⁵ One can view the election of fair value or historical cost (with impairment) measurement that was permitted under UK GAAP as an opportunity for higher quality firms to signal their quality through the selection of fair value. For example, suppose both a high quality and low quality property investment firm selected fair value measurement and revalued their assets by the same amount. The firm with the lower quality property investment portfolio would be more likely to reverse the revaluation in future years, which would hurt the firm's credibility with the financial markets, thereby reducing its incentive to revalue its assets, and possibly avoid election of fair value measurement.

4.3. Fair values measurement error

One problem that remains even in the absence of managerial manipulation of fair value estimates is that fair value estimates of assets and liabilities are likely to contain measurement error. If the findings in Barth et al. (1995) relating to banks' investment securities generalises to other bank assets and liabilities, implementation of a full fair value model for recognition of financial instruments at fair value could yield unrecognised gains/losses that could cause earnings (and, in the case of banks, regulatory capital) to be more volatile than earnings based on the current historical cost model. This would be expected to occur particularly if measurement error in assets' fair values – which is likely to be positively correlated across assets – is not fully offset by measurement error in bank liabilities' fair values.

Of course, not all earnings volatility arising from the application of fair value accounting is the result of measurement error. Barth (2004) makes the observation that there are three primary sources of 'extra' volatility associated with fair value-based accounting amounts relative to those determined under historical cost. The first is true underlying economic volatility that is reflected by changes in the fair value of assets and liabilities. The second is volatility induced by measurement error in estimates of those fair value changes. The third, induced volatility arising from using a mixed-attribute model, would be less of a concern if all instruments are recognised at fair value, or if a firm elects the fair value option that is permitted under IAS 39.

Before leaving the discussion of measurement error, it is important to note that although fair value estimates of assets and liabilities likely contain measurement error relative to true economic values, so do historical cost-based book value estimates.²⁶ The key question for policy makers and academic researchers alike is whether fair value-based financial statements improve information investors receive relative to information provided by historical cost-based financial statements. The overall conclusion from the research I review is that investors do indeed benefit from having access to fair value information.

5. Concluding remarks

This paper reviews the extant capital market literature that examines the usefulness of fair value accounting information to investors. In doing so, I highlight findings that are of interest not just to academic researchers, but also to practitioners and standard-setters as they assess how current fair value standards require modification, and issues

future standards need to address. Taken together, the research findings suggest that disclosed and recognised fair values are informative to investors, but that the level of informativeness is affected by the amount of measurement error and source of the estimates – management or external appraisers. I also provide a discussion of implementation issues of determining asset and liability fair values.

Fortunately for academic accounting researchers, the IASB and FASB continue to issue standards relating to fair value measurement, disclosure, and recognition, providing ample opportunity for future research. Findings from extant studies of firms in the US, UK, and Australian capital markets suggest that investors are provided with information that is somewhat reliable and relevant. Whether relevance and reliability of asset and liability fair values improves with the new measurement and disclosure standards and with fair value recognition extended to a broader set of assets and liabilities than has been the case to date remains to be seen. In addition, because standards issued by the IASB either are or will be required to be adopted by firms in a great number of countries around the world, researchers will have an opportunity to examine how the relevance and reliability of disclosed and recognised fair value amounts vary across the many countries, where depth of markets for assets and liabilities and other institutional features that can affect fair value estimates are likely to differ.

References

- Aboody, D., Barth, M.E. and Kasznik, R. (1999). 'Revaluations of fixed assets and future firm performance'. *Journal of Accounting and Economics*, 26:149–178.
- Aboody, D., Barth, M.E. and Kasznik, R. (2004). 'SFAS No. 123 Stock-based employee compensation and equity market values'. *The Accounting Review*, 79:251–275.
- Aboody, D., Barth, M.E. and Kasznik, R. (2006). 'Do firms understate stock-based compensation expense disclosed under SFAS 123?' *Review of Accounting Studies*, 11:429–461.
- Ahmed, A.S., and Takeda, C. (1995). 'Stock market valuation of gains and losses on commercial banks' investment securities: an empirical analysis.' *Journal of Accounting and Economics*, 20:207–225.
- AAA FASC. (2005). American Accounting Association Financial Accounting Standards Committee, 'Response to the FASB's Exposure Draft on Fair Value Measurements'. *Accounting Horizons*, 19:187–196.
- Barth, M.E. (1991). 'Relative measurement errors among alternative pension asset and liability measures'. *The Accounting Review*, 66:433–463.
- Barth, M.E. (1994). 'Fair value accounting: evidence from investment securities and the market valuation of banks'. *The Accounting Review*, 69:1–25.
- Barth, M.E. (2004). 'Fair values and financial statement volatility', in *The Market Discipline Across Countries and Industries*. Borio, C., Hunter, W.C., Kaufman, G.G. and Tsatsaronis, K. (eds.) Cambridge, MA: MIT Press.
- Barth, M.E., Beaver, W.H. and Landsman, W.R. (1996). 'Value-relevance of banks' fair value disclosures under

²⁶ As noted above (footnote 23), historical cost-based estimates are also subject to managerial discretion.

- SFAS 107'. *The Accounting Review*, 71:513–537.
- Barth, M.E., Beaver, W.H. and Landsman, W.R. (2001). 'The relevance of the value relevance literature for accounting standard-setting: another view'. *Journal of Accounting and Economics*, 31:77–104.
- Barth, M.E. and Clinch, G. (1996). 'International differences in accounting standards: evidence from UK, Australian, and Canadian firms.' *Contemporary Accounting Research*, (Spring):135–170.
- Barth, M.E. and Clinch, G. (1998). 'Revalued financial, tangible, and intangible assets: associations with share prices and non market-based value estimates'. *Journal of Accounting Research*, 36:199–233.
- Barth, M.E. and Landsman, W.R. (1995). 'Fundamental issues related to using fair value accounting for financial reporting'. *Accounting Horizons*, 9:97–107.
- Barth, M.E., Landsman, W.R. and Rendleman, R.J.Jr. (1998). 'Option pricing-based bond value estimates and a fundamental components approach to account for corporate debt.' *The Accounting Review*, 73:73–102.
- Barth, M.E., Landsman, W.R. and Rendleman, R.J.Jr., 2000. 'Implementation of an option pricing-based bond valuation model for corporate debt and its components'. *Accounting Horizons*, 14:455–479.
- Barth, M.E., Landsman, W.R. and Wahlen, J. (1995). 'Fair value accounting: effects on banks' earnings volatility, regulatory capital, and value of contractual cash flows'. *Journal of Banking and Finance*, 19:577–605.
- Beaver, W.H. and Landsman, W.R. (1983). *Incremental Information Content of Statement 33 Disclosures*. Research Report, FASB: Stamford, CT.
- Beaver, W.H. and Ryan, S.G. (1985). 'How well do Statement No. 33 earnings explain stock returns?' *Financial Analysts Journal*, 41:66–71.
- Bell, T.B., Landsman, W.R. Miller, B.L. and Yeh, S. (2002). 'The valuation implications of employee stock option accounting for profitable computer software firms'. *The Accounting Review*, 77:971–996.
- Bernard, V.L., Merton, R.C. and Palepu, K.G. (1995). 'Mark-to-market accounting for banks and thrifts: lessons from the Danish experience'. *Journal of Accounting Research*, 33:1–32.
- Black, E.L., Sellers, K.F. and Manly, T.S. (1998). 'Earnings management using asset sales: an international study of countries allowing non-current asset revaluation'. *Journal of Business Finance and Accounting*, 25:1,287–1,317.
- Cotter, J. and Richardson, S. (2002). 'Reliability of Asset Revaluations: The Impact of Appraiser Independence.' *Review of Accounting Studies*, 7:435–457.
- Cox, J.S., Ross, A. and Rubinstein, M. (1979). 'Option pricing: a simplified approach.' *Journal of Financial Economics*, 7:51–84.
- Dietrich, J.R., Harris, M.S. and Muller, K.A. III. (2001). 'The reliability of investment property fair value estimates'. *Journal of Accounting and Economics*, 30:125–158.
- Easton, P.D., Eddy, P.H. and Harris, T.S. (1993). 'An investigation of revaluations of tangible long-lived asset'. *Journal of Accounting Research*, 31:1–38.
- Eccher, A., Ramesh, K. and Thiagarajan, S. R. (1996). 'Fair value disclosures by bank holding companies'. *Journal of Accounting and Economics*, 22:79–117.
- Ernst & Young. (2005). *How Fair is Fair Value?* IFRS Stakeholder Series, Ernst & Young, London, UK.
- FASB. (1979). *Statement of Financial Accounting Standards No. 33, Financial Reporting and Changing Prices*. Financial Accounting Standards Board: Stamford, Connecticut.
- FASB. (1985). *Statement of Financial Accounting Standards No. 87, Employers' Accounting for Pensions*. Financial Accounting Standards Board: Norwalk, Connecticut.
- FASB. (1990). *Discussion Memorandum, Distinguishing between Liability and Equity Instruments and Accounting for Instruments with Characteristics of Both*. Financial Accounting Standards Board: Norwalk, Connecticut.
- FASB. (1991). *Statement of Financial Accounting Standards No. 107, Disclosures about Fair Value of Financial Instruments*. Financial Accounting Standards Board: Norwalk, Connecticut.
- FASB. (1993). *Statement of Financial Accounting Standards No. 115, Accounting for Certain Investments in Debt and Equity Securities*. Financial Accounting Standards Board: Norwalk, Connecticut.
- FASB. (1994). *Statement of Financial Accounting Standards No. 119, Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments*. Financial Accounting Standards Board: Norwalk, Connecticut.
- FASB. (1995). *Statement of Financial Accounting Standards No. 123, Accounting for Stock-based Compensation*. Financial Accounting Standards Board: Norwalk, Connecticut.
- FASB. (1998). *Statement of Financial Accounting Standards No. 133, Accounting for Derivative Instruments and Hedging Activities*. Financial Accounting Standards Board: Norwalk, Connecticut.
- FASB. (2000). *Proposed Statement of Financial Accounting Standards, Accounting for Financial Instruments with Characteristics of Liabilities, Equity, or Both*. Financial Accounting Standards Board: Norwalk, Connecticut.
- FASB. (2004). *Statement of Financial Accounting Standards No. 123 (revised), Share-Based Payment*. Financial Accounting Standards Board: Norwalk, Connecticut.
- FASB. (2006a). *Statement of Financial Accounting Standards No. 157, Fair Value Measurements*. Financial Accounting Standards Board: Norwalk, Connecticut.
- FASB. (2006b). *Proposed Statement of Financial Accounting Standards, The Fair Value Option for Financial Assets and Financial Liabilities*. Financial Accounting Standards Board: Norwalk, Connecticut.
- FASB. (2006c). *Statement of Financial Accounting Standards No. 158, Employers' Accounting for Defined Benefit Pension and Other Postretirement Plans – an amendment of FASB Statements No. 87, 88, 106, and 132(R)*. Financial Accounting Standards Board: Norwalk, Connecticut.
- IASB. (2003a). *International Accounting Standard 32: Financial Instruments: Disclosure and Presentation*. International Accounting Standards Board: London, UK.
- IASB. (2003b). *International Accounting Standard 39: Financial Instruments: Recognition and Measurement*. International Accounting Standards Board: London, UK.
- IASB. (2004). *International Financial Reporting Standard 2, Accounting for Share-based Payment*. International Accounting Standards Board: London, UK.
- IASB. (2005a). *International Financial Reporting Standard 7 Financial Instruments: Disclosures*. International Accounting Standards Board: London, UK.
- IASB. (2005b). *International Accounting Standard 39: Financial Instruments: Recognition and Measurement – The Fair Value Option*. International Accounting Standards Board: London, UK.
- IASB. (2006). *Discussion Paper, Fair Value Measurements Part I: Invitation to Comment*. International Accounting Standards Board: London, UK.

- Landsman, W. (1986). 'An empirical investigation of pension fund property rights'. *The Accounting Review*, 61:662–691.
- Landsman, W.R., K. Peasnell, Pope, P. and Yeh S. (2006). 'Which approach to accounting for employee stock options best reflects market pricing?' *Review of Accounting Studies*, 11:203–245.
- Lin, Y.N. and Peasnell, K.V. (2000). 'Fixed asset revaluation and equity depletion in the UK'. *Journal of Business Finance and Accounting*, 27:359–394.
- Muller, K.A. III. and Riedl, E.J. (2002). 'External monitoring of property appraisal estimates and information asymmetry'. *Journal of Accounting Research*, 40:865–881.
- Nelson, K. (1996). 'Fair value accounting for commercial banks: an empirical analysis of SFAS No. 107'. *The Accounting Review*, 71:161–82.
- Rendleman, R.J. and Barter, B.J. (1979). 'Two-state option pricing.' *Journal of Finance*, 34:1,093–1,110.
- SEC. (2005). *Report and Recommendations Pursuant to Section 401(c) of the Sarbanes-Oxley Act of 2002 On Arrangements with Off-Balance Sheet Implications, Special Purpose Entities, and Transparency of Filings by Issuers*. United States Securities and Exchange Commission.
- Sloan, R.G. (1999). 'Evaluating the reliability of current value estimates'. *Journal of Accounting and Economics*, 26:193–200.
- Venkatachalam, M. (1996). 'Value-relevance of banks' derivatives disclosures'. *Journal of Accounting and Economics*, 22:327–55.