An Experiment in Fair Value Accounting: UK Investment Vehicles

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Abstract

We use the British real estate and investment fund industries as experimental settings where historic cost (HC) and fair value accounting (FVA) can be compared. Both industries have the majority of their assets marked to market and hence the difference between the two accounting systems is profound. However, as the valuation of real estate is arguably more subjective than that of investment funds, we are able to contrast fair value accounting in a near ideal setting with one where it remains important, but where valuation difficulties may permit bias. As this distinction is incorporated in the recently issued SFAS 157, which also formed the basis of the IASB's relevant discussion document, the results of our study may be particularly timely.

As expected, we find that fair value income is considerably more value relevant than historic cost income. However, in the presence of changes in FVA balance sheet values, income measures become largely irrelevant. This implies that there is no obvious advantage from adopting FVA income accounting if FVA balance sheet values are available to the user. Furthermore, FVA for our real estate sample is considerably less value relevant than for the investment companies and the evidence for this sample, if not conclusive, is consistent with earnings management. We interpret these results as confirming that fair values are highly relevant and largely unbiased where the values are unambiguous. Where valuation is ambiguous, which will normally be the case value relevance will be lower and biased accounting may be revealed.

Keywords: fair value accounting, valuation models, investment companies.

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1. Introduction

We use the British real estate and investment fund industries as experimental settings where we can contrast value relevance and biases in historic cost (HC) and fair value accounting (FVA). UK GAAP for these investment vehicles is an unusual hybrid of historic cost and mark-to-market accounting for investment assets. In addition to the reported GAAP income and balance sheet figures, we are able to estimate both fair value and historic cost accounting figures for the same set of companies. With these three different sets of accounting numbers, we test the relationship between accounting and stock market variables.

We distinguish between relevance, bias and reliability. In this paper, as in many others, relevance is proxied by the correlation between accounting variables and stock market prices. We view bias as earnings management. We test two simple versions of bias: asymmetric recognition, which as one dimension of conservatism *may* be viewed as desirable; and avoiding negative earnings, which is normally seen as problematical. The 'reliability' of fair values is not seen as a problem for investment companies. The valuation is based on prices derived from a competitive and comprehensive market incorporating the value estimates of a large number of investors who are clearly independent of the investment fund's management. This would be consistent with SFAS 157's "level 1" valuation (FASB, 2006). However, the reliability of the real estate values is contentious and potentially open to both error and manipulation. The values are based on the work of individual experts who have to estimate the marketability, or predict the cash flows and discount rates, for assets with very different characteristics. The experts are also employed, directly or indirectly, by the real estate firms and are, at least potentially, subject to the influence of the real estate firm's management. According to SFAS 157 real estate valuation could be either level 2 or 3 depending on the source of the input data[1].

Thus, we define relevance as explanatory power; bias as a predictable difference in the relationship between accounting and market values; and reliability as the precision of fair value estimates – for which we rely on the SFAS 157 distinctions.

Our study is based on two distinctive UK industries. Our data is particularly useful as two dimensions which affect the importance and practicality of fair value accounting are a) the scope for applying fair values to the assets and liabilities, and b) the reliability with which those fair values can be estimated. The investment trust companies in our sample apply fair values to some 93% of their assets, and determining the fair values is largely unequivocal as there is limited debate as to the appropriate valuation model and little scope for subjectivity. Thus, investment trusts should provide a sample that could be thought of as the corner solution where fair value accounting is likely to be pervasive and easily computed (FASB, 2006). Conversely, real estate firms, whilst still incorporating a substantial proportion of fair value assets (around 75% for our sample) arguably present more substantial valuation problems (FASB, 2006). Hence, by contrasting the results of our two samples, we can examine the impact of moving away from a corner solution, identified as the investment companies, *towards* what might be thought of as a more general scenario, as represented by real estate firms.

Previous studies have included results for the revaluation of property owned by industrial and commercial firms – which would presumably have similar valuation problems to that experienced by our real estate firms – and the impact of applying fair values to assets or liabilities of banks – where the valuation problems will be comparable with those experienced by our investment trusts. However, in neither case is the impact of fair value accounting as pervasive as for our samples, so we expect to be able to demonstrate clearer results than in previous papers. We also estimate the impact of FVA on the accounting system – income and equity – rather than simply examining the value relevance of a particular FVA disclosure, which has been the practice in most previous papers.

We view our results as being particularly pertinent at this time for two reasons:

a) The move to international accounting standards (IAS) accounting in 2005 for public firms within the EU "*will result in many more enterprises developing and reporting fair value measures.*"

(Schipper, 2005). Furthermore, the recently issued SFAS 157, Fair Value Measurement (FASB, 2006), can also be expected to encourage more pervasive and standardised fair value accounting, and this document formed the basis of the IASB's discussion document issued in November 2006 as part of their Fair Value Measurements project. The IASB noted, in its discussions in December 2005, that fair value issues are explicitly required in 17 of their current standards and 8 other standards required fair values through reference to other standards. Only 13 of their current standards do not use fair value accounting in one way or another (and one of these, IAS 37, is expected to be changed to incorporate fair value).

b) However, some academics have expressed reservations over fair value accounting following the perceived misuse of fair value accounting in some recent American accounting scandals (Watts, 2003) and the role of accounting in boom periods (Penman, 2003). Some practitioners have also expressed reservations regarding the reliability of FVA (Ernst & Young, 2005). Conversely, many regulators, perhaps surprisingly, are more positive (Schipper, 2005; Whittington, 2005; Barth, 2006).

It would seem, rightly or wrongly, that fair value accounting is becoming more pervasive and its impact, beneficial or adverse, remains contentious. The ICAEW (2006) recently argued that "*Given the importance of the subject, it has not attracted the interest it deserves*" (p. 2). We attempt to provide information to help with the ongoing debate.

We firstly examine the relative value relevance of both historic cost and fair value accounting using an adapted version of the conventional levels and changes of earnings model (Easton and Harris, 1991). The changed specification we employ allows us to incorporate changes in equity, both fair value and historic cost, in the model. This is useful as one option open to accounting regulators is to use one approach for income calculation, presumably historic cost, and either use fair values for the determination of equity or to make these fair values available via the notes to the accounts. Therefore, we also examine the impact of mixed accounting systems – which is reflected, although in different ways – in the GAAP accounting currently used by both our sample industries.

We then investigate bias using modifications of the basic earnings – returns relationship. The first approach follows Basu (1997) where we segment the sample between good and bad news cases

to test for conservative accounting. We then extend this to look in more detail at the frequency of negative earnings as measured in the FVA approach. These approaches should not be considered conclusive investigations of accounting bias, but they provide interesting initial evidence.

Our sample, which only includes firms where estimates are available for all three measures of income (GAAP, HC and FVA), consist of 446 real estate and 915 investment company firm-years drawn from 1993 to 2002. We find that fair value income accounting is clearly more value relevant than historic cost or GAAP for both sets of firms, and that value relevance is much greater for investment companies than for real estate firms. This is much as expected. However, where FVA balance sheet values are incorporated into our model, income numbers – however calculated – become largely irrelevant. This has implications for accounting regulators: if fair value balance sheet figures are available FV income numbers may be superfluous (if value relevance is the objective). Note that the fair value balance sheet figures need only be available – they don't have to be incorporated into the accounting system – although the relative importance of disclosure and measurement is an interesting and, as yet unresolved, empirical question.

Where the fair values are expected to be reliable, i.e., for investment firms, we find that fair value accounting is largely unbiased. It should be noted, though, that any advantage derived from the asymmetric recognition of bad news (conservative accounting) is also lost. However, for the real estate firms, where fair values may be less reliable, we note that fair value accounting is adopted in such a way that negative earnings are unlikely to be frequently disclosed and we observe significantly fewer such cases than would be expected. Although we do not attempt to infer the motivation for this, we nevertheless interpret this as a warning to regulators. Where fair values are equivocal, the adoption of fair value accounting may lead to an increase in accounting bias that should be weighed against any gain in relevance.

As discussed in the literature review below, previous research has often found fair values of financial and tangible assets to be value relevant. However, the results are conditional on the environment and on the reliability of the estimates provided. There is also some evidence that, for both tangible and financial assets, revaluations may be biased. Our results add to this stream of

research. We have selected two samples where respectively financial and tangible assets are routinely and comprehensively revalued. The former sample represents relatively easily valued assets, the FASB's "level 1" and the latter represents more difficult cases which would either fall into the FASB's level 2 or 3. We investigate the characteristics of the accounting system and not just the revaluation of particular assets or liabilities. We apply the same tests to both samples and in doing so we can comment on a further crucial issue, as the reliability of financial assets' valuation is more generally accepted than that for tangible assets. Our evidence does seem to support some commentators' reluctance to allow pervasive revaluation of tangible assets. The routine revaluations also mean that, for our samples, signalling issues are less significant than otherwise (Citron, 1992; Lin and Peasnell, 2000; Dietrich *et al.*, 2001) and we can focus more clearly on issues of relevance and reliability.

Our approach also differs from previous studies in that we estimate fair value and historic cost income as well as examining the revaluation amounts. Thus, as well as investigating the relevance of the balance sheet amounts, we can contrast the relevance of the two competing income measurement systems, fair value and historic cost, and also test these against the pragmatic compromise represented in UK GAAP for these industries. Finally, we address aspects of both relevance and reliability. Whilst testing relevance is fairly well established, testing reliability is less so. Our two tests are quite simple and clearly not comprehensive. However, we are able to show that one sample exhibits results that are largely consistent with bias and the other does not.

In the following sections we review prior research; the accounting for UK investment vehicles; the research method; the data used in the analysis; our results; and finally the conclusions.

2. Fair Values and Prior Research

Barth and Landsman (1995) conclude that where assets are traded in a market that is perfect and complete, FVA based balance sheets "*reflect all value relevant information, the income statement is redundant, [and] income realization is not valuation-relevant…*" (p. 97). It might be expected that investment companies come close to this characterisation. However, where fair value is

not clearly defined by an unambiguous market, as for real estate firms, the valuation model and its estimation becomes problematic and "*neither the balance sheet nor income statement reflects fully all value-relevant information and income realization potentially can be valuation relevant, although management discretion can detract from its relevance*" (Barth and Landsman, 1995, p. 97).

Value relevance research has been used to address a considerable variety of accounting issues (see Easton (1999) for a brief review of some of the crucial issues). In this paper we are concerned with fair value and will concentrate on prior papers that address this issue. The strands of research most closely related to this paper are those that deal with the fair value of tangible assets, as for our real estate firms, and the fair value of financial assets (and liabilities), as for our investment trusts.

Tangible assets

Early work on current cost adjustments to tangible assets often failed to demonstrate value relevance. Barth *et al.*, (2001) suggest that this may be because the estimates provided by management were not always reliable. A strand of more recent work has been based on revaluations in regimes such as Australia, Hong Kong, New Zealand or the UK where revaluation of assets is permitted. These studies generally demonstrate value relevance (Standish and Ung, 1982; Brown *et al*., 1992; Whittred and Chan, 1992; Amir *et al.*, 1993; Easton *et al.*, 1993; Easton and Eddey, 1997; Barth and Clinch, 1998; Aboody *et al.*, 1999; Herrmann *et al*., 2002; Owusu-Ansah and Yeoh[2], 2006). However, Amir *et al.*, (1993) suggest that revaluations are less value relevant in the UK than in Australia, and Barth and Clinch (1996) argue that revaluations of UK firms' assets are discounted by US investors. Fields *et al.* (1998) find disclosed fair values by US real estate investment trusts to be highly value relevant, although the fair value is perceived to be unreliable and is not fully reflected in share prices. Gordon and Vincent (2000) analyse the valuation of property companies in Hong Kong, UK and the US during 1994-1997, and find these to be valued similarly, despite the differences in disclosure and accounting practices in the three countries.

Two papers (Aboody *et al*., 1999; Barth and Clinch, 1998[3]) look at revaluations for samples spread over many types of firms in the UK and Australia, respectively. These are conventional firms

for which revaluations have a marginal impact. They present evidence that the revaluations are important both in relation to share prices (and, less robustly, returns) and, in the Aboody *et al.* (1999) paper, with respect to future firm performance. Where their method most closely approaches ours, the results for the revaluations are clearly significant in the first paper, but somewhat weaker than ours, and variably or marginally significant in the second. Weaker results would be expected for firms where revaluations have a marginal impact.

Dietrich *et al.* (2001) take a different approach, but their results are very relevant to our paper. They also sample UK real estate trusts and have a similar sample size of 355 cases drawn from 1988 to 1996. (Our sample covers 446 cases from 1993 to 2002). The main thrust of their tests is to examine the reliability of the revaluation estimates. Their approach is to look at the role of fair value estimates in GAAP accounting – not the possibility of using comprehensive fair value accounting. They convincingly demonstrate various biases, although they do find that new regulations (FRS3) published in 1993 may have eliminated at least one form of bias.

Financial assets and liabilities

Fair value studies of financial assets have tended to concentrate on banks' and insurance firms' financial portfolios and the pension assets available to discharge pension liabilities. These studies generally find fair values to be more value relevant than historic cost. Studies of the portfolios of banks and insurance firms are largely agreed that fair values dominate historic costs when assessed against the value relevance criterion (Barth, 1994; Barth *et al*., 1996; Beaver and Venkatachalam, 1999; Demers, 1999; Park *et al.*, 1999), and pension assets and liabilities of firms are generally found to be relevant to firm valuation (Landsman, 1986; Barth *et al*., 1992; Amir, 1993, 1996). Of potentially more direct relevance to our study of UK investment companies, Carroll *et al.* (2003) find a significant positive relationship between share prices (and returns) and fair value security gains and losses for US closed-end mutual funds – even when controlling for historic cost.

However, fair values – even for financial assets and liabilities – may be subject to uncertainty and measurement error, such as where estimates of future pension liabilities (Barth, 1991; Choi *et al*.,

1997) or the value of illiquid assets held by insurance companies (Petroni and Wahlen, 1995) have to be made. Similarly, Eccher *et al.*, (1996) and Nelson (1996) find fair value disclosures of US banks' loans, deposits, long-term debt and net off-balance sheet financial instruments are too noisy to have any reliable incremental value relevance. While the reduced value relevance of fair values for such illiquid financial instruments may be due to genuine uncertainty regarding fair value, value relevance may also be impeded if the market believes that the 'fair' values may be managed or manipulated. In their analyses of US banks, Barth (1994) and Warfield and Lindsmeier (1992) find the estimation error incorporated in security trading gains and losses (STGLs), especially in the fourth quarter (due to incentives to manage tax liabilities or reported earnings), is sufficient to counteract any underlying value relevance. Ahmed and Takeda (1995) find that realised gains have less impact if accounting returns are low or if the company has low capital ratios – circumstances when incentives to manage earnings are high. Similarly, Barth *et al.*, (1996) and Nissim (2003) find the reliability of loan fair values to be lower for less healthy banks, as banks may overstate fair values in an attempt to influence the market's perception of their risk and performance. It is interesting to note that Nissim (2003) finds that banks manipulate *loan* fair values (which are more subjective), while *asset* fair values (which are more readily observable to the market) are found to be value relevant. As there is arguably more scope for uncertainty surrounding fair values of property than financial securities, we expect fair value disclosures by real estate companies to be less value relevant and more biased than fair value disclosures by investment companies. We return to this in our empirical analysis.

3. Accounting for UK Investment Vehicles

Accounting for real estate firms and investment companies in the UK differs from both historic cost and full fair value accounting. While the investment assets, which make up the vast majority of assets for these companies, are stated in the balance sheet at estimated fair values, the income statement does not normally incorporate investment gains or losses, not necessarily even when realised.

The accounting for *real estate companies* is more conventional, as no special rules apply. Statement of Standard Accounting Practice (SSAP) 19 "Accounting for investment properties" governs the valuation of investment properties and this applies to all firms[4]. While trading properties (which were bought for resale) are carried in the accounts at the lower of cost and net realisable value, investment properties are revalued on an annual basis. The unusual feature is that only the change in value of investment properties during the year of sale is recognised in income. Any change which had occurred, and been transferred to the revaluation reserve in earlier years, is credited directly to the profit and loss reserve. Thus, income only recognises the profits or losses on investment properties occurring during the year of disposal.

The impact of these requirements can be illustrated with a simple example presented in table 1. Assume a property firm has only one asset: an investment property bought for £100 at the start of the year (financed with equity). The firm's profits from ordinary activities – from rental income less operating expenses – amounts to £5 per year. (For simplicity the company pays annual dividends of £5 so that the net income has no impact on equity values at the end of the year).

Assume that at the end of the first year, the fair value of the property has risen to £120, while at the end of the second year the company sells the property for £150 in cash. Under historic cost (HC), the investment gains will not be recognised until realised in the second year, when the gain of £50 is added to income to yield net income of £55. The increase in asset value will similarly not be recognised in the balance sheet until realised in year two, with equity now at £150.

Under full fair value accounting (FVA), increases in asset values will be recognised in the balance sheet (£120 at end of year 1 and £150 at the end of year 2), with the unrealised investment gain of £20 in year 1, and the additional gain of £30 realised in year 2, taken through the income statement.

Under UK GAAP, revaluations are recognised in the balance sheet through the revaluation reserve, and equity values will therefore be the same as under FVA. However, only a small part of the investment gains – the difference between the sales proceeds (£150) and the previous revaluation (£120) will be taken through the income statement. The previous revaluations now realised (£20) will

merely be transferred from the revaluation reserve to the revenue reserve. Thus, no investment gains will be recognised in the income statement for year 1, while for the second year, £30 will be taken through the profit and loss account.

Table 1 about here

The accounting for *investment companies* is, if anything, more unusual than that for real estate firms. The GAAP for these firms is governed by the "Statement of Recommended Practice – Financial Statements of Investment Trust Companies", as well as by general legal and professional requirements. Since the SORP issued in 1995, investment companies have tended to produce a "Statement of Total Return", which gives information regarding total return in a columnar format, split between revenue and capital[5]. In the revenue section, which we take to be the main GAAP income statement, no investment gains or losses are recognised. The income recognised in the revenue section consists mainly of dividends and other direct return on investments. However, in the capital section of the statement of total returns, both unrealised and realised investment gains and losses are recorded. Adding the revenue and capital sections of the statement of total returns together yields fair value income. Thus, since the statement of recommended practice issued in 1995, UK investment companies have reported, quite prominently in their accounts, fair value income. This is in addition to the balance sheet also being at fair value.

To illustrate the main aspects of their accounts, let us again assume a firm holds a financial asset bought at the start of the year for £100, which increases in value to £120 by the end of the first year, and is sold at the end of the second year for £150. If we for simplicity again assume net revenue income (this time from dividends) of £5 (and that the company makes annual dividend payments of £5), the HC and FVA earnings and equity would be the same as for the real estate firm, as reported in table 1.

Under GAAP accounting, the balance sheet incorporates unrealised investment gains and losses and is therefore the same as for FVA. However, none of the investment gains – even when realised – are recognised in the main revenue section of the income statement. Headline GAAP earnings will therefore, in our example, be £5 for both years 1 and 2. The investment gains – both

realised and unrealised – are, however, recorded in the capital section of the statement of total returns. Together, the revenue and capital sections yield the FVA income[6].

Thus, neither real estate firms nor investment trusts use conventional accounting. For both, the income reported under GAAP is usually less than it would be under traditional historic cost. Real estate firms include rents, profits from properties bought for resale and this years' realised profit or loss on investment properties. Investment companies only incorporate the direct yield on investments – dividends and interest payments – and further a proportion of costs are allocated to the capital account. Both realised and unrealised returns on investments are accounted for in the capital element of the total return statement. In shareholders' equity, real estate firms maintain a revaluation reserve for unrealised appreciation, and as the appreciations become realised they are transferred to the revenue reserve. Investment trust companies include two reserves separate from the revenue reserve – realised and unrealised reserves.

Given our sample firms have a high proportion of financial assets, the differences in earnings depending on whether these are measured using GAAP, HC or FVA can be profound. Real estate GAAP income averages approximately 6.2% of start of year equity market values, HC earnings average 8.4% and FV earnings 16.8%. For investment companies, GAAP earnings tend to be low, at 2.4% of market value. Again, HC and FV earnings tend to be considerably higher, at 7.9% and 9.1%, respectively.

4. Research Methods

4.1 Tests of Value Relevance

Following Bernard (1995), we base our value relevance test on the residual income model, which assumes that expectations regarding accounting outcomes follow a clean surplus relationship. The residual income model can be expressed as:

$$pr_{it} = eq_{it} + \sum_{\tau=1}^{\infty} (1+r)^{-\tau} E_t\left[ni_{it+\tau} - r*eq_{it+\tau-1}\right] \quad (1)$$

where pr_{it} is the price per share at time *t*, eq_{it} is the book value of equity per share, ni_{it} is the net

income per share, r is the cost of equity capital, and $E_t[.]$ the expectations at time *t*.

Although Bernard suggests that models based on the residual income model, or models incorporating linear dynamics such as Ohlson (1995) or Feltham and Ohlson (1995), are less dependent on ad hoc assumptions, it is still necessary to model expectations regarding the appropriate discount rate and growth in residual income. Our staring point is an empirical model based on a simplified version of the residual income model:

$$pr_{it} = \alpha_1 eq_{it} + \alpha_2 ni_{it} \tag{2}$$

In this model, expectations regarding the appropriate discount rate and growth in residual income are embedded in the coefficients α_1 and α_2.[7]

Following normal practice, and to avoid some of the statistical difficulties involved in estimating levels equations, we estimate the relationship in differences scaled by opening share price. This leads us to the following specification, where the superscript x refers to a particular accounting system: HC, GAAP or FVA:

$$\left(\frac{pr_{it} - pr_{it-1}}{pr_{it-1}}\right) = \beta_0 + \beta_1 \frac{\Delta ni_{it}^X}{pr_{it-1}} + \beta_2 \frac{\Delta eq_{it}^X}{pr_{it-1}} + \varepsilon_{it} \tag{3}$$

However, as both empirical evidence and theoretical reasoning would suggest that the level and change of earnings would contain different information regarding future earnings (Easton and Harris, 1991), we disaggregate the change in earnings into the levels of current and lagged earnings, to allow the regression coefficient to vary between the two components[8]. Following normal practice, we show this as level and change in earnings rather than current and lagged earnings[9].

Finally, we incorporate the change in the revaluation component of equity. This information would be available to users of accounting information in both the fair value and GAAP systems and could be readily provided to users of historic cost accounts in notes to those accounts.

$$\left(\frac{pr_{it} - pr_{it-1}}{pr_{it-1}}\right) = \gamma_0 + \gamma_1 \frac{ni_{it}^X}{pr_{it-1}} + \gamma_2 \frac{\Delta ni_{it}^X}{pr_{it-1}} + \gamma_3 \frac{\Delta eq_{it}^{HC}}{pr_{it-1}} + \gamma_4 \frac{\Delta rv_{it}}{pr_{it-1}} + \varepsilon_{it} \tag{4}$$

The specification of the model appears somewhat different from conventional value relevance tests, such as Easton and Harris (1991), in that the dependent variable is price relative

rather than returns, and the presence of the equity variables on the right hand side. In fact, given the high correlation between price relatives and returns, the specification of the dependent variable is of little practical relevance. We test the sensitivity of our results by using returns as the dependent variable and discover very little difference in the results. We also run our regressions using only the level and change of earnings as regressors as our base case. Readers may prefer to then think of the equity change variables as 'additional information' added to the standard earnings level and change value relevance model.

In our initial tests, we look at three income measurement systems (GAAP, HC and FV) with a) no equity change variable, b) income together with the historic equity change variable, and c) income with the equity change variable plus the revaluation element which adjusts historic cost to fair value. The value relevance tests therefore use nine regressions for both industries.

Hypotheses

- Fair value accounting will demonstrate higher relative and incremental information content than either historic cost or GAAP where the model includes no fair value equity change, or equity change measured under the historic cost convention. We expect this dominance to be more obvious for investment companies than for real estate firms. We have no presumption regarding the relative explanatory power of historic cost or GAAP accounting. The relative explanatory power of the three models for any particular specification is tested using the Vuong statistic.
- We expect income variables to be insignificant in the presence of the change in fair value computation of equity for investment companies, and less significant in the presence of change in fair value computation of equity for real estate firms (as estimation difficulties may still leave income measures significant for this sub-sample). We use the Wald statistic to test the restriction that the sum of the two earnings coefficients is significantly different from zero.

4.2 Tests of accounting biases

We presume that using fair value accounting should, where fair values are readily and

reliably available, reduce the opportunities for accounting biases such as asymmetric recognition of good versus bad news. Following Basu (1997) and others, we look for asymmetric recognition between good and bad news cases: i.e., between those with positive and negative stock price changes. Our sample contains 425 firm-years (out of 915, or 46%) with negative price relatives for investment companies and 164 (out of 446; 37%) for real estate firms. We use the reverse regression employed by Basu (1997) and estimate the coefficients for the following model:

$$\frac{ni_{it}^{X}}{pr_{it-1}} = \delta_0 + \delta_1\left(\frac{pr_{it} - pr_{it-1}}{pr_{it-1}}\right) + \delta_2 D + \delta_3 D\left(\frac{pr_{it} - pr_{it-1}}{pr_{it-1}}\right) + \varepsilon_{it} \qquad (5)$$

D is a zero-one dummy where D is one if the price relative is negative. The direct test of asymmetric recognition is the sign of δ_3. A positive and significant δ_3 coefficient implies faster recognition of bad news.

Hypothesis

- Our expectations are that both GAAP and historic cost accounting results will be associated with larger and more significant response coefficients during periods of negative returns (bad news). However, we expect fair value accounting to display less asymmetric recognition, and that recognition will be more symmetric for investment companies than for real estate firms. This is because investment companies have reliable and readily available fair value estimates, whereas this is more problematic and arguably prone to 'management' for real estate firms.

Focusing only on fair value income, we further extend this examination. As FV earnings measures are designed to record changes in value, they should, to a great extent, exhibit similar characteristics to changes in market value. (Of course, the other accounting systems do not purport to mimic value changes, so we do not test the relationship between value changes and non-FV earnings). We first investigate results from the Basu (1997) model to see if the estimated relationship is consistent with a system that reports negative earnings when value changes are negative, and secondly we examine the frequency of negative earnings to determine if they are indeed under-

reported.

The first test is conducted by examining whether the estimated coefficients in the Basu regression are, for negative price changes, significantly different from unbiased reporting: i.e., an intercept ($\delta_0+\delta_2$) of zero and a slope coefficient ($\delta_1+\delta_3$) of one. To provide some intuition for this approach we simply point out that if we estimate an intercept of 0.10 and a slope coefficient of 0.50 we would need a price change below -20% before we would expect negative earnings.

To test the second characteristic, we examine whether the observed number of negative earnings are significantly less than we would expect given the observed distribution of price changes. We conduct this experiment both with total negative earnings and with negative earnings close to zero. The rationale follows Burgstahler and Dichev (1997) and subsequent studies, which provided evidence that suggested that managers are reluctant to report negative earnings. We take this approach as a simple starting point for examining earnings management. However, we should point out that our analysis does not employ the distributional assumptions incorporated in Burgstahler and Dichev (1997) and others, but is based on a comparison of earnings and stock price movements in the spirit of traditional value relevance tests. We have taken this approach as a) we doubt that our sample is sufficient to support a Burgstahler and Dichev (1997) approach and b) as FVA purports to measure value changes, unlike other accounting systems, a comparison between negative price changes and negative earnings seem appropriate.

Commentators have pointed out that we are looking for a deliberate measurement bias in *unreported* accounting numbers (as FV earnings are not reported by the real estate firms, and only from 1995 onwards for investment companies). These numbers are unlikely to have any contractual function and it is therefore not obvious why managers would wish to manipulate these figures. Certainly from a traditional agency perspective the point is well made, and should we fail to find evidence of bias, these reservations will provide a convincing explanation. Conversely, should we find bias, some justification will be necessary. At this point we will only point out that FVA income is largely determined, for these firms, by changes in the FVA valuation of investment assets. Thus, negative earnings are usually accompanied by negative changes in the value of assets and any

reluctance to report negative earnings could equally be a reluctance to report declining investment asset values. It does not seem unreasonable to hypothesise that managers of investment firms will, at the very least, be concerned about the reputation effect of being seen to manage investments with declining values.

Hypothesis.

- Our expectation is that we will observe unbiased earnings for investment companies with intercept and slope coefficients close to zero and one, respectively, and observed distributions of negative earnings close to those implied by stock price changes. However, we expect to find a reluctance to report negative earnings for real estate firms evidenced by an intercept significantly greater than zero, slope coefficients significantly less than one and significantly fewer cases of negative earnings than implied by stock price changes. We use the Wald test to examine whether the unbiased zero intercept and unitary slope coefficient is statistically valid and the Chi-squared test to contrast the number of cases above and below zero with the number of expected cases.

5. Data

From the Company Analysis database (Thomson Financial/Primark), we identify (over the period 1993-2002) 989 firm-years for real estate companies, and 3,123 firm-years for investment companies, as detailed in table 2. GAAP income and equity (equal to FVA equity) are taken directly from the database. Historic cost and fair value income, and historic cost equity are estimated from the accounting data. Details of variable definitions and estimation procedures are given in table 3. This estimation of the variables follows in the tradition of empirical accounting research where variables such as cash flows or accruals, where not directly observable, are estimated from other accounting numbers[10].

Missing data reduce the sample to 754 and 2,226 firm-years for real estate and investment companies, respectively. Excluding firm-years substantially different in length from a calendar year further reduce the samples to 750 and 2,206 firm-years. Balancing the sample to ensure that all

variables are present to allow for the calculation of the level and change in GAAP, HC and FV net income, as well as the change in reported and historic cost book equity, reduce the sample to 464 observations for real estate and 999 for investment companies. After trimming to control for outliers (we remove the top and bottom 1% of each variable), we are left with a final sample of 446 firm-years (for 100 firms) for real estate companies, and 915 firm-years (for 315 firms) for investment companies, as detailed in table 2.

Tables 2 and 3 about here

Descriptive statistics for the real estate and investment companies are contained in panels A and B of table 4, respectively. Both industries experienced growth in equity and market values, and average positive earnings, however measured. The performance of the real estate firms was rather better than that of the investment trusts. In both industries GAAP earnings were lowest on average, with fair value accounting highest and historic cost intermediate.

Table 4 about here

Correlation statistics between the test variables presented in table 5 with product moment statistics below the diagonal and rank correlations above. As with most cross sectional models, we find considerable evidence of co-linearity. This is natural and inevitable when we are examining different measures of the same underlying construct. High correlations in our data come from two sources. First, the different income measures are often closely related. As they purport to be different measures of the same variable, this is not surprising. However, they are never included in the same models, so this causes no statistical problems. Second, measures of income and changes in equity will often be highly correlated as the second is caused by the first. Clearly little can be learned from adding equity movements calculated under one method to net income calculated using the same method. We report those results for completeness. However, the comparison of interest is the combination of fair value equity movements with income measures from other systems. This is a viable combination, either in an accounting system that violates the clean surplus relationship, or where the fair value numbers are drawn from notes to the accounts.

Table 5 about here

6. Results

6.1 Value Relevance Models

Results for the test of relative and incremental information content are contained in table 6 for the real estate firms, and table 7 for the investment companies. The first set of regressions presented in tables 6 and 7 report results for earnings only models using the GAAP, historic cost and fair value definitions. The second set of regressions extends the analysis to include the change in historic cost equity, whilst the final set of regressions includes the change in revaluation reserves. The results in these tables are generated using pooled White-adjusted OLS regressions. We have, however, also estimated the models using annual regressions and the Fama-McBeth (1973) approach, as well as robust regressions[11]. The results are generally insensitive to the choice of estimation technique, and any differences in the results based on the different estimations are indicated in the tables.

As detailed in table 6, for real estate firms the relative information of earnings measured using fair value accounting (adjusted R^2 of 21.8%) dominates GAAP (7.4%) and historic cost (6.9%)[12] and this is confirmed by the conventional Vuong test. If the change in HC equity is added, this substantially improves the performance of the GAAP and HC regressions, but leaves both GAAP and HC income insignificant. The change in HC equity is significant in all models[13], but while the explanatory power of the FV model also increases with the inclusion of this variable, FV income remains highly significant. Vuong tests still reveal that the FV model dominates the other two, but HC and GAAP are indistinguishable. Finally, if the change in revaluations is incorporated[14], the explanatory power of the various models are statistically indistinguishable, with adjusted R^2 values of approximately 25%. None of the income measures are significant. Thus, once the balance sheet is stated using FVA – as they are under current GAAP – income looses its ability to explain changes in share prices for real estate companies, regardless of how earnings are measured.

Table 6 about here

For investment companies, the FV earnings, as detailed in the first set of regressions in table

7, have much higher adjusted R^2 (72.8%) contrasting with 23.2% for HC and 0.3% for GAAP. The dominance of FV over both of the other measures and HC over GAAP are statistically confirmed by the Vuong test. The introduction of the change in HC equity substantially improves the fit of the GAAP model (with adjusted R^2 increasing from 0.3% to 18.3%), although it still remains marginally in third place. Although HC equity is significant in all models, it has relatively limited effect on the overall explanatory power of the other two models[15]. While the change in HC earnings is found to be significant, FV earnings still dominate. As can be seen from the final set of regressions in table 7, the inclusion of the change in revaluations extinguishes the explanatory power of GAAP earnings, although both HC and FV earnings remain significant, which did not occur with the real estate firms. As for real estate firms, the inclusion of revaluation changes in equity leaves all three models with very similar explanatory power – the choice of income measure is again largely irrelevant.

Table 7 about here

For both samples, our principal expectations are largely confirmed. Fair value earnings have higher value relevance than either GAAP or historic cost. The dominance of fair value is greater for investment companies than for real estate firms, and the explanatory power of the fair value models are substantially higher for investment companies (adjusted R^2 of 74.1%) than for the real estate firms (25.1%). Earnings are largely irrelevant in the presence of changes in revaluation reserves – except for FV and HC income for investment firms. This is inconsistent with our hypothesis that, if earnings remained value relevant, it would be more likely to occur with the real estate firms.

6.2 Sensitivity analyses

The analysis in tables 6 and 7 is based on the price differential as the dependent variable. As an alternative specification of equation 1, we run returns regressions. Returns data, which we obtained from Datastream, are missing for a number of firms, reducing our sample to 415 firm-years for real estate and 714 for investment companies. As a robustness check, we re-estimate the regressions for tables 4 and 5 based on this alternative specification of returns. The regression results are similar to those reported above and the main conclusions discussed above remain unaltered.

We next test the sensitivity of the results reported in tables 6 and 7 above to the inclusion of a negative earnings interaction term (Hayn, 1995). The results from these unreported regressions indicate that while some of the negative interaction terms are significant (with a negative coefficient, as would be expected), there is virtually no change in the explanatory power of the models, and the earlier conclusions regarding the relative and incremental explanatory power of the different accounting systems remain unaltered.

We also examine the sensitivity of the results to the inclusion of the level of equity in regressions containing income and change in equity. No substantive changes are observed.

6.3 Asymmetric Recognition Results

Table 8 contains results for the samples segmented by negative versus positive price relative. In the first set of results, the three income only models are presented for the real estate firms and those for the investment companies are in the second set.

For HC in both industries, and for GAAP for real estate companies, the normal Basu result is evident. Bad news has a significantly stronger relationship with price changes than does good news, as indicated by the significant δ_3 coefficient.[16] The model incorporating GAAP earnings for the investment companies is insignificant overall and we can draw no conclusions from it. When focusing on the FV results, we find that, for both industries, the incremental bad news coefficient δ_3 is not significantly different from zero[17]. This is of course what should be expected from an unbiased accounting system, and at first sight we can show no clear evidence of bias.

However, the Basu model can be replicated by segmenting the model between good and bad news cases instead of using a dummy variable. We also report the adjusted R^2, slope coefficient and t-statistic for these separate good news and bad news regressions. The interesting element lies with the FV models. For both industries, the slope coefficients are similar for bad news and good news (0.28 vs. 0.32 for real estate and 0.95 vs. 0.92 for investment trust), but in both cases the explanatory power of the model is considerably higher for good news than for bad news (3.7% vs. 18.9% for real estate and 42.9% vs. 65.3% for investment trusts). Our interpretation of this result, although it is only

indicative, is that the firms are less consistent in writing down assets during bad news periods than they are in writing them up during good news periods. Thus, although the Basu test does not reveal asymmetric recognition, it does suggest that further investigation of the relationship may be instructive.

Table 8 about here

Table 8 also reports the Wald statistics for the test that the combined intercept ($\delta_0+\delta_2$) and the combined slope coefficient ($\delta_1+\delta_3$), for cases with negative earnings, are significantly different from zero and one, respectively. Tests reveal that for the real estate firms the intercept is significantly above zero and the slope significantly less than 1. Fair value income is therefore significantly different from what we would expect under unbiased accounting. While the constant is also significantly positive for the investment companies, it is less than half the size of that for the real estate firms. Furthermore, the bad news slope for investment companies is not significantly different from 1, consistent with unbiased accounting. To put these results in context, with a combined intercept of 0.1379 and slope coefficient of 0.2762 a real estate firm would expect to report negative earnings when its stock price decline by more than 49.9%, whilst for an investment company with intercept 0.0666 and slope 0.9467, the corresponding value is 7.0%.

Table 9 reports tests of expected versus observed negative earnings. We conduct this test for the full sample and for the subset of cases falling within 10 percentage points of zero. Before considering the statistical results it is helpful to refer to figures one to four. These plot earnings against price changes (both deflated by opening price) for both the full sample and the cases close to zero. For the full sample of investment companies (figure 1), we see a tight plot extending well into negative earnings, with relatively few cases in the top left or bottom right quadrants (where cases with mixed negative and positive results would be found). Conversely, the equivalent real estate plot (figure 2) is less tightly grouped, with relatively few negative earnings cases and a significant number of cases falling in the lower right quadrant identifying negative price changes and positive earnings. Focusing on the area restricted to 20 percentage points either side of zero, for the investment companies (figure 3) we can still discern a relationship. Whilst the lower right quadrant (positive

earnings and negative price changes) is heavily populated, the lower left (negative earnings and negative price change) is even more so. Conversely, for the real estate sample (figure 4) there seems to be a distinct drop in cases to the left of zero earnings, and the bottom right quadrant (negative price changes and positive earnings) has a disproportionately large number of cases.

Table 9 and figures 1 to 4 about here

The chi-squared tests show that when we restrict the analysis to cases close to zero, negative earnings are significantly underrepresented for real estate firms, but not for investment companies. This result is repeated if we alter the band to 5% or 15% on either side of zero, restrict ourselves to stock market returns instead of price changes, or replace FVA earnings with changes in FVA equity. However, if we look at the full sample rather than that restricted to close to zero, we find that both industries are under-represented by negative earnings. The proportion of such under representation is much smaller for the investment companies than for the real estate firms[18], and the statistical significance is lower despite the larger sample size. Even so, it remains the case that for investment companies we have almost 20% fewer negative incomes than we would expect given the changes in stock price.

These results do not prove earnings management among real estate firms, but they are consistent with it. Nor do the results explain how or why the earnings are managed. Nevertheless, our interpretation of this result is that the clear-cut and unambiguous valuation of investment assets precludes management of investment companies from significant earnings manipulation. Conversely, the discretion available to the management of real estate firms in the timing of revaluations and the subjectivity involved in valuing real estate assets provides significant opportunities for earnings management.

7. Conclusion

The accounting for UK financial firms includes financial assets and investment properties in the companies' balance sheets at estimated market values. This gives us an opportunity to investigate the relative value relevance of GAAP, historic cost and fair value accounting for UK real estate and

investment companies. For both industries, most assets are stated in the companies' accounts at fair values (on average, 92% of total assets for investment companies and 75% for real estate firms). However, while fair values are generally straightforward and unequivocal for investment companies, the valuation of investment properties for real estate firms is less clear-cut and more open to manipulation.

For both real estate and investment companies, fair value earnings dominate both GAAP and historic cost income in explaining annual changes in share prices. However, once the model is extended from an earnings-only model to one that controls for the change in the equity at fair value accounting (the change in HC equity plus the change in the revaluation reserve), the differences in the explanatory powers of the models based on GAAP, historic cost and fair value accounting are generally small. This evidence provides no support for the introduction of FVA for income statements, as FV equity information can be, and for these industries is already, provided.

The explanatory power of the regressions including fair value earnings and changes in fair value equity are higher for investment companies (adjusted R^2 of 74.1%) than for real estate firms (25.1%). The higher information content of fair value estimates for investment companies may be due to asset values being more reliably determined for investment company assets than for real estate investment, where realisable values are generally more difficult to estimate. Our results are robust to varying model specifications and estimation procedures, including controlling for dividends in the returns measure, for negative earnings, or for the level (as well as change) in equity.

Our test of conservatism using Basu's (1997) approach confirms conservative accounting for historic cost income and is consistent with unbiased fair value accounting. However, the estimated relationship revels that we should only expect negative FV income for investment companies with share values declining by more that 7.0% and for real estate firms declining by more that 49.9%. Equally, we observe significantly fewer negative FV incomes for both industries and significantly fewer small losses for the real estate firms than we would expect given the share price movements. We have not examined why or how earnings management is conducted and this evidence should not be interpreted as proof of earnings management, even for the real estate firms. However, the evidence

is consistent with earnings management and strongly so in the case of the real estate firms. For our sample of these firms 164 cases (36.8%) revealed declining share prices whilst 47 cases (10.5%) reported changing asset values causing FV losses.

We interpret our results as confirming that fair value accounting is consistently more value relevant than historic cost (or UK GAAP income), although this value relevance can be conveyed via asset values and need not be incorporated into income computations. Therefore, our experiment provides no convincing support for full FV accounting. Furthermore, the results are consistent with the management of fair values to avoid losses and/or declining asset values – especially where fair values are ambiguous. The experiment suggests that regulators should be concerned that fair value accounting might well be accompanied by earnings (or asset value) management where fair values are anything less than unequivocal.

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Table 1
Illustrative accounts

	Historic Cost	Fair Value	GAAP Real Estate	GAAP Investment Companies		
				Revenue	Capital	Total
Year 1						
Net income	5	25	5	5	20	25
Equity	100	120	120			120
Year 2						
Net income	55	35	35	5	30	35
Equity	150	150	150			150

The table illustrates the key differences between HC, FV and GAAP accounting for UK real estate and investment companies. The example assumes the firm's profits from ordinary activities amounts to £5 per year and that the company pays annual dividends of £5 so that the net income has no impact on equity values at the end of the year. We further assume the company owns only one asset (be it property or securities), bought with equity for £100 at the start of year 1. At the end of year 1 the value has increased to £120, while at the end of year 2 the company sells the asset for £150 in cash.

Table 2.
Sample

	Real Estate	Investment
Initial sample of firms classified as respectively Real Estate Companies or Investment Companies by both FT and SIC, 1993-2002	989	3,123
Missing or unsuitable data:		
Negative share issue		420
Share price missing	174	69
Share price at t-1 missing	61	408
	754	2,226
Accounting year outwith 350-380 days	4	20
	750	2,206
Balanced sample:		
Eliminate where $niHC/pr_{-1}$, $niFV/pr_{-1}$, $\Delta niHC/pr_{-1}$ or $\Delta niFV/pr_{-1}$ missing.	286	1,207
	464	999
Outlier elimination:	18	84
	446	***915***

Table 3
Variable Definitions

$(pr_{it}-pr_{it-1})/pr_{it-1}$	*Share Price Relative*. pr_{it} refers to firm *i*'s price per share for ordinary equity at the accounting year end *t*♣, and pr_{it-1} to the share price at the end of the previous accounting year. (Extel Ref = mkt.shpc).
$(pr_{it}+dv_{it}-pr_{it-1})/pr_{it-1}$	*Share Returns*. dv_{it} refers to firm *i*'s ordinary dividends per share for year *t* defined as ordinary dividends. (Extel Ref = ir.dv.os/(mkt.nos)). pr_{it} is as previously defined.
$niGAAP_{it}/pr_{it-1}$	GAAP Net Income. Firm *i*'s reported earnings per share for year *t* defined as earned for ordinary after interest charges, extraordinary items, taxation etc. (Extel Ref = (ni + ir.dv + ir.dv.os). All earnings are calculated on a per share basis, dividing by the number of shares. (Extel Ref = mkt.nos). The variable is deflated by opening share price.
$niHC_{it}/pr_{it-1}$	*Historic Cost Net Income.* $niHC_{it}$ refers to firm *i*'s historic cost net income. For *real estate companies*, we estimate the historic cost net income by adding realised property gains or losses (total revaluations for the year♦ less the increase in unrealised revaluations, as reflected by the increase in the revaluation reserve, (Extel Ref = ir.rvl + lag(eq.r.rvl) – eq.r.rvl) to $niGAAP_{it}$. Where relevant, we also adjust for realised appreciation on investments, as for investment companies (see below), but assume missing values to be zero. For *investment companies*, we add realised investment appreciation to the reported GAAP income, which is estimated from the change in the realised capital reserves (Extel Ref = eq.r.rl – lag(eq.r.rl)). Where relevant, we also adjust for any realised property gains or losses, as for the real estate companies, but assume missing values to be zero.
$niFV_{it}/pr_{it-1}$	*Fair Value Net Income.* $niFV_{it}$ refers to firm *i*'s fair value net income. For *real estate companies*, we estimate the fair value net income by adding total property revaluations for the year (less any tax adjustment or foreign exchange translation gains) to $niGAAP_{it}$. (Extel Ref = ir.rvl + ir.fx + ir.tx). Where relevant, we also adjust for any appreciations in investment values, as reflected by changes in the realised and unrealised appreciation on investment reserves (Extel Ref = eq.r.rl – lag(eq.r.rl) + eq.r.iap – lag(eq.r.iap)), but assume missing values to be zero. For *investment companies*, we add the change in realised and unrealised appreciation on investment reserves arising during the year to reported GAAP net income. (Extel Ref = eq.r.rl – lag(eq.r.rl) + eq.r.iap – lag(eq.r.iap) + eq.r.rvl – lag(eq.r.rvl)). Where data is available, we also adjust for any property revaluations for the year, as for the real estate companies, but assume missing values to be zero.
$\Delta niGAAP_{it}/pr_{it-1}$, $\Delta niHC_{it}/_{it-1}$, and $\Delta niFV_{it}/pr_{it-1}$.	*Change in Net Income.* These variables measure the change in net income from year *t*-1 to year *t*, measured using GAAP, historic cost and fair value accounting, respectively.

$\Delta eq_{it}/pr_{it-1}$	*Change in Historic Cost Book Equity.* Change from year *t*-1 to year *t* in firm *i*'s historic cost equity per share. For *real estate companies*, we estimate historic cost book equity by subtracting the revaluation reserve (Extel Ref = eq.r.rvl) and, where applicable, any unrealised appreciation on investment (Extel Ref = eq.r.iap, but assuming missing values to be zero) from the GAAP figure for the book value of ordinary equity (Extel Ref = eq – eq.s.ps). For *investment companies*, we subtract unrealised appreciation on investment and, where applicable, the revaluation reserve (assuming missing values to be zero) from eq.
$\Delta rv_{it}/pr_{it-1}$	*Change in Revaluations.* Change from year *t*-1 to year *t* in firm *i*'s revaluations. Revaluations equate to the difference between the reported (GAAP, which equates to the FV) and historic cost book equity.

♣ Prior evidence (e.g., Barth et al., 1992) indicates that the results are not sensitive to the choice between year-end or disclosure date share prices. ♦ Where data for 'revaluations' (ir.rvl) is missing, we replace this variable with 'properties gross-revaluation' (it.pg.rvl). The correlation between these two variables is 0.996.

Table 4.
Descriptive Statistics

	Mean	Median	Std.Dev.	Min	Max	Q1	Q3
Panel A – Real Estate (446 firm-years)							
$(pr-pr_{-1})/pr_{-1}$	0.0935	0.0760	0.2745	-0.6431	1.7879	-0.0835	0.2298
$niGAAP/pr_{-1}$	0.0616	0.0622	0.0804	-0.4354	0.5146	0.0373	0.0887
$\Delta niGAAP/pr_{-1}$	0.0081	0.0058	0.0856	-0.5684	0.7422	-0.0072	0.0239
$niHC/pr_{-1}$	0.0840	0.0775	0.1074	-0.6297	0.6076	0.0413	0.1231
$\Delta niHC/pr_{-1}$	0.0187	0.0103	0.1103	-0.5684	0.5964	-0.0146	0.0471
$niFV/pr_{-1}$	0.1680	0.1684	0.1754	-0.5625	0.9282	0.0728	0.2507
$\Delta niFV/pr_{-1}$	0.0231	0.0322	0.1810	-0.8278	0.7610	-0.0645	0.1149
$\Delta eq/pr_{-1}$	0.0584	0.0479	0.1211	-0.6078	0.8349	0.0149	0.0985
$\Delta rv/pr_{-1}$	0.0800	0.0696	0.1493	-0.4332	0.7293	-0.0011	0.1450
Panel B – Investment Trusts (915 firm-years)							
$(pr-pr_{-1})/pr_{-1}$	0.0273	0.0156	0.3078	-0.7647	1.5854	-0.1434	0.1774
$niGAAP/pr_{-1}$	0.0237	0.0181	0.0308	-0.0526	0.1746	0.0041	0.0372
$\Delta niGAAP/pr_{-1}$	0.0008	0.0009	0.0131	-0.1022	0.0869	-0.0034	0.0044
$niHC/pr_{-1}$	0.0785	0.0830	0.1619	-0.5531	0.8560	0.0098	0.1392
$\Delta niHC/pr_{-1}$	0.0054	0.0036	0.1886	-0.8028	1.0311	-0.0764	0.0714
$niFV/pr_{-1}$	0.0905	0.0792	0.3370	-0.9089	1.7244	-0.0899	0.2442
$\Delta niFV/pr_{-1}$	-0.0054	-0.0471	0.4664	-1.2605	2.6609	-0.2428	0.1780
$\Delta eq/pr_{-1}$	0.0597	0.0626	0.1761	-0.7189	0.9103	-0.0054	0.1254
$\Delta rv/pr_{-1}$	0.0086	-0.0067	0.2942	-0.8240	1.4568	-0.1563	0.1425

Table 5.
Correlation Matrix

	$(pr-pr_{-1})/pr_{-1}$	$niGAAP/pr_{-1}$	$\Delta niGAAP/pr_{-1}$	$niHC/pr_{-1}$	$\Delta niHC/pr_{-1}$	$niFV/pr_{-1}$	$\Delta niFV/pr_{-1}$	$\Delta eq/pr_{-1}$	$\Delta rv/pr_{-1}$
Panel A – Real Estate									
$(pr-pr_{-1})/pr_{-1}$		0.288	0.164	0.279	0.181	0.431	0.310	0.253	0.343
$NiGAAP/pr_{-1}$	0.279		0.494	0.772	0.276	0.440	0.313	0.554	0.078
$\Delta niGAAP/pr_{-1}$	0.123	0.376		0.355	0.618	0.348	0.491	0.316	0.163
$niHC/pr_{-1}$	0.267	0.814	0.230		0.481	0.464	0.256	0.673	0.008
$\Delta niHC/pr_{-1}$	0.145	0.261	0.754	0.372		0.267	0.427	0.361	0.024
$niFV/pr_{-1}$	0.471	0.562	0.223	0.530	0.184		0.578	0.399	0.728
$\Delta niFV/pr_{-1}$	0.280	0.397	0.444	0.318	0.409	0.614		0.228	0.449
$\Delta eq/pr_{-1}$	0.349	0.626	0.094	0.699	0.174	0.463	0.204		-0.097
$\Delta rv/pr_{-1}$	0.350	0.102	0.113	-0.025	-0.006	0.759	0.492	-0.034	
Panel B - Investment Trusts									
$(pr-pr_{-1})/pr_{-1}$		0.089	-0.029	0.454	0.403	0.853	0.640	0.435	0.727
$NiGAAP/pr_{-1}$	-0.007		0.351	0.211	0.038	0.110	0.035	0.054	0.032
$\Delta niGAAP/pr_{-1}$	-0.069	0.362		0.028	0.006	-0.023	-0.000	0.000	-0.033
$niHC/pr_{-1}$	0.434	0.107	-0.011		0.606	0.491	0.148	0.890	0.082
$\Delta niHC/pr_{-1}$	0.439	-0.012	-0.016	0.629		0.447	0.297	0.568	0.199
$niFV/pr_{-1}$	0.854	0.020	-0.088	0.509	0.513		0.781	0.437	0.853
$\Delta niFV/pr_{-1}$	0.665	-0.024	-0.100	0.113	0.404	0.788		0.120	0.836
$\Delta eq/pr_{-1}$	0.425	0.033	0.000	0.874	0.543	0.439	0.090		0.063
$\Delta rv/pr_{-1}$	0.753	-0.036	-0.095	0.042	0.252	0.877	0.852	0.028	

The table contains the correlation coefficients between the variables of analysis. Pearson correlation coefficients are contained in the bottom left of the table, while Spearman correlations are reported in the top right.

Table 6.
Earnings Model for Real Estate Companies

	Earnings Only			Plus Equity Change			Plus Revaluation Change		
	GAAP	HC	FV	GAAP	HC	FV	GAAP	HC	FV
γ_0: Const.	***0.0359***	***0.0379***	**-0.0322**	***0.0382***	***0.0450***	**-0.0313**	-0.0078	-0.0100	-0.0192
	(1.94)	***(2.16)***	**(-1.71)**	***(2.09)***	***(2.54)***	**(-1.66)**	(-0.43)	(-0.57)	(-0.98)
γ_1: Ni	**0.9275**	**0.6315**	**0.7510**	0.2159	*0.0040*	**0.6085**	0.0101	0.0057	0.2300
	(3.59)	**(3.75)**	**(6.57)**	(0.67)	*(0.02)*	**(5.76)**	(0.03)	(0.02)	(1.13)
γ_2: Δni	0.0664	0.1314	*-0.0222*	0.2263	0.2145	*0.0107*	0.1542	0.2139	0.0187
	(0.25)	(0.87)	*(-0.17)*	(0.84)	(1.36)	*(0.09)*	(0.59)	(1.44)	(0.15)
γ_3: Δeq				**0.6874**	**0.7556**	***0.3807***	**0.8052**	**0.7827**	**0.6508**
				(3.30)	**(3.09)**	***(2.20)***	**(4.01)**	**(3.22)**	**(3.03)**
γ_4: Δrv							**0.6545**	**0.6654**	***0.4446***
							(7.19)	**(7.52)**	***(2.26)***
Adj R^2	7.4%	6.9%	21.8%	12.6%	12.3%	23.9%	24.9%	25.3%	25.1%
F-test	**18.85**	**17.59**	**63.17**	**22.46**	**21.89**	**47.49**	**37.39**	**38.78**	**38.24**
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
($\gamma_1+\gamma_2 = 0$)	**15.70**	**23.86**	**43.85**	2.05	0.75	**50.52**	0.34	0.86	1.43
	(0.000)	**(0.000)**	**(0.000)**	(0.152)	(0.386)	**(0.000)**	(0.56)	(0.35)	(0.23)
	GAAP vs HC	GAAP vs FV	HC vs FV	GAAP vs HC	GAAP vs FV	HC vs FV	GAAP vs HC	GAAP vs FV	HC vs FV
Vuong									
F-test	-0.32	**3.32**	**3.29**	-0.36	**3.16**	**3.15**	1.12	0.22	-0.25

White (1980) adjusted t-statistics are reported in brackets. Coefficients in bold are significant at least at the 10% level (two-tailed test). Coefficients that change sign or lose significance under robust or Fama-MacBeth regression estimation are reported in italics. The adjusted R^2 and Wald statistic for the regressions are reported, as well as Wald statistics for partial restrictions of the regression model. Voung tests for e.g., GAAP vs HC test the significance of the difference in the explanatory power of niGAAP and ΔniGAAP against niHC and ΔniHC.

Table 7.
Earnings Model for Investment Companies

	Earnings Only			Plus HC Equity Change			Plus FV Equity Change		
	GAAP	HC	FV	GAAP	HC	FV	GAAP	HC	FV
γ_0: Const.	*0.0239*	-0.0142	**-0.0446**	*-0.0168*	-0.0087	**-0.0461**	***-0.0231***	**-0.0336**	**-0.0363**
	(1.71)	(-1.21)	**(-8.96)**	*(-1.30)*	(-0.76)	**(-9.34)**	***(-3.31)***	**(-5.84)**	**(-7.04)**
γ_1: Ni	*0.2051*	**0.4979**	**0.7934**	*0.0445*	0.1587	**0.7300**	*0.0677*	**0.3977**	**0.4095**
	(0.54)	**(5.15)**	**(19.19)**	*(0.13)*	(1.08)	**(13.45)**	*(0.35)*	**(3.60)**	**(4.36)**
γ_2: Δni	*-1.7917*	**0.4472**	-0.0127	***-1.6591***	**0.4511**	*0.0192*	-0.0322	*0.0027*	*-0.0220*
	(-1.63)	**(4.76)**	(-0.43)	***(-1.73)***	**(4.83)**	*(0.52)*	(-0.05)	*(0.04)*	*(-0.58)*
γ_3: Δeq				**0.7433**	**0.3537**	**0.1292**	**0.7069**	**0.3865**	**0.3858**
				(10.69)	**(2.88)**	**(1.91)**	**(15.06)**	**(4.33)**	**(4.35)**
γ_4: Δrv							**0.7755**	**0.7711**	**0.3992**
							(29.35)	**(28.70)**	**(3.87)**
Adj R^2	0.3%	23.2%	72.8%	18.3%	24.1%	73.1%	72.9%	73.9%	74.1%
F-test	**2.35**	**139.33**	**1227.13**	**69.32**	**97.86**	**830.82**	**615.30**	**649.04**	**653.88**
	(0.096)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
($\gamma_1+\gamma_2 = 0$)	1.98	**144.37**	**969.73**	2.66	**20.55**	**699.66**	0.00	**15.56**	**15.89**
	(0.159)	**(0.000)**	**(0.000)**	(0.103)	**(0.000)**	**(0.000)**	(0.95)	**(0.00)**	**(0.00)**
	GAAP vs HC	GAAP vs FV	HC vs FV	GAAP vs HC	GAAP vs FV	HC vs FV	GAAP vs HC	GAAP vs FV	HC vs FV
Vuong F-test	**2.26**	**4.48**	**4.06**	0.79	**3.80**	**4.03**	1.32	1.36	0.22

White (1980) adjusted t-statistics are reported in brackets. Coefficients in bold are significant at least at the 10% level (two-tailed test). Coefficients that change sign or lose significance under robust or Fama-MacBeth regression estimation are reported in italics. The adjusted R^2 and Wald statistic for the regressions are reported, as well as Wald statistics for partial restrictions of the regression model. Voung tests for e.g., GAAP vs HC test the significance of the difference in the explanatory power of niGAAP and ΔniGAAP against niHC and ΔniHC.

Table 8
Negative vs Positive Price Relatives

	Real Estate			Investment Companies		
	GAAP	HC	FV	GAAP	HC	FV
δ_0: Const	**0.0663**	**0.0955**	**0.1328**	**0.0254**	**0.0938**	**0.0680**
	(10.45)	**(11.63)**	**(8.47)**	**(14.44)**	**(11.14)**	**(5.50)**
δ_1: Prdiff	***0.0403***	0.0392	**0.3216**	-0.0045	**0.1442**	**0.9249**
	(1.79)	(1.60)	**(5.11)**	(-0.74)	**(4.25)**	**(16.58)**
δ_2: D	*0.0039*	-0.0106	0.0067	-0.0040	*0.0111*	*-0.0014*
	(0.31)	(-0.69)	(0.26)	(-1.27)	*(0.89)*	*(-0.70)*
δ_3: D*Prdiff	***0.1707***	***0.1922***	-0.0454	*-0.0024*	**0.2501**	*0.0218*
	(2.16)	***(2.15)***	(-0.31)	*(-0.17)*	**(4.88)**	*(0.24)*
Adj R^2	9.7%	9.0%	21.7%	-0.1%	20.9%	72.8%
F-test	**16.92**	**15.59**	**42.18**	0.60	**81.66**	**812.82**
	(0.000)	**(0.000)**	**(0.000)**	(0.613)	**(0.000)**	**(0.000)**
Good News Adj R^2	1.2%	0.4%	18.9%	0.0%	5.2%	65.3%
Slope	***0.0403***	0.0392	**0.3216**	-0.0045	**0.1442**	**0.9249**
	(1.79)	(1.60)	**(5.11)**	(-0.74)	**(4.25)**	**(16.58)**
Bad News Adj R^2	8.8%	7.5%	3.7%	0.0%	18.9%	42.9%
Slope	**0.2111**	**0.2313**	**0.2761**	*-0.0068*	**0.3944**	**0.9467**
	(2.79)	**(2.69)**	**(2.04)**	*(-0.54)*	**(10.26)**	**(13.61)**
Bad News Wald Restrictions						
$(\delta_0+\delta_2) = 0$	**0.0702**	**0.0849**	**0.1396**	**0.0214**	**0.1048**	**0.0666**
	(6.65)	**(6.51)**	**(6.66)**	**(8.09)**	**(11.43)**	**(4.38)**
$(\delta_1+\delta_3) = 1$	**-0.7889**	**-0.7687**	**-0.7239**	**-1.0068**	**-0.6056**	-0.0533
	(-10.42)	**(-8.93)**	**(-5.36)**	**(-79.84)**	**(-15.76)**	(-0.77)
Joint Wald	**970.13**	**748.70**	**405.79**	**22753.71**	**124.94**	**75.70**
(p-value)	**(0.000)**	**(0.000**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
	GAAP vs HC	GAAP vs FV	HC vs FV	GAAP vs HC	GAAP vs FV	HC vs FV
Vuong F-test	**5.89**	**9.97**	**5.84**	**14.00**	**14.46**	**2.69**

Net income (calculated using GAAP, Historic Cost and Fair Value, respectively) is regressed against the price differential [(pr-pr-1)/pr-1], a dummy variable taking the value 1 where the price differential is negative [(pr-pr-1)/pr-1<0], and an interactive term. White (1980) adjusted t-statistics are reported in brackets. Coefficients are estimated on pooled data for 1993-2002. Coefficients in bold are significant at least at the 10% level (two-tailed test). Coefficients that change sign or lose significance under robust or Fama-MacBeth regression are reported in italics. The adjusted R^2 and Wald statistic for the regression are reported, as well as Wald statistics for partial restrictions of the regression model. The adjusted R^2, slope coefficient and t-statistic for the good and bad news independent regressions are also reported. Voung tests for e.g., GAAP vs HC test the significance of the difference in explanatory power of regressions for GAAP and historic cost net income.

Table 9
Chi-squared tests of distributions.

	Real Estate			Investment Companies		
Full Distribution						
	PR	NI	Chi-Sq.	PR	NI	Chi-Sq.
Negative	164	47	**84.978**	425	341	**15.843**
Positive	282	399	**(0.000)**	490	574	**(0.000)**
Around Zero						
	PR	NI	Chi-Sq.	PR	NI	Chi-Sq.
Negative	74	27	**22.60**	147	119	0.71
Positive	74	96	**(0.000)**	151	141	(0.401)

The cells report the frequency of cases with positive or negative price relatives (PR) and fair value net income (NI). 'Around zero' refers to observations with price relatives or fair value net income within ±10 percentage points. The Chi-squared test (and associated p-values in brackets) examines the hypothesis that the frequency distributions of fair value net income and the price relative are the same – the p-values reflecting the possibility that the distributions are indeed the same.

Figure 1
Investment Companies – Price Relative and Fair Value Net Income
Full Sample

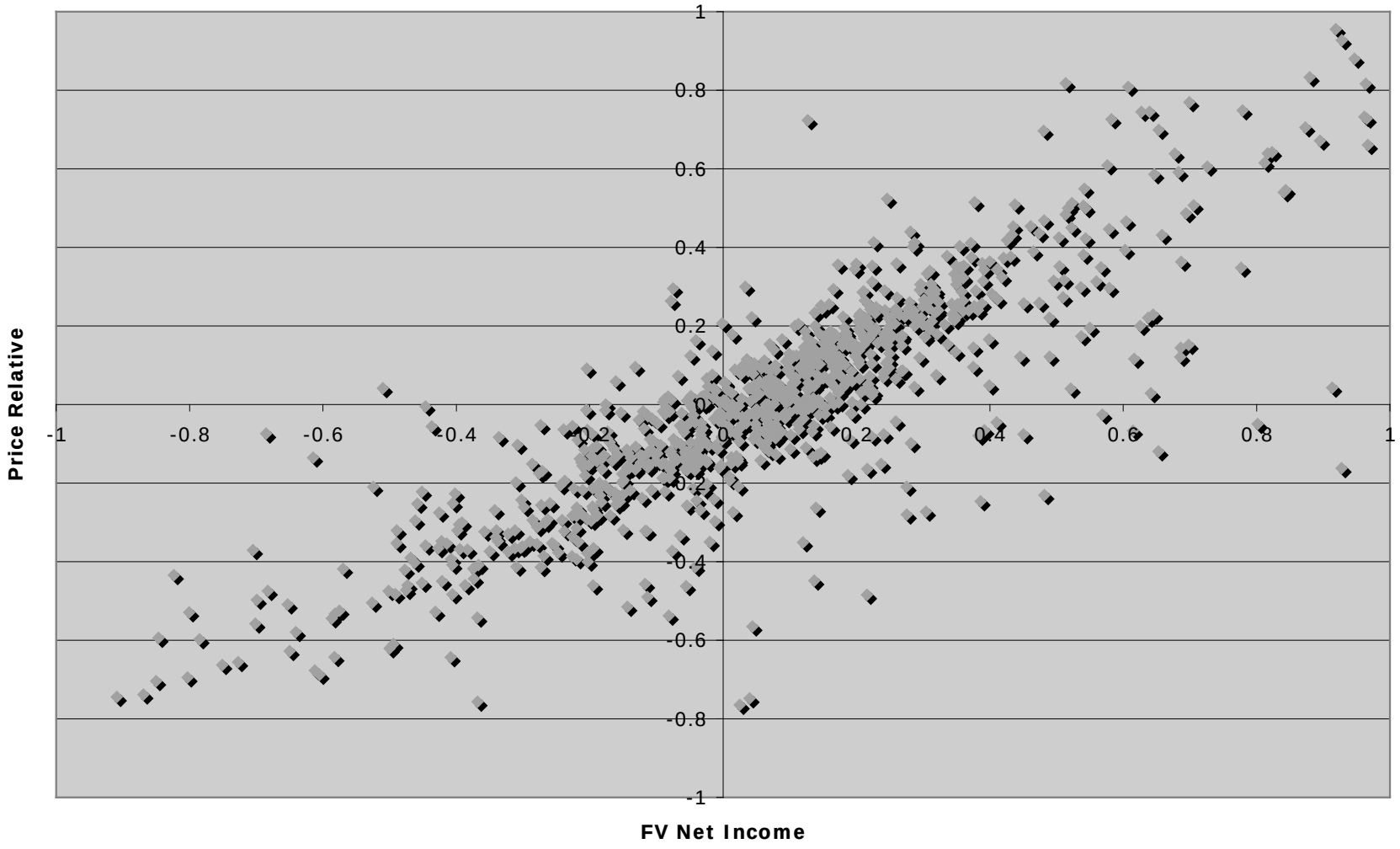


Figure 2
Real Estate Companies – Price Relative and Fair Value Net Income
Full Sample

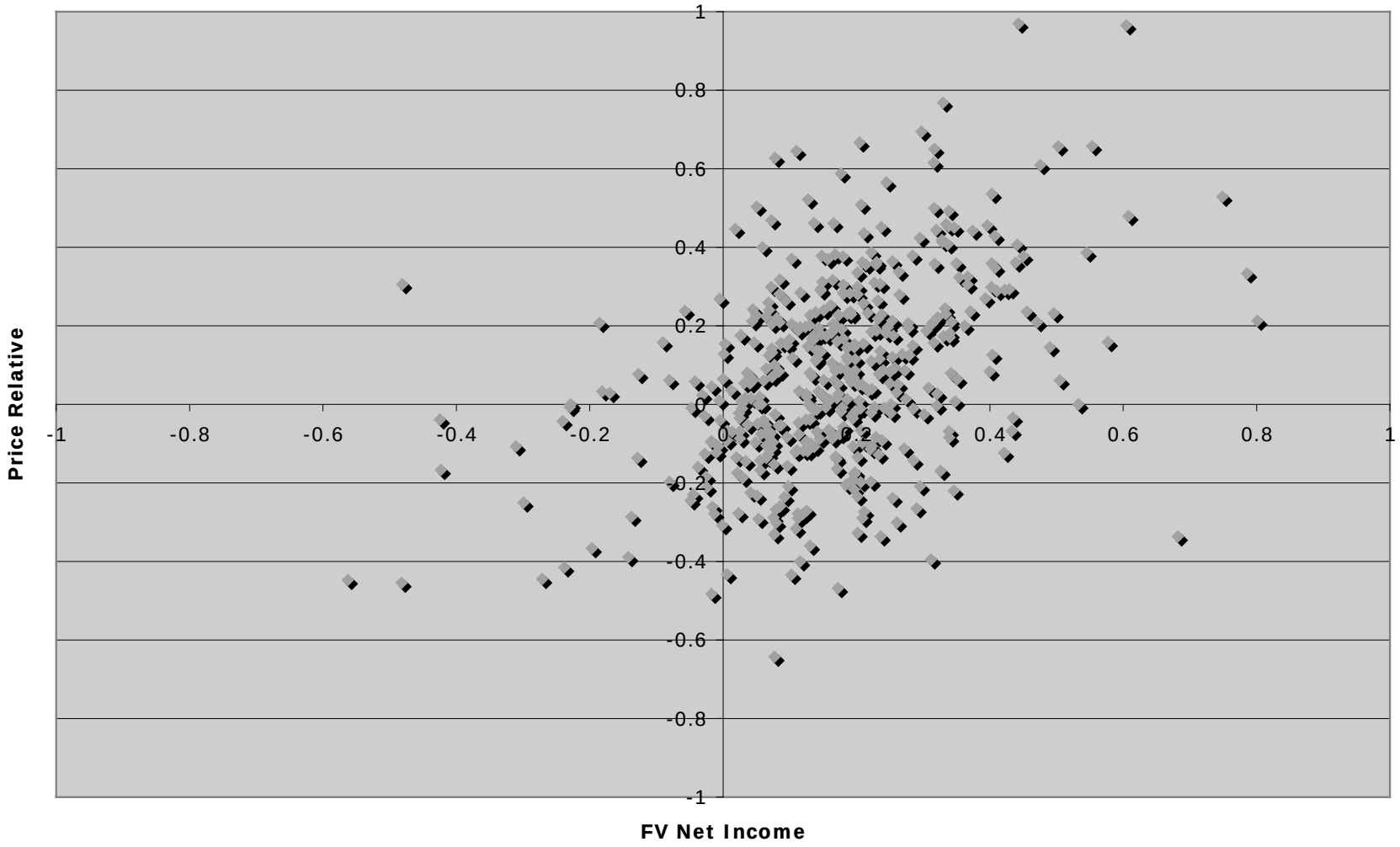


Figure 3
Investment Companies – Price Relative and Fair Value Net Income
Close to Zero

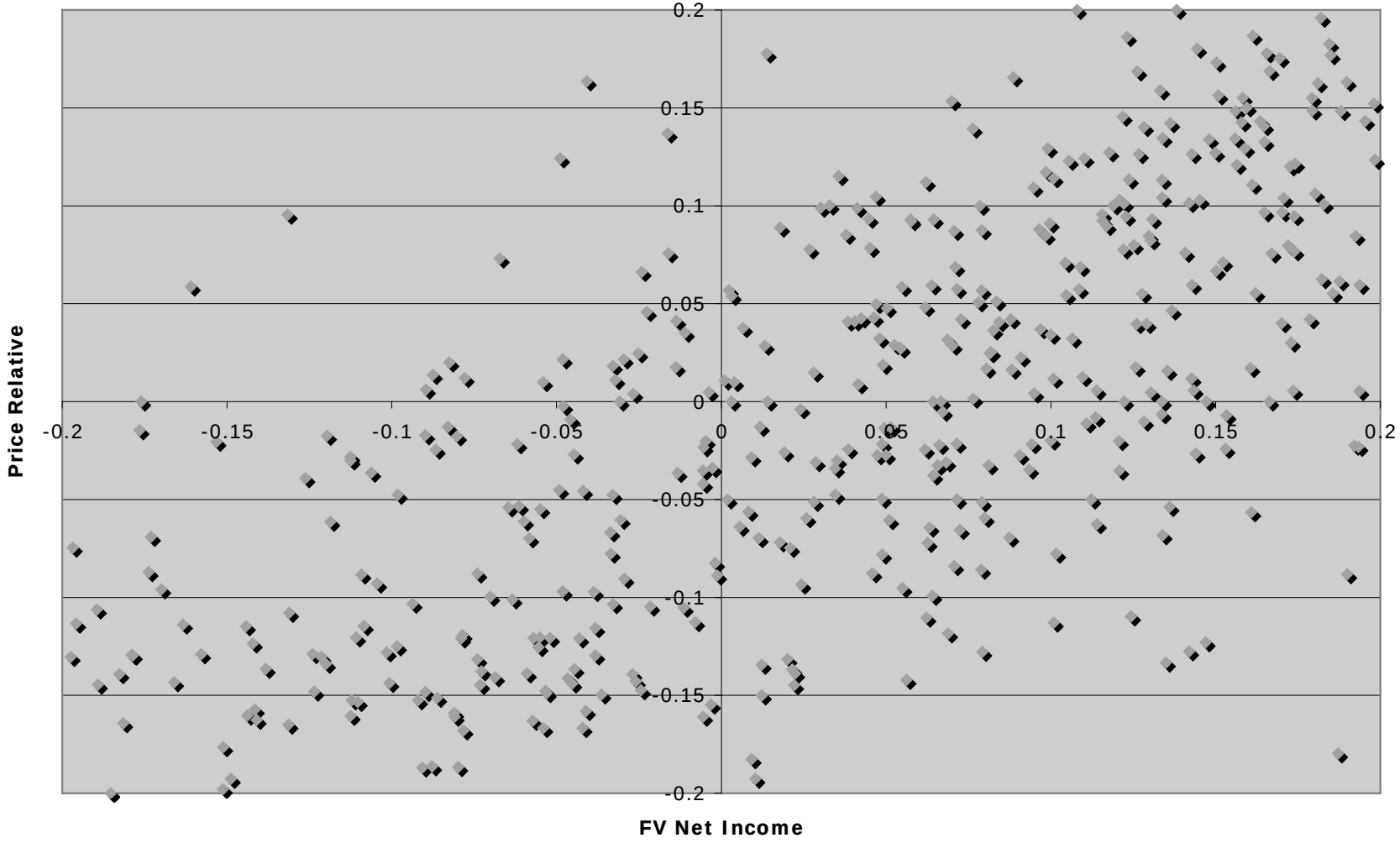
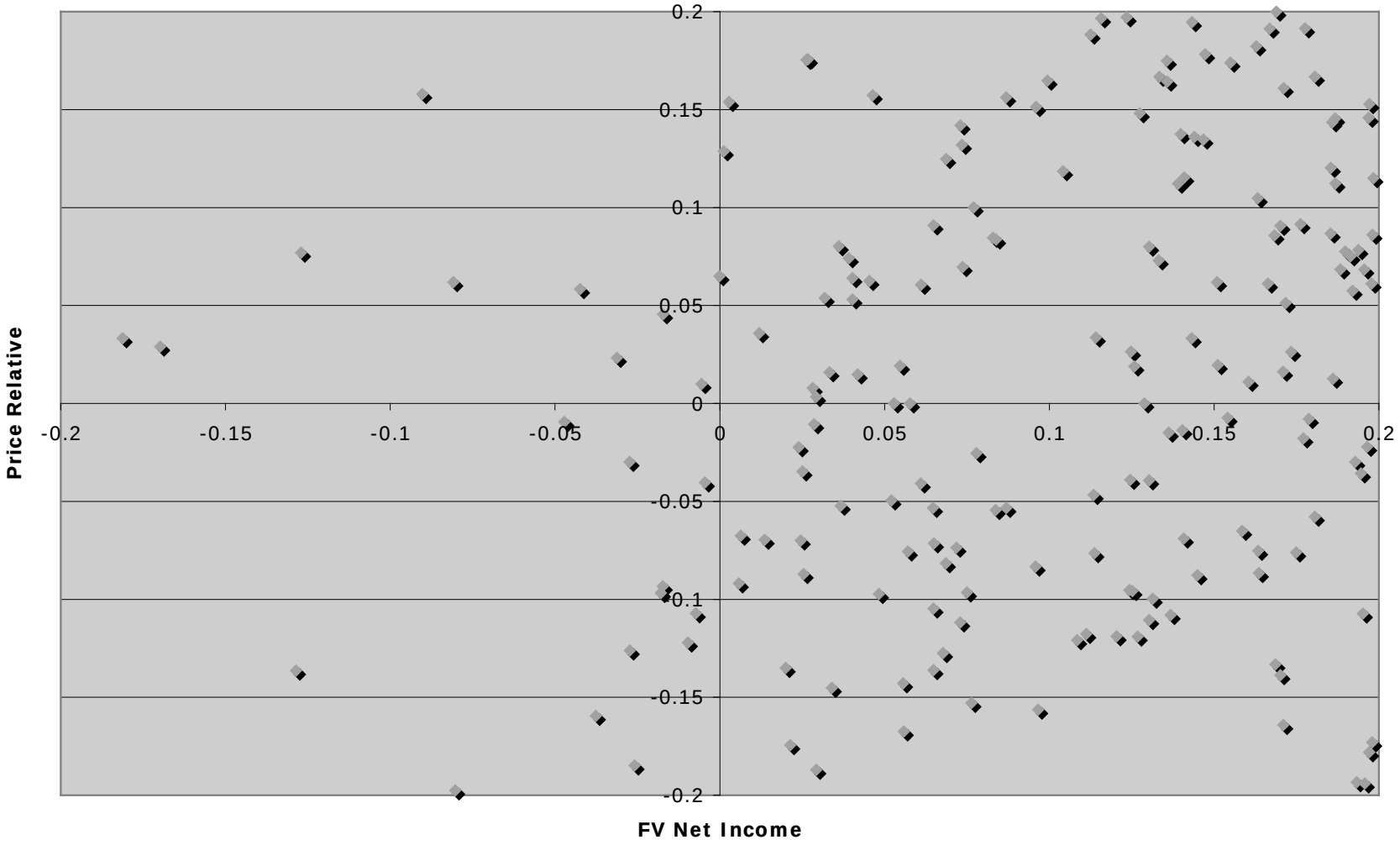


Figure 4
Real Estate Companies – Price Relative and Fair Value Net Income Close to Zero



Notes

[1] SFAS 157 identifies a three level fair value hierarchy, with level 1 referring to fair values based on input such as quoted prices in active markets for identical assets available at the measurement date. Level 2 inputs refers to other inputs that are observable, either directly or indirectly, while Level 3 inputs are unobservable (FASB, 2006). Earlier drafts of SFAS 157 included five levels and we would expect the greater fineness implied to be useful in distinguishing the appropriate position of real estate assets held for investment. Under the current statement, real estate assets would probably be designated level 2 if the valuation was based on market-corroborated inputs (such as prices per square foot of similar buildings), or level 3 if the information was generated within the firm. For our purposes the distinction is not crucial. It is obvious that real estate investment assets are dominated by financial assets valued by reference to a quoted market.

[2] In New Zealand, companies are allowed to recognise unrealised gains and losses either in the income statement or in the balance sheet revaluation reserve. Owusu-Ansah and Yeoh (2006) find no difference in value relevance of the two forms of recognition.

[3] This paper also includes results for financial as well as tangible assets.

[4] Since the adoption of International Accounting Standards by UK listed companies in 2005 (after the sample period included in our study), the accounting for investment properties is now governed by IAS 40. IAS permits companies to choose between reporting property values at cost or fair value. Gains or losses (in fair values or upon disposal if a cost model is adopted) are to be recognised as income or expense in the income statement.

[5] Before the 1995 SORP, most companies did not incorporate a columnar statement of total returns including capital returns, although the same information was typically included in the notes to the accounts.

[6] While real estate companies normally report a reconciliation of GAAP income to historic cost profits and losses, investment companies do not. In reality, the estimation of HC earnings is generally

more complex than the example above suggests. For example, it is usual for investment companies to simply split the management fees and interest between income and capital by some rule of thumb, often 50:50. To get from GAAP earnings to historic cost, any investment management fee or interest payable charged to capital needs to be deducted, while any tax that has been allocated to the capital rather than revenue element of the account needs to be added back.

[7] In this model, α_1 must encapsulate the unit value of opening capital plus the growth and discount rate needed to calculate the present value of the capital charge portion of residual income. α_2 will capture the growth and discount rate of the income element of residual income, including the growth of this year's income to next.

[8] While there are arguments for disaggregating Δni_{it} into ni_{it} and ni_{it-1}, we know of no theoretical rational or empirical evidence that would suggest that allowing the coefficients on opening and closing book value of equity to vary would provide useful information. It could also introduce considerable colinearity into the explanatory variables rendering interpretation of the results more difficult.

[9] Running regressions with ni_{it} and ni_{it-1} is equivalent to incorporating ni_{it} and Δni_{it}. This transformation has no impact on the explanatory power of the model.

[10] We conducted an audit for a sample of firm years. This included a random sample plus an investigation of cases where alternative approaches to estimating the variables produced large differences. We found no cases where the estimated values of the reserves were misleading, but minor differences persist in our estimates of historic cost and fair value earnings. These occur where transactions are debited or credited to the relevant reserve accounts that are not relevant to the revaluation assets or the recognition of realised earnings. This is not uncommon, but usually trivial. However, where share repurchases were conducted by investment trusts, they could write off the premium on cancelled shares to the realised capital account. These amounts could be large. We have therefore excluded all investment trust cases from our sample where we have evidence of share repurchase activity (where 'share capital issued', Extel Ref = cfi.s, is negative).

[11] The method for estimating the robust (rank) regression coefficients is an extension of the Mann-Whitney-Wilcoxon procedure. The procedure offers a robust, asymptotically distribution-free alternative to the usual least-squares analysis. The regression coefficients are found by minimising a measure of the dispersion of the residuals.

[12] Although R^2s are unreliable in the presence of heteroscedastcity, and strictly speaking reference should be made to the Wald tests of explanatory power, we often refer to the more familiar R^2 results to aid clarity. However, the models are based on the same data, which implies similar levels of heteroscedsaticity, and the R^2 results are consistent with the Wald tests.

[13] In the FV model, while the change in HC equity is highly significant under OLS and robust estimation, the coefficient loses significance under Fama-MacBeth estimation. This is due to a large negative coefficient for 1993 when we have only 15 observations. Excluding this year, Δeq becomes significant also under Fama-MacBeth estimation.

[14] Δrv is significant under OLS and robust estimation, but not under Fama-MacBeth estimation in the FV model.

[15] For the investment companies, the coefficient on Δni is (as indicated by italics in table 7) generally sensitive to the method of estimation. While the coefficient is significantly negative in the GAAP plus HC equity change model under OLS and robust estimation, Δni becomes insignificantly positive under Fama-Macbeth estimation.

[16] The γ_3 coefficients in the GAAP and HC models (as well as the γ_1 coefficient in the GAAP model) are significant under both OLS and robust regression techniques, although not under Fama-MacBeth estimation. The number of observations in some of the annual regressions for real estate firms is fairly small, resulting in somewhat erratic regression results.

[17] For the real estate companies, the γ_3 coefficient is significantly negative in the FV model under robust estimation. This may be indicative of aggressive FV accounting. However, while still negative, the γ_3 coefficient is not significant under either OLS or Fama-Macbeth estimation.

[18] There are 425 investment company cases (46.4% of the sample) with negative returns compared to 341 cases (37.3%) with negative niFV. There are thus almost 19.8% fewer negative niFV cases than we would expect from the changes in stock prices. For the real estate companies, the comparable figures are 164 cases (36.8%) of negative returns, but only 47 cases (10.5%) of negative niFV – a difference of 71.3%.