Value-relevance of reported changes in fair values and measurement-related fair value disclosures: evidence from the Australian real estate industry

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Abstract

Purpose – The paper aims to investigate the value-relevance of changes in fair values of investment property reported under International Accounting Standards (IAS) 40 and International Financial Reporting Standards (IFRS) 13.

Design/methodology/approach – Multivariate regression models are used to regress cumulative market-adjusted stock returns of real estate firms on changes in fair values, along with control variables and corporate governance variables, in order to examine the research question.

Findings – Using hand-collected data from the Australian Real Estate Industry (AREI), the authors find that changes in fair values of investment property are value-relevant for equity investors. The authors further find that using unobservable inputs in an active market (Level 3 inputs) does not diminish the information content of fair values. The authors document that properties valued exclusively by directors have a significantly reduced value-relevance, whereas property valuations made collectively by both directors and independent valuers have superior value-relevance, possibly owing to the combination of inside knowledge and externally imposed monitoring. Collectively, the findings suggest that in the real estate industry, where unobservable inputs are commonly used to determine fair values of properties, the fair values determined subjectively are perceived to be sufficiently informative and relevant.

Research limitations/implications – The authors' findings have important implications for accounting standard-setters in considering whether an external valuation should be required and whether the extensive measurement-related fair value disclosure requirements are useful.

Originality/value – The study extends previous archival evidence and complements prior commentaries on experimental and analytical work in the Australian regulatory environment.

Keywords Fair value, Value-relevance, Fair value hierarchy, Investment property, Real estate industry

Paper type Research paper

1. Introduction

This study investigates the value-relevance of changes in the fair value (CFV) of investment property [1] recorded and disclosed under IAS 40: Investment Property and IFRS 13: Fair Value Measurement. The motivation for this study stems from the ongoing debate regarding the beneficial effects of fair value reporting and its associated reliability trade-offs (Barth, 2018; Power, 2010). This is particularly relevant to non-financial assets because fair values of non-financial assets are difficult to verify in the absence of market price information on identical assets from an active market (Sundgren, 2013). As a result, the faithful

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representation of property fair values may be questionable, although such values are preferable from a value-relevance perspective (Barth, 2018; Georgiou, 2018; Landsman, 2007). Also, this study responds to a call for additional evidence on the consequences of the fair value accounting standards as encapsulated in IFRS (Chang *et al.*, 2018) and a joint call from the European Financial Reporting Advisory Group (EFRAG) (2017) and the International Accounting Standards Board (IASB) (2017) to better understand the post-implementation benefits of IFRS 13 [2].

Our study differs from prior research on the value-relevance of investment properties in the real estate industry in several ways. *First*, Israeli (2015), So and Smith (2009) and Bandyopadhyay *et al.* (2017) focus mainly on whether fair value reporting is superior to the historical cost and revaluation model and whether the CFV of investment properties are indicative of firms' future cash flows. We, however, aim to examine the information-usefulness of the CFV in investment property and the effects on the value-relevance of CFV of the reliability differences that stem from sources of fair value inputs and valuers. *Second*, the existing fair value research on the fair value input hierarchy is focussed primarily on financial instruments and on the banking industry (e.g. Bagna *et al.*, 2014; Song *et al.*, 2010). However, unlike financial instruments, investment properties are heterogeneous in nature, leading to low volumes of transactions (Ling and Archer, 2013) and, consequently, the usage of unobservable inputs [3] for fair value estimations are relatively common. Thus, our study offers an alternative implication of the effect of fair value input choice on the value-relevance of accounting information. Third, this paper further investigates whether extensive fair value disclosure enhances the value-relevance of the CFV: an issue not investigated in the studies cited above.

We focus on the CFV of investment property in the AREI for the following reasons. First, the fair value measurement under IAS 40 applies to investment properties, and investment properties are the primary operating assets of real estate companies [4] (In the AREI, on average, they represent 70% of total assets). Second, there is extensive fair value information coverage in the AREI, as the current value-reporting concept has been applied in the Australian market for decades (Cairns *et al.*, 2011; Yao *et al.*, 2015). Third, the transparent financial environment of the AREI is known as the world's best practice structure for listed real estate entities (Steinert and Crowe, 2001). Such transparency could be a result of the "Continuous Disclosure" regulation under the Australian Securities Exchange [ASX] Listing Rules 3.1, which requires listed firms on the ASX to reveal information that would have a material effect on the prices or values of securities in a timely manner. This requirement may enhance the value-relevance of published accounting information to equity investors, especially in the real estate market, where capital providers generally suffer from imperfect information about the future demand for property (Hilbers *et al.*, 2001; Ling and Archer, 2013). Therefore, these characteristics make the AREI a particularly suitable subject for investigating the value-relevance of accounting information, i.e. CFV in particular.

Following the accounting literature, we measure the value-relevance of CFV as the statistical association between share returns and CFV [5]. This approach is also consistent with the value-relevance notion proposed by Barth *et al.* (2001), which contends that accounting information is value-relevant if it has explanatory power for share returns. Further, this method is in line with the IFRS conceptual framework (IASB, 2010), which states that the information is relevant if it has the ability to influence economic decision-making.

We hand-collect the required data for the sample periods 2007–2015. We document several interesting findings. First, the results show that CFV has a statistically positive relationship with the seven-day (one-month or three-month) cumulative abnormal stock returns surrounding the preliminary earnings announcement dates, suggesting that investors consider CFV sufficiently reliable and relevant in making investment decisions. Second, we further find that the use of unobservable inputs does not reduce the value-relevance of the

CFV, indicating that such inputs, at least, provide comparable information about property values for real estate firms. Third, we find the value-relevance of CFV greater for firms employing external valuations and/or valuations conducted by mixed valuation, than for firms using director valuation only. And finally, we fail to document any moderating effects of disclosure quality on the value-relevance of CFV. This could be explained by the fact that companies in the AREI are likely to disclose capitalisation rates, which seem to be the information most relevant to property values. As long as this piece of information is disclosed, equity investors can access the key indicators (i.e. capitalisation rates and tenant portfolios) related to CFV from other sections in the annual report.

Our study contributes to research and standard-setting on fair value reporting in the real estate and non-financial assets contexts in multiple ways. First, we provide direct evidence that fair values of investment properties are useful despite the subjectivity inherent in the fair value estimation because of the heterogeneous characteristics of the real estate market. Thus, this study is valuable because it reports empirical evidence on a widely debated topic in the accounting community (Warne, 2020). Second, Barth *et al.* (2001) contend that the majority of value-relevance research implications have joint implications for both relevance and reliability. We contribute to this insight by documenting that the use of Level 3 inputs in fair value estimates does not impair fair value information content in the real estate sector. Third, we also contribute to the accounting standard-setting domain. Based on the findings, we suggest that accounting standard-setters consider requiring firms to employ the mixed-valuation approach. In addition, the IASB has encouraged discussion on a better understanding of the post-implementation effects of the IFRS 13 (IASB, 2017). The findings from the value-relevance of additional disclosures imply that in the real estate industry, where companies are most likely to reveal information about property values, the extensive disclosure requirements under this standard may be an uneconomical and wasteful practice and may even cause information overload.

The remainder of the paper proceeds as follows. The following section introduces the institutional background of the real estate industry in general and the Australian real estate market in particular. Section 3 reviews the related literature and develops hypotheses. The research methods, sample selection procedure and descriptive results are reported in Section 4. Section 5 reports the regression results, and Section 6 concludes the paper.

2. The AREI and Australian financial information environment

The AREI has a long history. The real estate association was established in 1923, signalling the growth of interest in the real estate sector (Real Estate Institute of Australia, 2017). Since the 1970s, the market has grown steadily at approximately 3% annually (Stapledon, 2010). The AREI includes about 84 publicly traded entities on the ASX as of 23 March 2017. AREI has a world-top ranking given by foreign investors as an attractive source of investment. It is considered to be a highly scrutinised market by the corporate regulators (i.e. Australian Securities and Investments Commission) (Australia and New Zealand Banking Group, 2017).

Australian real estate firms' classification and distribution requirements are different from those of other countries, particularly the USA and the UK [6] There are two main types of real estate companies in Australia: Australian Real Estate Investment Trusts (AREITs) and Australian Real Estate Operating Companies (AREOCs) (Einhorn *et al.*, 2000). AREITs are structured as unit trusts and have a major benefit in accessing flow-through tax treatment: entities can pass income on to the owners and/or investors by not engaging in active real estate investment activities [7]. The AREOCs, on the other hand, are not prohibited from conducting active real estate operations. AREITs are dominant in the AREI (Einhorn *et al.*, 2000). As for dividend distributions, REITs in the UK and the USA are required to distribute, at least, 90% of their rental profits, whilst there is no such distribution requirement

for AREITs (PwC, 2011). However, since the undistributed income may be subject to higher-tax rates, the AREITs are less likely to retain earnings and, instead, tend to distribute dividends to avoid the associated tax. This necessitates AREIT reliance on external financing to generate funds for investment activities. Being dependent on external capital can drive firms to strive for financial transparency (Danielsen *et al.*, 2014). Therefore, AREI managers have incentives to adopt prudent accounting policies and report financial information transparently in order to enhance information-usefulness to investors.

The continuous disclosure principle characterises the Australian stock market information environment. ASX Listing Rule 3.1 "Continuous disclosures" requires listed entities to publicly disclose information that has the potential to materially affect the price or value of the firms' securities (ASX compliance, 2013). All material public information can be accessed freely by investors from the ASX website. Listing Rule 3.1 of the ASX is considered very important for the integrity of the Australian stock market (Hsu, 2009). Russell (2015) reports that continuous disclosure has a significant association with stock price revisions, thus indicating that continuous disclosure is informative to equity investors about firm valuation. Furthermore, all such material information is required to be disclosed to ASX directly before its revelation to other information intermediaries (e.g. analysts and media) (Beekes *et al.*, 2015).

3. Literature review and hypotheses development

3.1 Aggregate valuation changes and equity investors' economic decision-making

Real estate asset values tend to fluctuate widely, and historical cost-reporting is insufficient to capture the relevant economic information about these assets (Fortin *et al.*, 2008; Searfoss and Weiss, 1990). The fair value accounting model is desirable from the economic perspective, as it is based on current value reporting, providing up-to-date and relevant information (Barth, 2018). The fair value accounting model for real estate assets provides users with information on potential financial resources that may be available to an entity through the use or sale of these assets and reveals changes in the values of these assets from one reporting period to another (Barth, 2018; Georgiou, 2018; Landsman, 2007).

As a product of the current reporting concept, IAS 40 "Investment Property" was issued in 2000 and came into effect in the European Union (EU) and many developed countries, including Australia, after 2005 (Cairns *et al.*, 2011; Yao *et al.*, 2015). The Australian Accounting Standards Board (AASB) 140, the Australian implementation of IAS 40, was mandated in 2007. AASB 140 defines investment properties and permits firms to apply fair value measurements to assets classified as investment properties. In AASB 140, investment properties are defined as properties held (by means of purchase, construction or lease) to earn rental income, gain from capital appreciation or both. In the fair value accounting model, investment properties are reported on the statement of financial position at fair value, and changes in those fair values are recognised as profit or loss.

However, obtaining observable market inputs for fair value estimates on an investment property is complex owing to its illiquid nature [8]. Consequently, AASB 140 allows firms to use valuation techniques based on managerial assumptions and inputs (i.e. rental income and discount rate) when observable inputs are not accessible directly from the market. Firms in the AREI have used four major valuation methods to measure fair values for investment properties (Ernst and Young, 2012). The first method is the discounted cash flow (DCF) model based on discounting expected future cash flows. The second method is the "comparable method", which is typically used when comparable transactions in the active markets are available. The third method is the "yield capitalisation method" [9]. The yield capitalisation method is also commonly used to estimate terminal values: an important input into methods, such as DCF (Geltner *et al.*, 2001; Ling and Archer, 2013). Finally, the last method is the "mixed

approach", and it generally blends the "yield capitalisation" method and the DCF method (Ernst and Young, 2012).

Providing timely and detailed accounting information and management's estimates of fair values may reduce the systematic information risk and enhance information transparency (Barlev and Haddad, 2003; Sengupta, 1998). Equity investors evaluate the firm's risks according to accessible and available information when investing in the firms (Jacoby *et al.*, 2019). That is, uninformed investors facing information-based systematic risk would compensate for that risk by discounting firms' share prices and charging a higher cost of capital (Francis *et al.*, 2005). With the fair value paradigm, firms provide greater levels of information and more thorough disclosures (Barlev and Haddad, 2003), allowing managements to provide private information about future cash flows expected from their firms' investment properties. In addition, when fair values of real estate properties are changed, the new information conveyed after the application of fair value accounting reduces information asymmetry and enhances the predictive usefulness of accounting information (Bandyopadhyay *et al.*, 2017; Barlev and Haddad, 2003).

Research examining the value-relevance of the fair value accounting model for investment properties documents that this accounting model is useful to financial report users [10]. Using data from the USA real estate companies, which comprises historical-cost-based measurements in general, Fields *et al.* (2001) report recognition of impairment loss for investment property is associated incrementally with firms' share prices. However, with a sample from three European countries (i.e. France, Germanyand Italy), where the revaluation model was not allowed before the IFRS adoption, Israeli (2015) finds that investors place a lesser weight on disclosed fair values relative to recognised fair values. In the UK, Dietrich *et al.* (2000) investigate the reliability of fair values for investment property by comparing pre- and post-IFRS periods and find that estimated fair values are more accurate than historical costs. Likewise, So and Smith (2009) examine the value-relevance of fair value adjustments for investment properties recognised in the income statement using Hong Kong data and find that the adjustments presented in the income statement as a profit and/or loss are more value-relevant compared to those presented in the revaluation reserve account as equity.

On the other hand, the exclusive use of a management-estimated approach can introduce subjectivity in fair value estimation for investment properties and can create an inconsistency with the fair value definition specified by IFRS 13. Under IFRS 13, fair value is a market-based measurement instead of an entity-specific measurement (IASB, 2011, para. 2). Opponents of fair value accounting argue that the IASB's goal of providing current value information based on current market conditions may not be met when significant managerial discretions are embedded in the fair values (Gonçalves and Lopes, 2014; Marsh and Fischer, 2013). Dechow *et al.* (2010), too, suggest that opportunistic managements may use the flexibility given by the fair value accounting model to engage in earnings management. Even though fair value reporting is desirable from the economic perspective, this accounting model may entail reduced reliability and increased subjectivity. In turn, if up-to-date fair values are affected by managerial opportunism, they may not be so reliable and value-relevant.

However, we posit that the unique characteristics of the AREI, namely, its reliance on external financing, should encourage managers to be transparent and to provide fair value information that is value-relevant to equity investors. Furthermore, although fair value estimates are subject to the opportunism argument, managerial estimations are based on the stabilised vacancy rate and contractual tenants (Born and Pyhrr, 1994; Hilbers *et al.*, 2001); hence, it can be fairly verifiable. That is, the CFV is likely to indicate whether the property is attractive to tenants or not. Consequently, the CFV of investment properties can reduce the

information gap between managers and uninformed equity investors about property values. Therefore, our fitrst hypothesis is stated as follows:

H1. The reported CFVs of investment properties are value-relevant to equity investors, ceteris paribus.

3.2 Aggregate Level 3 fair value inputs and the information content

Although the fair value accounting model has been promoted from the value-relevance perspective, there is an ongoing debate on whether fair values of identical assets and/or liabilities are still value-relevant when such values are unobservable in the active market (Yao *et al.*, 2018). As noted previously, owing to the illiquid characteristic, fair value estimates for investment property are most likely to rely on valuation techniques incorporating unobservable inputs in the active market (e.g. DCF with managements' assumptions). Arguably, the estimated fair values with unobservable inputs may lead to lower-financial-reporting quality, affecting the fair value information content since value-relevance depends on the reliability of fair values (Kadous *et al.*, 2012; Koonce *et al.*, 2011).

In order to help financial report users to distinguish and assess the quality and reliability of fair values, IFRS 13 was issued and came into effect in 2011 and 2013, respectively (IASB, 2011). IFRS 13 requires firms to classify fair values according to the quality of inputs used in fair value estimates: the so-called fair value hierarchy of disclosures. Level 1 fair value inputs are the unadjusted quoted prices of identical assets and/or liabilities in an active market. Level 2 inputs refer to adjusted observable market inputs, whilst Level 3 inputs are unobservable inputs from active markets using valuation techniques with managements' judgements and assumptions. Amongst the three fair value hierarchies, the Level 3 fair values appear to be the least reliable and verifiable, thereby lowering financial information quality (Kadous *et al.*, 2012; Koonce *et al.*, 2011).

Using Level 3 inputs in fair value estimates can provide managers with earnings management opportunities (Ramanna and Watts, 2012; Yao *et al.*, 2018) and, consequently, reduce information quality. Prior evidence on the value-relevance of fair values generally suggests that the information-usefulness of such values differs based on the input levels and suggests that investors consider Level 3 estimates as less reliable and less useful than the observable Levels 1 and 2 inputs. Bagna *et al.* (2014) report that the capital market assigns a material discount on fair values obtained using Level 3 inputs. Likewise, Magnan *et al.* (2016) find that the debt market charges a higher cost of debt for firms using Levels 2 and 3 fair value inputs.

On the other hand, using unobservable inputs or management assumptions in fair value estimates for investment property could make financial reports more transparent. In the real estate industry, Vergauwe and Gaeremynck (2019) show that firms employing valuation models to estimate the fair value of their investment properties have provided higher levels of information related to model assumptions and more accurate fair values. Likewise, Barron *et al.* (2016) and Altamuro and Zhang (2013) show that Level 3 fair values of mortgages can mitigate the uncertainty in analysts' information environments and better reflect the persistence of future cash flows than can Level 2 inputs. Lawrence *et al.* (2016) also conclude that the information-usefulness of Level 3 fair values is not different from that of Level 1 and Level 2 fair values. Lawrence *et al.* (2016) use the closed-end fund setting, where fair values for the majority of assets can be observed directly.

In the real estate industry context, where unobservable inputs are predominant because of the lack of an active market and values of properties rely heavily on future cash flow from rents (Ernst and Young, 2013; PwC, 2011), equity investors may not discount the information content of Level 3 fair values owing to reliability concerns. Supporting this view, prior studies in this area show that neither auditors nor debt-holders view fair values of investment

property estimated with Level 3 inputs as less reliable than those estimated with Level 2 inputs (Sangchan *et al.*, 2020a, b). Underpinned with this line of argument and evidence, the information content of fair values of investment property classified as Level 3 may not be valued differently from that measured with Level 2 inputs. Based on the preceding competing arguments, we develop the hypothesis as follows:

H2. The value-relevance of reported CFV of investment property estimated with Level 3 inputs is not different from those estimated with Level 2 inputs, ceteris paribus.

3.3 The director valuation approach and the information content

Dietrich *et al.* (2000) find that external valuers provide less-biased and more-accurate estimates, relative to internal valuers or managements. Muller and Riedl (2002) report that the market perceives lower levels of information asymmetry (proxied by bid-ask spreads) when the firms employ external valuers rather than internal valuers. As an external appraisal is considered as being relatively more credible (less biased) (Muller and Riedl, 2002), firms' choice of valuers to conduct fair value estimates for an investment property can affect the reliability and value-relevance of such estimated values, accordingly.

Although the AASB 140 does not require fair values to be estimated by external valuers, this remains a preferred practice. Fair value estimates in the AREI can be conducted by independent valuers (the external valuation), internal valuers (the director valuation only) or a mixture of both (mixed valuation) (Ernst and Young, 2012). In the real estate industry, on average, 40% of firms employ the director valuation only to estimate properties' fair values (Ernst and Young, 2012), although this option is perceived as comparatively biased and less reliable.

Defining reliability in terms of ex-post adjustments of recognised value increases, and using a sample of Australian asset revaluations, Cotter and Richardson (2002) find that revaluations of plant and equipment that are valued by independent valuers are more reliable than those valued by directors. However, this finding does not apply to revaluations of investment properties and identifiable intangible assets. The authors interpret this as evidence that directors of investment property and intangible asset-dependent firms have been chosen to ensure that asset-specific knowledge is embedded in their director valuations. As properties and intangible assets are typically heterogeneous in nature, the knowledge specific to a given asset may be required for a more accurate valuation. This explains the popularity of using director valuations in the AREI.

Considering the arguments from both sides, it is rational to presume that a mixed valuation approach would have an advantage, as it possesses the favourable characteristics of both the director and external valuation approaches. The mixed valuation approach benefits from directors' asset-specific knowledge whilst still maintaining a degree of reliability – thanks to the incorporation of independent valuers' opinions. Essentially, even though firms are involved in self-valuation when using the director valuation approach, firms using a mixed valuation approach have an extra layer of external assurance from independent valuers, and this may reduce the information-based risk of CFV. Therefore, we posit that the use of director valuation exclusively would reduce the reliability and value-relevance of fair value estimates as follows:

H3. The reported change in fair value of investment properties is less value-relevant when the valuation of investment properties is carried out by directors exclusively, ceteris paribus.

3.4 An extensive fair value measurement-related disclosure and the information content

Although AASB 140 requires firms to use a fair value accounting model to disclose information about fair value estimates, the disclosures made by firms are often insufficient to allow investors to make efficient economic decisions (Sundgren *et al.*, 2018). In addition to fair value hierarchy disclosure, AASB 13 also requires firms to supply more detailed information about fair value estimates. For example, AASB 13 requires firms to disclose the discount rates, which are key inputs in present value calculation for DCF models, and to conduct sensitivity analyses on the key unobservable inputs that may affect fair value measurements significantly. Additional requirements under AASB 13, together with AASB 140 requirements (e.g. expected rental income and growth rate of rental income) would be helpful for equity investors to verify and assess the quality of fair values of investment properties.

Although there is concern over information overload caused by an additional volume of disclosure (Singh and Peters, 2015), additional disclosures are likely to be the key components for property valuations and useful for equity investors. Real estate firms typically employ unobservable inputs to estimate the values of real estate holdings and, consequently, there might be a high level of information asymmetry. Therefore, additional disclosures required by AASB 13 would give equity investors detailed information for estimating the future cash flows expected to be generated by the portfolio of investment properties. Consistent with this, Sundgren *et al.* (2018) report that firms complying with the disclosure requirements of IAS 40 and IFRS 13 are more likely to be followed by analysts and tend to have higher market liquidity. Therefore, we posit that CFV could be more informative if such values are reported by firms providing high-quality disclosures about fair value valuation inputs instead of firms providing low-quality disclosures. Thus, we hypothesise as follows:

H4. The reported change in the fair value of investment properties is more value-relevant when firms provide high-quality additional disclosures, ceteris paribus.

4. Research design

We employ an event-study approach to investigating the value-relevance of fair value application to investment properties. Specifically, we investigate the association between cumulative abnormal stock returns with fair value of investment properties during the event windows around the event day: the preliminary earnings announcement date (day 0). We select three-event windows, including a seven-day window (−3 days and +3 days), a one-month window (0 and +1 month) and a three-month window (0 and +3 months) [11].

The ASX Listing Rules require listed Australian companies to release their financial reports within four months following the end of the financial year. The preliminary results, which include, but are not limited to, the financial statements, are required to be published within two months after the end of an accounting period. Hence, the preliminary final report announcement dates are identified as the "earnings announcement date" in conducting the empirical tests. Although the preliminary reports may contain other types of information, information regarding the fair value and the CFV of investment properties is expected to be necessary to investors, since these are the key operating assets for real estate firms. We hand-collected earnings announcement dates from the ASX website.

4.1 Empirical model

Following Easton *et al.* (1993) and Barth and Clinch (1998), we begin with the relationship between the information content of earnings and the cumulative abnormal share returns in the AREI context. That relationship is expressed in equation (1) as follows:

$$\mathrm{RET}_{i,t} = \beta_0 + \beta_1 \mathrm{EARN}_{i,t} + \beta_2 \Delta\mathrm{EARN}_{i,t} + \beta_3 \mathrm{SIZE}_{i,t-1} + \beta_4 \mathrm{GROWTH}_{i,t-1} + \beta_5 \mathrm{LEV}_{i,t} + \beta_6 \mathrm{CAPRATE}_{i,t} + \beta_7 \mathrm{BIG4}_{i,t} + \beta_8 \mathrm{RC}_{i,t} + \beta_9 \mathrm{MEET}_{i,t} + \beta_{10} \mathrm{OWN}_{i,t} + \mathrm{FIRM\_FE} + \mathrm{YEAR\_FE} + \varepsilon_{i,t} \quad (1)$$

where, RET is the seven-day [RET(7d)] {one-month or three-month [RET(1m)] or [RET(3m]} cumulative abnormal stock returns (adjusted for market returns), which is centred on the preliminary final report announcement date. EARN and ΔEARN are the level and change in earnings, which are scaled by the total market value of the firm at the beginning of the accounting year [12]. We include ΔEARN in the model, as it captures unexpected earnings (transitory components) under the assumption that annual earnings are permanent (Easton and Harris, 1991). We expect both these coefficients to be positive and significant if the stock returns and accounting information relationship holds.

Following the value-relevance literature (e.g. Bandyopadhyay *et al.*, 2017; So and Smith, 2009), a number of control variables are included in the regression equation above. SIZE is the natural logarithm of the market value of a firm at the beginning of the accounting year. Atiase (1985) hypothesises and finds evidence consistent with an inverse relationship between firm size and abnormal return in the USA market. However, a more recent study points out that such inverse relationships between these two are context dependent (Astakhov *et al.*, 2017). GROWTH is firm growth opportunities and is measured as market value of equity divided by book value of equity at the beginning of the year. We expect a negative coefficient [13], although a positive coefficient would be consistent with positive abnormal returns for high-growth firms that persist in the future (Habib, 2008). LEV is the ratio of mortgages and other interest-bearing liabilities to market values of real estate at the end of the accounting year and is obtained from the annual reports of sample firms. Although the theoretical literature suggests a positive association between leverage and returns (Giacomini *et al.*, 2015), Nellessen and Zuelch (2011) show that a high debt to equity ratio is not perceived as being risky for real estate firms. CAPRATE represents the capitalisation rate at the accounting-year end and is defined as net-operating income divided by the property market value. CAPRATE reflects specific risks and returns that are related to properties and is also helpful to investors to form the trend and to indicate the direction of their real estate market and properties portfolio (PropertyMetrics, 2013). Therefore, we expect a positive coefficient of CAPRATE. BIG4 is a dummy variable coded 1 if a firm is audited by one of the Big 4 firms, and 0 otherwise, and is expected to be related to returns positively (Sundgren *et al.*, 2018; Vergauwe and Gaeremynck, 2019).

We also include corporate governance variables, as prior studies find that the value-relevance of fair values can be strengthened by firms' corporate governance mechanisms (e.g. Song *et al.*, 2010). We employed three corporate governance proxies: the existence of risk management committees [a dummy variable equal to 1 if firms have a risk management committee and 0 otherwise (risk committee (RC))], the frequency of audit committee meetings (MEET) and the percentage of institutional unitholders (OWN). We expect the coefficient of RC to be positive, as RCs have a vital role in reducing business risks: action that is valued by investors, especially in industries where assets have unique characteristics (Kallamu, 2015; Pakhchanyan, 2016). Likewise, the coefficients of MEET and OWN are also expected to be positive, as audit committees are responsible for monitoring the quality of financial reporting and institutional shareholders with a larger stake in firms have an incentive to activate the monitoring activities (Gillan and Starks, 2000). That is, investors perceive firms with larger numbers of MEETs and a greater percentage of OWN as low risk and price those firms as

high-value firms accordingly. Additionally, the regression equation includes firm- and year-fixed effects (FIRM_FE and YEAR_FE).

To test H1, we estimate the relationship between the cumulative share returns and the CFV of investment property by modifying equation (1). In so doing, we include the CFV of investment property as a separate component of earnings in the equation as follows:

$$\begin{aligned} \mathrm{RET}_{i,t} = {} & \beta_0 + \beta_1 \mathrm{EARN}_{i,t} + \beta_2 \Delta\mathrm{EARN}_{i,t} + \beta_3 \mathrm{CFV}_{i,t} + \beta_4 \mathrm{SIZE}_{i,t-1} + \beta_5 \mathrm{GROWTH}_{i,t-1} \\ & + \beta_6 \mathrm{LEV}_{i,t} + \beta_7 \mathrm{CAPRATE}_{i,\mathrm{t}} + \beta_8 \mathrm{BIG4}_{i,t} + \beta_9 \mathrm{RC}_{i,t} + \beta_{10} \mathrm{MEET}_{i,t} + \beta_{11} \mathrm{OWN}_{i,t} \\ & + \mathrm{FIRM\_FE} + \mathrm{YEAR\_FE} + \varepsilon_{i,t} \end{aligned} \tag{2}$$

where CFV, which is the variable of interest, is defined as changes in fair value of investment properties, scaled by the total market value at the beginning of the year. Notably, EARN and ΔEARN are the level and change in earnings *before* CFV, which are scaled by the total market value of the firm at the beginning of the accounting year. Equation (2) is the baseline model used in this study for testing the value-relevance of CFV of investment properties. Other variables are as previously defined. A positive and significant coefficient of CFV would support H1.

To investigate H2, which tests the moderating effect of Level 3 inputs in fair value estimates on the value-relevance of CFV, we estimate the regression specification as follows:

$$\begin{aligned} \mathrm{RET}_{i,t} = {} & \beta_0 + \beta_1 \mathrm{EARN}_{i,t} + \beta_2 \Delta\mathrm{EARN}_{i,t} + \beta_3 \mathrm{CFV}_{i,t} + \beta_4 \mathrm{LEVEL3}_{i,t} \\ & + \beta_5 \ \mathrm{CFV}_{i,t} * \mathrm{LEVEL3}_{i,t} + \beta_6 \mathrm{SIZE}_{i,t-1} + \beta_7 \mathrm{GROWTH}_{i,t-1} + \beta_8 \mathrm{LEV}_{i,\mathrm{t}} \\ & + \beta_9 \mathrm{CAPRATE}_{i,t} + \beta_{10} \mathrm{BIG4}_{i,t} + \beta_{11} \mathrm{RC}_{i,t} + \beta_{12} \mathrm{MEET}_{i,t} + \beta_{13} \mathrm{OWN}_{i,t} \\ & + \mathrm{FIRM\_FE} + \mathrm{YEAR\_FE} + \varepsilon_{i,t} \end{aligned} \tag{3}$$

LEVEL3 is a dummy variable coded 1 if firms used Level 3 inputs in their fair value estimate and 0 otherwise [14]. The interactive variable, CFV*LEVEL3, our variable of interest, captures the incremental value-relevance of CFV when LEVEL3 inputs are used. An insignificant coefficient of the interactive variable would be consistent with H2. Other variables are as defined previously.

To test H3, we include DIR_VAL, a dummy variable coded 1 if firms use the standalone director valuation for estimating fair values and 0 otherwise, along with an interactive variable, CFV*DIR_VAL, as the variable of interest. The latter captures the moderating effects of the sources of valuation on the value-relevance of CFV. If the independent valuation is more credible, then the coefficient of CFV*DIR_VAL would be negative and significant. Other variables are as defined previously. The regression equation is as follows:

$$\begin{aligned} \mathrm{RET}_{i,t} = {} & \beta_0 + \beta_1 \mathrm{EARN}_{i,t} + \beta_2 \Delta\mathrm{EARN}_{i,t} + \beta_3 \mathrm{CFV}_{i,t} + \beta_4 \mathrm{DIR\_VAL}_{i,t} \\ & + \beta_5 \mathrm{CFV}_{i,t} * \mathrm{DIR\_VAL}_{i,t} + \beta_6 \mathrm{SIZE}_{i,t-1} + \beta_7 \mathrm{GROWTH}_{i,t-1} + \beta_8 \mathrm{LEV}_{i,t} \\ & + \beta_9 \mathrm{CAPRATE}_{i,t} + \beta_{10} \mathrm{BIG4}_{i,t} + \beta_{11} \mathrm{RC}_{i,t} + \beta_{12} \mathrm{MEET}_{i,t} + \beta_{13} \mathrm{OWN}_{i,t} \\ & + \mathrm{FIRM\_FE} + \mathrm{YEAR\_FE} + \varepsilon_{i,t} \end{aligned} \tag{4}$$

Finally, to test H4 (the value-relevance of CFV of investment properties and conditional on disclosure quality), we follow Vergauwe and Gaeremynck (2019) and Sundgren *et al.* (2018) in constructing a disclosure-quality index. The index consists of (1) discount rate (a score of 1 is assigned if firms disclosed the discount rate or yield rate in the notes); (2) assumptions about expected rental incomes and operating expenses (a score of 1 is assigned if firms disclosed expected rents in the notes); (3) vacancy rate (a score of 1 is assigned if firms revealed the

vacancy rate); (4) the sensitivity of fair value estimates (a score of 1 is assigned if firms provide a narrative sensitivity analysis as required by IFRS 13) and (5) quantitative sensitivity analysis (a score of 1 is assigned if a firm provides such information on the notes). We sum the scores for the respective firm-year observations and generate DISCL, which is a dummy variable coded 1 if DISCL is greater than the median DISCL and 0 otherwise. The interactive variable, CFV*DISCL, captures the value-relevance of CFV conditional on disclosure quality. LEVEL3 is included as a control variable because it can affect the level of information disclosure (Ernst and Young, 2013). A positive and significant coefficient of the interactive variable would support H4. The regression equation is stated as follows:

$$\begin{aligned} \mathrm{RET}_{i,t} = {} & \beta_0 + \beta_1 \mathrm{EARN}_{i,t} + \beta_2 \Delta\mathrm{EARN}_{i,t} + \beta_3 \mathrm{CFV}_{i,t} + \beta_4 \mathrm{DISCL}_{i,t} + \beta_5\ \mathrm{CFV}_{i,t} * \mathrm{DISCL}_{i,t} \\ & + \beta_6 \mathrm{LEVEL3}_{i,t} + \ \beta_7 \mathrm{SIZE}_{i,t-1} + \ \beta_8 \mathrm{GROWTH}_{i,t-1} + \beta_9 \mathrm{LEV}_{i,t} + \beta_{10} \mathrm{CAPRATE}_{i,t} \\ & + \beta_{11} \mathrm{BIG4}_{i,t} + \beta_{12} \mathrm{RC}_{i,t} + \ \beta_{13} \mathrm{MEET}_{i,t} + \beta_{14} \mathrm{OWN}_{i,t} + \mathrm{FIRM\_FE} \\ & + \mathrm{YEAR\_FE} + \varepsilon_{i,t} \end{aligned} \tag{5}$$

4.2 Sample selection and descriptive analysis

This study consists of all the real estate companies listed on the ASX for the period 2007–2015. There were 84 publicly traded entities on the ASX as of 23 March 2017. We began with 2007 because AABS 140 (equivalent to IAS 40) was first mandated in 2007. We collected CFV of investment property, earnings and corporate governance information manually from the firms' preliminary final reports. Individual equity returns and the return on the market portfolio (ASX 200) were derived from the DataStream. The initial sample included a total of 84 listed companies in the AREI sector, with a total of 756 firm-year observations. We then deleted 18 firm-year observations applying the historical cost method. After that, we excluded 297 observations with no reported investment property values on their financial reports (e.g. developers for whom the properties are treated as inventories). We further dropped 123 firm-year observations with missing relevant financial data. The final sample includes 318 observations. Panel 1 of Table 1 reports the sample selection procedures in detail.

Panel B of Table 1 reports the descriptive statistics. The cumulative abnormal stock returns around the seven-day event window, RET(7d), have a mean (median) value of −0.003 (−0.004) with a standard deviation of 0.078. The cumulative abnormal stock returns around the one-month and three-month event windows, RET(1m) and RET(3m), have a mean value of −0.004 and −0.017, respectively. The mean (median) of CFV is −0.013 (0.017).

Table 2 presents the correlation coefficients amongst the variables. The correlation between RET(7d) and CFV is positive and statistically significant (coefficient = 0.29 and $p < 0.01$). RET(7d) is also related to LEVEL3 positively, but this relationship is insignificant. Similarly, DIR_VAL and DISCL are correlated with RET(7d) positively and insignificantly. Correlation analysis also shows GROWTH (CAPRATE) to have a negative (positive) association with RET(7d). To eliminate the concern over multicollinearity, we also run the estimated variance inflation factor (VIF) for every fitted model in the main tests. The mean VIFs range from 1.64 to 2.19. Given that mean VIFs are less than ten [15], multicollinearity is not a concern.

5. Main results

Table 3 reports the regression results for the four hypotheses developed in Section 3. We use RET(7d) as our dependent variable for all the models presented in Table 3. Results reported in Column (1) demonstrate that both earnings (EARN) and changes in earnings (ΔEARN) are

Panel A: Sample selection

Procedures	Firm-years observations
Original observations	756
After excluding observations using historical cost method	738
After excluding observations without investment property	441
After excluding observations with missing value of variables	318

Panel B: Regression variables

Continuous variables	Mean	SD	25%	Median	75%	*N*
RET(7d)	−0.003	0.078	−0.202	−0.004	0.013	318
RET(1m)	−0.004	0.078	−0.120	−0.005	0.011	318
RET (3m)	−0.017	0.148	−1.002	−0.017	0.011	318
EARN	0.348	0.993	−0.434	0.023	0.175	318
ΔEARN	0.090	0.516	−0.821	−0.008	0.127	318
CFV	−0.013	0.234	−0.823	0.017	0.070	318
DISCL	2.260	1.710	1.000	2.000	4.000	318
SIZE	5.814	1.978	1.589	5.745	7.263	318
GROWTH	1.072	1.392	0.120	0.885	1.100	318
LEV	0.274	0.218	0.001	0.279	0.425	318
CAPRATE (%)	7.729	1.622	4.000	7.750	8.575	318
MEET	4.522	2.080	1.000	4.000	6.000	318
OWN (%)	72.858	19.148	7.170	76.850	86.675	318

Dichotomous variables	Yes Frequency (%)	No (%) Frequency (%)	*N*
LEVEL3	258 (81)	60 (19)	318
DIR_VAL	186 (58)	132 (42)	318
DISCL (Low VS High)	145 (46)	173 (54)	318
BIG4	244 (77)	74 (23)	318
RC	254 (80)	64 (20)	318

Note(s): All continuous variables are winsorised 1% at the top and the bottom. See Appendix 1 for variable definitions

Table 1.
Sample selection and descriptive statistics

value-relevant in the AREI setting (coefficient = 0.016, *t*-stat = 1.87 and $p < 0.10$ and coefficient = 0.106, *t*-stat = 3.51 and $p < 0.01$, respectively).

5.1 Summary of findings from H1

We then include CFV, the main variable of interest related to H1, and report the results in column (2). Column (2) reports that CFV is associated with RET(7d) positively (coefficient = 0.092, *t*-stat = 3.62 and $p < 0.01$). In terms of economic impact, the result suggests that a one standard deviation increase in CFV increases stock returns by about 2.15% [16]. Overall, the finding is consistent with the argument that subjective fair values of investment properties can reduce information-based risk by providing private information from managers about the future resource-generating capabilities of a portfolio of investment properties. Consequently, such values are relevant to equity investors for economic decision-making.

By including CFV as a component of fair value earnings, this equation has significant incremental explanatory power in explaining the share returns model in this context [F-stat = 42.56, $p < 0.01$ and likelihood ration (LR) chi-square = 42.45 and $p < 0.01$]. This is in line with the work of Barth and Landsman (2018), demonstrating that separating fair value

Table 2.
Correlation analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
RET(7day) (1)	1														
EARN (2)	0.09	1													
ΔEARN (3)	0.06	0.56*	1												
CFV (4)	0.29*	−0.32*	−0.49*	1											
LEVEL3 (5)	0.08	0.18*	*0.11*	*−0.10*	1										
DIR_VAL (6)	0.04	0.03	−0.02	−0.00	0.08	1									
DISCL (7)	0.04	0.15*	0.08	−0.01	−0.22*	−0.08	1								
SIZE (8)	0.01	−0.27*	−0.17	−0.07	0.18*	*0.10*	*−0.11*	1							
GROWTH (9)	−0.01	0.02	0.02	0.09	0.06	*0.09*	0.01	0.08	1						
LEV (10)	−0.06	0.07	0.10	*−0.10*	0.10	−0.09	0.07	−0.29*	−0.04	1					
CAPRATE (11)	*0.11*	0.15*	***0.14***	−0.07	*0.10*	−0.02	***−0.14***	−0.09	***0.14***	−0.04	1				
BIG4 (12)	−0.06	*−0.10*	0.05	*−0.19*	0.23*	*−0.10*	0.09	0.40*	0.07	−0.03	***−0.14***	1			
RC (13)	*0.08*	***−0.14***	−0.06	−0.03	−0.06	−0.05	0.01	0.27*	0.03	0.10	−0.17*	0.34*	1		
MEET (14)	−0.03	***−0.13***	−0.01	*−0.10*	0.15*	−0.04	−0.01	0.18*	−0.08	−0.05	−0.03	*0.10*	0.05	1	
OWN (15)	−0.03	−0.04	−0.60	0.03	−0.03	0.05	0.15*	0.22*	0.02	−0.20*	−0.05	*−0.10*	*−0.24*	0.06	1

Note(s): *Correlation coefficients are statistically significant at the $p < 0.01$. Bold and italicised correlations are significant at $p < 0.05$. The italicised correlations are significant at $p < 0.10$. See Appendix 1 for variable definitions

Table 3.
Multivariate coefficient estimates of regressing market return on changes in fair value and other explanatory variables

Variables	Pred	Column (1) Earnings and returns relationship	Column (2) Baseline model	Column (3) Fair value inputs	Column (4) Choice of valuers	Column (5) Disclosure quality
Intercept		−0.065** [2.19]	−0.056** [−2.55]	−0.063*** [−2.76]	−0.060** [−2.46]	−0.053* [−1.76]
EARN	+	0.016* [1.87]	0.025* [1.78]	0.023* [1.76]	0.026* [1.91]	0.025* [1.91]
ΔEARN	+	0.106*** [3.51]	0.009 [0.36]	0.009 [0.37]	0.007 [0.31]	0.009 [0.35]
CFV (H1)	+	–	0.092*** [3.62]	0.106*** [4.74]	0.109*** [4.05]	0.103** [2.37]
LEVEL3	?	–	–	0.018*** [3.09]	–	0.017** [2.04]
CFV*LEVEL3 (H2)	?	–	–	−0.038 [−1.09]	–	–
DIR_VAL	–	–	–	–	0.009* [1.74]	–
CFV*DIR_VAL (H3)	–	–	–	–	−0.061* [−1.76]	–
DISCL	–	–	–	–	–	−0.002 [−0.16]
CFV*DISCL (H4)	–	–	–	–	–	0.016 [0.37]
Control variables						
SIZE	? –	−0.006 [−0.71]	−0.004 [−0.01]	−0.003 [−0.41]	−0.004 [−0.28]	−0.002 [−0.05]
GROWTH		−0.003** [−2.47]	−0.004*** [−2.58]	−0.004*** [−2.70]	−0.004*** [−2.71]	−0.004** [−2.25]
LEV	?	−0.041 [−1.15]	−0.015 [−0.99]	−0.020 [−1.30]	−0.016 [−0.98]	−0.015 [−0.93]
CAPRATE	+	0.009** [2.11]	0.005*** [3.32]	0.005*** [3.11]	0.006*** [3.26]	0.005*** [3.15]
BIG4	+	0.036 [0.040]	0.004 [0.44]	0.004 [0.02]	0.001 [0.15]	0.003 [0.28]
Corporate governance variables						
RC	+	0.028*** [2.95]	0.029*** [2.89]	0.031*** [3.08]	0.028*** [2.73]	0.028*** [2.77]
MEET	+	0.001 [0.38]	0.001 [0.30]	0.001 [0.02]	0.002 [0.31]	0.001 [0.33]
OWN	+	0.001 [0.23]	0.001 [0.30]	0.002 [0.58]	−0.002 [−0.34]	0.001 [0.17]
F-test intercepts differ by categories						
LEVEL3 = 0		–	–	3.00*	–	–
DIR_VAL = 0		–	–	–	2.87*	–
DISCL = 0		–	–	–	–	0.03
Incremental *F*-test		–	42.56***	1.91	2.77*	1.06
Likelihood ratio test		–	42.45***	4.08	5.90*	3.04
Firm fixed effect		Yes	Yes	Yes	Yes	Yes
Year fixed effect		Yes	Yes	Yes	Yes	Yes
Robust		Yes	Yes	Yes	Yes	Yes
VIF		1.64	1.69	2.19	1.72	1.87
Observations		318	318	318	318	318
Adj. *R*-squared		0.14	0.21	0.22	0.22	0.21

Note(s): The dependent variable is RET(7d). Robust *t*-statistics in brackets. ***$p < 0.01$, **$p < 0.05$ and *$p < 0.10$. See Appendix 1 for variable definitions

earnings into components can help financial report users make better economic decisions. However, the coefficients of ΔEARN become insignificant once CFV is included in the model. Recall that ΔEARN is defined as changes in earnings before the CFV of investment properties. The finding implies that CFV attracts the attention of equity market participants because real estate is the key-asset class driving the intrinsic value (Cready and Kumas, 2020). That is, ΔEARN, which is measured after subtracting CFV (the primary component of earnings in the income statement of real estate firms), may comprise items of little or no informative content, e.g. non-recurring expenses and other income (Doyle *et al.*, 2003). See Appendix 2 for a representative example from our sample.

With respect to the control variables and corporate governance variables, SIZE is insignificantly related to RET(7d). Findings also indicate that GROWTH is associated with RET(7d) across all the models significantly and negatively, which suggests that growth firms are perceived as expensive or overvalued stocks; hence, they underperform compared to value firms. Likewise, we find an insignificant association between LEV and RET(7d). The coefficients of CAPRATE are positive and statistically significant, which indicates that equity investors use the capitalisation rate disclosed by the AREI firms to infer potential risk and returns or as an indicator of property market trends. Amongst the four corporate governance variables (BIG4, RC, MEET and OWN), only the coefficient on RC is significant as predicted (coefficient = 0.029, *t*-stat = 2.89 and $p < 0.01$). The significant and positive relationship suggests that firms having risk-management committees are valued by equity investors, as their function can lower business risks. The coefficients of BIG4, MEET and OWN are insignificant. The insignificant coefficients are perhaps because investors view firms' corporate governance practices affecting financial-reporting quality as a joint effect of those practices and not as an individual contributor (see Francis and Wang, 2008).

5.2 Summary of findings from H2

Column (3) of Table 3 reports the findings of H2, which hypothesises that there is no difference between the value-relevance of CFV estimated with Level 3 inputs and of CFV estimated with Level 2 inputs. The coefficient of the interactive variable, CFV*LEVEL3, which is the variable of interest, is insignificant (coefficient = −0.038 and *t*-stat = −1.09), whilst the coefficient of LEVEL3 is positive and significant (coefficient = 0.018, *t*-stat = 3.09 and $p < 0.01$). The findings imply that equity investors do not discount the value-relevance of CFV significantly when firms use unobservable inputs (Level 3 inputs) in fair value estimates for investment property. That is, equity investors may benefit from using private managerial information classified into Level 3 embedded in CFV in making economic decisions resulting in no substantial difference in the information content between Level 3 and Level 2 fair values. The findings from the sub-sampling test also remain unchanged (Section 5.5 report the sub-sampling test results). Following Lawrence *et al.* (2016), we re-run the baseline model by separating the CFV into Level 3 and Level 2 valuations and compare the value-relevance of CFV information. Untabulated results also indicate that the value-relevance of CFV based on a Level 3 valuation is not different from that based on a Level 2 valuation. Hence, H2 is supported. In terms of control variables and corporate governance measurements, results are generally consistent with H1 results.

5.3 Summary of findings from H3

Column (4) of Table 3 presents the findings of H3, investigating whether the value-relevance of CFV is affected by the choice of valuers. CFV*DIR_VAL is the main variable of interest for H3, and we hypothesised a negative association with RET(7d). The coefficient of the interactive variable is, indeed, negative and significant (coefficient = −0.61, *t*-stat = −1.76 and $p < 0.10$). This suggests that the value-relevance of CFV is decreased when standalone corporate directors conduct fair value estimations. Note that the coefficient of DIR_VAL is

positive and significant (coefficient = 0.009, *t*-stat = 1.74 and $p < 0.10$). The explanation for the coefficient of DIR_VAL is perhaps because corporate directors own asset-specific knowledge, which gives them advantages over external valuers when valuing investment properties (Cotter and Richardson, 2002). Equity investors could value that crucial knowledge of firms' directors as insightful information about corporate-asset values. Equity investors, however, discount the information usefulness of CFV as valued by standalone firms' directors owing to reliability concerns. Altogether, our results support H3: the director valuation is less reliable relative to external and mixed valuation approaches.

We further explore our data to identify the directors' expertise and find that firms' directors have real estate industry and financial and accounting backgrounds. We estimate Equation (4) for sub-samples categorised based on each of the above three backgrounds. However, we find no effect of directors' specific area of expertise on the value-relevance of property asset valuation.

5.4 Summary of findings from H4

The findings relating to H4 are presented in Column (5) of Table 3. H4 hypothesises that the reported CFV of investment properties are more value-relevant when firms have high-quality disclosure. However, the coefficient of the interactive variable, CFV*DISCL, our variable of interest, is insignificant. The coefficient of DISCL is also insignificant. These unexpected findings suggest that equity investors do not value additional information about fair value estimations for investment properties that were disclosed in the notes to financial statements. The inferences remained unchanged even after performing the sub-sampling test (see Section 5.5). Thus, we reject H4.

Our findings from the value-relevance of CFV conditional on the quality of fair value measurement-related disclosure are in line with Sundgren *et al.* (2018), who find no beneficial effects from additional disclosure under IFRS13. This could be explained by the fact that all companies reveal capitalisation rates, which seem to be the information most relevant to property values. In turn, although the lower-disclosure quality samples did not disclose the required information in financial reports (e.g. discount rate and occupancy rate), equity investors could gather the key indicators (e.g. the capitalisation rate and tenant information) relating to the CFV of investment properties from other sections in the annual report.

5.5 Sub-sampling tests for further analysis of H2, H3 and H4

We adopt sub-sample analyses to test H2, H3 and H4 further. Specifically, we estimate equation (1), which is our baseline model, separately for firms with LEVEL3 vs LEVEL2 inputs, firms employing director valuation (DIR_VAL) vs external and mix valuations (Non-DIR_VAL) and firms with high-disclosure quality (High) vs low-disclosure quality (Low). We perform a Wald chi-square test to test the difference in regression coefficients across groups. The large chi-square value leads us to conclude that the regression coefficients of variables in the model differ statistically across groups (the higher the chi-square value, the stronger the statistical evidence) (Liao, 2011). Table 4 shows that the inferences from H2, H3 and H4 are unchanged.

Overall, Table 4 indicates that the value-relevance of CFV differs neither statistically nor economically, which is conditional on the usage of LEVEL3 vs Non-LEVEL3 inputs regarding H2. The coefficients of the standalone variable CFV continue to be positive and significant as are the coefficients of LEVEL3. The latter implies that managerial assumptions or inputs are informative about properties' values, reflecting management knowledge of asset specificity. Alternatively, we can state that the predominant use of Level 3 inputs makes this useful to investors from the perspective of comparability. Thus, H2 is supported.

Table 4.
Sampling tests and a Wald chi-squared test in difference in effect

Variables	Column (1) Fair value inputs (H2) LEVEL3	LEVEL2	Diff	Column (2) The choice of valuer (H3) DIR_VAL	Non_DIR_VAL	Diff	Column (3) Disclosure quality (H4) High	Low	Diff
Intercept	−0.050 [−1.15]	−0.048 [−0.40]		−0.110 [−1.41]	−0.041 [−1.21]		−0.086* [−1.89]	−0.043est [−0.85]	
EARN	0.014*** [2.66]	0.043 [1.36]	3.95**	0.001*** [4.14]	0.120*** [2.87]	2.87*	0.046*** [5.15]	0.010 [1.65]	4.28**
ΔEARN	−0.001 [−0.09]	0.016 [0.69]	0.27	−0.031* [−1.93]	0.027** [2.39]	1.98	0.007 [0.45]	−0.001 [−0.08]	0.03
CFV	0.111*** [4.86]	0.178*** [4.82]	2.24	0.051* [1.78]	0.154*** [6.12]	3.95**	0.114*** [5.04]	0.117*** [3.52]	0.01
Control variables									
SIZE	0.001 [0.44]	−0.009 [−1.63]	2.95*	0.001 [0.26]	0.000 [0.14]	0.01	0.001 [0.49]	−0.000 [−0.04]	0.01
GROWTH	−0.003* [1.74]	−0.019 [−1.33]	1.04	−0.003* [−1.77]	−0.002* [−1.71]	0.03	−0.005 [−1.60]	−0.005 [−1.13]	0.01
LEV	−0.22 [−1.04]	−0.053 [−1.43]	1.02	−0.010 [−0.29]	−0.009 [−0.43]	0.01	−0.023 [−1.13]	−0.012 [−0.40]	0.12
CAPRATE	0.006** [2.31]	0.002 [0.70]	1.77	0.008* [1.74]	0.006** [2.22]	0.18	0.004* [1.78]	0.006* [1.76]	0.02
BIG4	−0.006 [−0.50]	0.041** [2.05]	4.97**	0.016 [0.66]	0.001 [0.10]	0.46	−0.001 [−0.06]	0.009 [0.61]	0.04
Corporate governance variables									
RC	0.35*** [2.74]	0.002 [0.33]	3.86**	0.041* [1.85]	0.013 [1.18]	2.96*	0.025* [1.95]	0.019 [1.17]	2.87*
MEET	0.001 [0.10]	0.003 [1.10]	1.02	0.002 [0.62]	0.001 [0.62]	0.04	0.004* [1.67]	−0.001 [−0.43]	3.59**
OWN	0.001 [0.44]	0.002 [1.56]	1.19	−0.000 [−0.53]	−0.000 [−0.76]	0.01	0.000 [0.49]	−0.000 [−0.11]	0.01
Year fixed effect	Yes	Yes		Yes	Yes		Yes	Yes	
Observations	258	60		132	186		145	173	
Adj. R^2	0.12	0.36		0.13	0.19		0.29	0.07	

Note(s): Robust *t*-statistics in brackets. ***$p < 0.01$, **$p < 0.05$ and *$p < 0.10$. See Appendix 1 for variable definitions

In terms of H3 relating to sources of valuer effect, results show that the coefficients of CFV reported by firms with both director (coefficient 0.051 and $p < 0.01$) and external valuations (coefficient 0.154 and $p < 0.01$) are positive and significant. However, the value-relevance of CFV is more pronounced when it is reported by firms using independent or mixed valuers. A Wald chi-squared test also confirms that the effects of the CFV differ economically across samples (chi-squared stat = 3.95 and $p < 0.05$). Furthermore, the untabulated LR value for the overall difference in effect across groups shows persistent findings (LR chi-squared stat = 39.58 and $p < 0.01$). Altogether, the empirical findings are in line with the argument that fair value estimates conducted by directors/management are perceived as less reliable and, accordingly, less relevant, although these estimates can benefit from the directors' knowledge of how assets are managed. Therefore, H3 is partially supported.

Regardless of H4, the results from sub-sampling tests show that the coefficient of CFV reported by both the high- and low-disclosure quality groups are strongly significant (Coefficient = 0.114, *t*-stat = 5.04 and $p < 0.01$ and 0.117, *t*-stat = 3.52 and $p < 0.01$, respectively). Results support the main tests. Thus, H4 is rejected.

5.6 Additional tests

5.6.1 Global financial crisis (GFC) and the value-relevance of CFV. Although our sample period entails the onset and culmination of GFC, we included 2008 and 2009 observations in our regression analyses because our dependent variable, RET(7d), is adjusted for broader market movements. However, we conducted an additional test for a sample that excludes observations from 2008 and 2009 [17]. The results are reported in Table 5. Reported results reveal that excluding the GFC period does not alter the inferences for H1–H4.

5.6.2 Alternative returns windows and the value-relevance of CFV. Table 6 presents a sensitivity analysis using adjusted returns in different windows: RET(1m) and RET(3m), which are the one-month and three-month window returns, beginning from the preliminary final reports' announcement date and calculated using the market-adjusted return. In general, results from the RET(1m) and RET(3m) methods are consistent with the given results (coefficient of CFV = 0.074, *t*-stat = 2.18 and $p < 0.05$ and 0.108, *t*-stat = 1.90 and $p < 0.10$ for RET(1m) and (RET(3m), respectively). The positive relationship between LEVEL3 and share returns becomes insignificant in the RET(3m) approach, whilst the significant association between DIR_VAL and returns persists across all three return models. Notably, the coefficient of DIR_VAL is even larger in the RET(3m) model. Additional tests also show that the association between DISCL and share returns is insignificant across all three return models. In terms of interactive variables, the coefficients of CFV*LEVEL3 and CFV*DISCL remain insignificant throughout the three return windows, whilst the coefficient of CFV*DIR_VAL becomes insignificant in the RET(1m) and RET(3m) models. Interestingly, EARN and ΔEARN become positively significant in the three-month return window. Overall, findings are not sensitive to the window length, as CFV will be re-measured and reported annually. Also, findings suggest that CFV has the greatest impact on share returns for the RET(7d) model compared with longer-return windows.

5.6.3 Additional test of the effect of sources of valuers. To further investigate why valuations using directors as valuers, exclusively, have lower value-relevance of fair value information than those conducted by independent or mixed valuers, we further perform the following analysis. Specifically, we first re-estimate Equation (2) for each of the following sub-sample groups: director valuation approach ($N = 131$) vs mixed valuation approach ($N = 105$). Untabulated results show that the coefficient on CFV reported by firms employing the director valuation approach is positive but insignificant, whilst that reported by firms using the mixed-valuation approach is significant and positive (coefficient = 0.167, *t*-stat = 3.07 and $p < 0.01$). Later, we use Wald tests to compare coefficients across groups

Table 5. Multivariate coefficient estimates of regressing market return on changes in fair value and other explanatory variables – excluding GFC periods

Variables	Pred	Column (1) Earnings and returns relationship	Column (2) Baseline model	Column (3) Fair value inputs	Column (4) Choice of valuers	Column (5) Disclosure quality
Intercept		−0.078** [2.53]	−0.063*** [−2.69]	−0.071*** [−2.71]	−0.067*** [−2.57]	−0.053* [−1.76]
EARN	+	0.014* [1.83]	0.027* [1.86]	0.025* [1.67]	0.027** [1.99]	0.028** [1.96]
ΔEARN	+	0.096*** [3.48]	0.005 [0.20]	0.005 [0.21]	0.004 [0.15]	0.005 [0.19]
CFV (H1)	+	–	0.093*** [3.43]	0.138*** [4.41]	0.119*** [3.69]	0.086** [2.49]
LEVEL3	?	–	–	0.018*** [2.85]	–	0.017** [2.04]
CFV*LEVEL3 (H2)	?	–	–	−0.050 [−1.28]	–	–
DIR_VAL	–	–	–	–	0.011* [1.66]	–
CFV*DIR_VAL (H3)	–	–	–	–	−0.060* [−1.76]	–
DISCL	–	–	–	–	–	−0.002 [−0.16]
CFV*DISCL (H4)	–	–	–	–	–	0.016 [0.37]
Control variables						
SIZE	? –	−0.001 [−0.71]	−0.004 [−0.23]	−0.002 [−0.24]	−0.004 [−0.52]	−0.001 [−0.35]
GROWTH		−0.002* [−1.77]	−0.004** [−2.49]	−0.004*** [−2.58]	−0.004*** [−2.66]	−0.004** [−2.40]
LEV	?	−0.145 [−1.09]	−0.014 [−0.54]	−0.014 [−0.86]	−0.016 [−0.57]	−0.014 [−0.85]
CAPRATE	+	0.005** [2.18]	0.005** [2.53]	0.005** [2.32]	0.005** [2.55]	0.005** [2.17]
BIG4	+	0.007 [0.021]	0.007 [0.77]	0.004 [0.43]	0.001 [0.52]	0.002 [0.23]
Corporate governance variables						
RC	+	0.025** [2.39]	0.029*** [3.14]	0.032*** [3.32]	0.029*** [2.95]	0.033*** [3.32]
MEET	+	0.001 [0.29]	0.001 [0.28]	0.001 [0.12]	0.000 [0.28]	0.001 [0.23]
OWN	+	0.001 [0.11]	0.001 [0.55]	0.001 [0.53]	−0.000 [−0.28]	0.000 [0.51]
F-test intercepts differ by categories						
LEVEL3 = 0		–	–	2.45	–	–
DIR_VAL = 0		–	–	–	2.99*	–
DISCL = 0		–	–	–	–	0.03
Incremental *F*-test		–	39.86***	1.88	12.71***	0.89
A likelihood ratio test		–	39.80***	4.02	37.25***	2.86
Firm fixed effect		Yes	Yes	Yes	Yes	Yes
Year fixed effect		Yes	Yes	Yes	Yes	Yes
Robust		Yes	Yes	Yes	Yes	Yes
VIF		1.61	1.68	2.24	1.72	1.86
Observations		289	289	289	289	289
Adj. *R*-squared		0.13	0.21	0.22	0.22	0.22

Note(s): The dependent variable is RET(7d). Robust *t*-statistics in brackets. ***$p < 0.01$, **$p < 0.05$ and *$p < 0.10$. See Appendix 1 for variable definitions

Table 6.
Longer event window test results

Variables	RET(1m) Column (1) Base model	Column (2) Fair value inputs	Column (3) Choice of valuers	Column (4) Disclosure quality	RET(3m) Column (5) Base model	Column (6) Fair value inputs	Column (7) Choice of valuers	Column (8) Disclosure quality
Intercept	−0.066*** [−3.18]	−0.074*** [−3.42]	−0.070*** [−3.23]	−0.079*** [−2.75]	−0.106* [−1.74]	−0.117* [−1.76]	−0.111* [−1.88]	−0.099* [−1.82]
EARN	0.012 [1.01]	0.010 [0.85]	0.012 [0.99]	0.010 [0.89]	0.016* [1.74]	0.019* [1.70]	0.016* [1.73]	0.024** [2.38]
ΔEARN	0.002 [0.09]	0.003 [0.13]	0.002 [0.12]	0.002 [0.13]	0.030* [1.79]	0.030* [1.76]	0.034* [1.75]	0.033* [1.75]
CFV	0.042** [2.18]	0.074** [2.18]	0.040** [2.48]	0.031** [2.32]	0.040* [1.89]	0.108* [1.90]	0.095* [1.83]	0.046* [1.75]
LEVEL3		0.012* [1.86]		0.012* [1.76]		0.041 [1.00]		0.055 [1.23]
CFV*LEVEL3		−0.038 [−1.03]				−0.147 [−1.57]		
DIR_VAL			0.007* [1.76]	0.006* [1.84]			0.043** [1.97]	0.043* [1.89]
CFV*DIR_VAL			−0.003 [−0.10]				−0.084 [−0.68]	
DISCL				−0.007 [−0.70]				−0.023 [−0.81]
CFV*DISCL				0.018 [0.49]				0.067 [0.52]
Control variables								
SIZE	0.000 [0.05]	0.001 [0.33]	0.000 [0.20]	0.000 [0.12]	0.002 [0.40]	0.000 [0.02]	0.001 [0.15]	0.004 [0.60]
GROWTH	−0.003** [−2.33]	−0.003** [−2.37]	−0.003** [−2.37]	−0.003** [−2.28]	−0.010*** [−2.92]	−0.010*** [−2.75]	−0.010*** [−3.21]	−0.009*** [−2.64]
LEV	−0.020 [−1.43]	−0.023 [−1.56]	−0.021 [−1.47]	−0.023 [−1.63]	−0.036 [−0.81]	−0.054 [−1.13]	−0.033 [−0.76]	−0.050 [−1.05]
CAPRATE	0.005** [2.37]	0.005** [2.32]	0.005** [2.47]	0.005** [2.45]	0.022** [2.52]	0.024*** [2.59]	0.024*** [2.65]	0.024*** [2.61]
BIG4	0.002 [0.23]	0.000 [0.02]	0.000 [0.05]	0.000 [0.05]	0.026 [1.32]	0.044 [1.57]	0.016 [0.81]	0.024 [0.95]
Corporate governance variables								
RC	0.026*** [3.34]	0.028*** [3.30]	0.026*** [3.31]	0.029*** [3.36]	0.022*** [3.39]	0.024*** [3.30]	0.025*** [3.35]	0.027*** [3.36]
MEET	0.001 [0.69]	0.001 [0.52]	0.001 [0.67]	0.000 [0.37]	0.001* [1.89]	0.001* [1.84]	0.001* [1.83]	0.001* [1.92]
OWN	0.000 [0.42]	0.000 [0.62]	0.000 [0.09]	0.000 [0.34]	0.000 [0.93]	0.000 [0.88]	0.000 [0.25]	−0.000 [−0.07]
FIRM_FX	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
YEAR_FX	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Robust	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VIF	1.69	2.14	1.82	1.77	1.61	2.07	1.81	1.86
Observations	318	318	318	318	318	318	318	318
Adj. *R*-squared	0.08	0.08	0.07	0.08	0.07	0.07	0.08	0.08

Note(s): Robust *t*-statistics in brackets. ***$p < 0.01$, **$p < 0.05$ and *$p < 0.10$. See Appendix 1 for variable definitions

(Liao, 2011). Untabulated results show that the difference is economically significant ($\chi^2 = 3.15$ and $p < 0.10$). These results imply that the mixed expertise of external, independent valuers, together with directors, performs better in providing valuable information to investors than the director-only approach.

Then, we test the baseline model on sub-sample groups, including valuations conducted by mixed valuers ($N = 105$) vs valuations conducted by independent valuers alone ($N = 82$). Untabulated results indicate that the coefficient on CFV for the mixed valuation group (independent valuation group) is significant and positive [coefficient = 0.167, t-stat = 3.88 and $p < 0.01$ (coefficient = 0.154, t-stat = 4.79 and $p < 0.01$)]. However, the Wald test reports no significant difference. Therefore, the results indicate that valuations conducted exclusively by independent valuers are not superior to valuations conducted by a mixed group of experts, including independent valuers and company directors. Taken together, valuations conducted by mixed valuers can bring not only insiders' asset-specific knowledge, but also the independence of external valuers as an extra layer of valuation monitoring. The strong policy implication is that when a fair value is determined, both directors and independent valuers should work collectively. Investors perceive the values determined by a mixed group interactively as being more relevant and useful than those determined by directors alone.

6. Conclusion

This paper offers insightful evidence into the fair value debate by investigating the value-relevance of the CFV of investment properties in the real estate industry, which lacks an active market. We further examine whether the value-relevance of fair value changes of investment properties is affected by (1) firms' source of inputs used in fair value estimates (i.e. Level 2 vs Level 3 inputs); (2) firms' source of valuers used to conduct the valuation (i.e. internal vs non-internal and mixed valuers) and (3) the quality of firms' extensive related-measurement disclosures. Using a sample of Australian real estate firms from 2007 to 2015, we report a positive relationship between the CFV of investment property and the cumulative market-adjusted stock returns over short- and longer-event windows. We further report that Level 3 inputs provide comparably useful information to equity investors and that the value-relevance of CFV is more pronounced when it is reported by firms using external or mixed valuers. We failed to find an effect of disclosure quality on the value-relevance of CFV.

Our findings have important implications for accounting standard-setters, the real estate industry and investors. The results suggest that fair value accounting under IAS 40 provides sufficiently faithful and relevant information to equity investors for their economic decision-making. Thus, our findings provide an empirical endorsement of IAS40. Also, our results indicate that companies and auditors should feel comfortable with adopting Level 3 inputs as long as due diligence is carried out in selecting such inputs, because the use of level 3 inputs in fair value estimates does not diminish the information-usefulness of the estimated fair values economically as compared with the use of Level 2 inputs. However, our finding did not examine this proposition conditional on either audit quality or the information environment (Lu *et al.*, 2018). The finding further suggests that companies should strive to conduct property valuations using independent valuers in order to improve information usefulness for equity investors. Additionally, our findings suggest that providing the greater level of disclosure required by IAS 40 and IFRS 13 in the notes of financial statements does not increase the information-usefulness of reported fair values as long as equity investors can access the relevant indicators associated with such values from annual reports. In that case, extensive disclosure may be a wasteful activity.

Notes

1. As is defined by IAS 40, investment property is property held (by means of acquisition, construction or lease) to earn either rental income or gain from capital appreciation or both.
2. IFRS 13 aims to provide useful information about valuation techniques and inputs used in fair value measurement as well as judgements made in determining those fair values to financial report users. Also, this standard classifies fair values into three levels, with respect to the quality of inputs used in fair value estimates, in aiming to enhance the comparability of financial information.
3. According to IFRS 13, fair value inputs are divided into three levels. The Level 1 inputs are unadjusted prices quoted in active markets for identical assets or liabilities. Level 2 inputs refer to adjusted observable market inputs, whilst Level 3 inputs are unobservable inputs in active markets. The level of reliability of fair values is somewhat dependent on the level of inputs used in fair value estimates.
4. Real estate companies are defined as companies that own a portfolio of stabilised real estate and earn significant operational revenue from property rental income (Ling and Archer, 2013; Standard & Poor's, 2018).
5. We did not use the value-relevance construct using share price, as the value-relevance inference regarding the association between accounting information and share prices may be limited by the fact that many factors, other than just the fair value information, influence share prices (Sloan, 2001).
6. In the USA real estate industry, categories of real estate firms include publicly traded REIT, non-traded REIT, real estate fund managers, other private real estate owners and real estate services firms (KPMG, 2017). The USA publicly traded REIT has been researched more extensively in the literature (e.g. Goncharov *et al.*, 2014).
7. Real estate operations refer to business activities associated with physical assets – evaluation, production, acquisition, disposal and management of real property assets (Ling and Archer, 2013).
8. This approach is the most frequently used in the real estate industry. This method shows that property value can be determined by income generated from property divided by the yield rate.
9. The yield capitalisation rate is the overall rate of returns on the entire portfolio of properties owned by an entity. Properties' values can be found if the buyer's expected income and rate of returns from an investment property portfolio are known. Therefore, the yield capitalisation rate converts future monetary benefits generated from properties into a single percentage (Geltner *et al.*, 2001; Ling and Archer, 2013).
10. One stream of research on the value-relevance of fair values for financial assets and liabilities in the banking industry demonstrates that fair value measurements are informative to financial report users. For instance, Venkatachalam (1996) finds that the fair value of off-balance sheet derivatives is associated with equity values over and above the notional value of derivatives recognised in the balance sheet. Barth *et al.* (1996), Eccher *et al.* (1996) and Nelson (1996) also come to the same conclusion after investigating the value-relevance of fair value disclosures required by Statement of Financial Accounting Standard (SFAS) No 107. A more recent study by Evans *et al.* (2014) shows that fair value adjustments for the Commercial Banks' investment securities are associated with future financial performance. Unlike financial assets, which are more likely to have quoted prices from the active market or observable market prices, non-financial asset valuation tends to rely on firm-specific assumptions. Therefore, the empirical findings of studies on financial assets do not necessarily apply to the non-financial asset context.
11. The reason for starting three days before the preliminary results announcement date is to account for the possibility of information leakage. However, this does not apply to the one- and three-month windows. In practice, the preliminary results announcement date ranges from 1.5 to 2 months after the accounting year ends. In order to prepare Appendix 4E-Preliminary final report according to the ASX Listing Rules, the (disclosing) committee and audit meetings need to be arranged. Additionally, all material information is required to be released to the ASX directly and that information can then be released to the media through the ASX (see discussion in Section 2). Even though the

management could use social media (e.g. Twitter) to signal the announcement of results and, consequently, affect stock returns (Liu *et al.*, 2018), the signal would not provide the actual CFV information. Therefore, any information circulating in the market one to three months before the preliminary final report announcement date is more likely to be considered speculative and information leakage is not likely.

12. We did not use comprehensive income because there is very little difference between earnings and comprehensive income reported by AREI firms (see Appendix 2).
13. Hovakimian (2006) proposed that market-to-book ratio is an appropriate proxy reflecting the growth opportunities. In Australian context, Islam and Heaney (2009) re-test Hovakimian (2006) assumption and report that market-to-book value is informative about growth opportunities affecting Australian firms' financing decision making. Yet, using Australian data, more recent study demonstrates that the book-to-market ratio can also capture financial risk, and thus, it can have a negative relationship with stock prices and returns (Dempsey, 2010).
14. The default dummy variable is Level 2 inputs, as there is no use of Level 1 inputs in fair value estimates in the AREI.
15. Marquardt (1970) uses a VIF greater than 10 as a guideline for serious multi-collinearity.
16. This is derived by multiplying the coefficient of CFV (0.092) with the standard deviation of CFV (0.234).
17. Like other countries, Australian real estate properties' value suddenly fell during the GFC period, in particular, around September 2008, yet the Australian economy recovered quickly in 2010 (Australia and New Zealand Banking Group, 2017; Thangaraj and Chan, 2012). Therefore, we excluded observations from 2008 to 2009 to remove the GFC effect.

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Further reading

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Appendix 1

Variables	Definition
RET(7d)	Cumulative market-adjusted stock returns calculated for the seven-day event window, starting three days before and ending three days after the preliminary earnings announcement date
RET(1m) and RET(3m)	Cumulative market-adjusted stock returns calculated for one- and three-month event windows, beginning from the preliminary final report's announcement date
EARN	Earnings before changes in fair value of investment properties scaled by the market value at the beginning of the accounting year
ΔEARN	The difference between earnings before changes in fair value of investment properties in the current year and the previous year, scaled by the market value at the beginning of the accounting year
CFV	Changes in fair value of investment properties reported in the statement of the comprehensive income statement, scaled by the market value at the beginning of the accounting year
LEVEL3	Dummy variable coded 1 if fair values of investment properties are classified as Level 3 fair value and 0 otherwise
DIR_VAL	Dummy variable which is set equal to one if fair values of investment properties of firms are valued by firms' directors exclusively, and zero otherwise
DISCL	Dummy variable coded 1 if firms have the sum of disclosure indices lower than the median of total samples, 0 otherwise. Sum of disclosure indices constructed as (1) *DISRATE* coded 1 if firms reveal discount rate and 0 otherwise; (2) *VACAN* valued 1 if firms disclose vacancy rate and 0 otherwise; (3) *EXPRENT* taking the value of 1 if firms disclose expected rental incomes and operating expenses and 0 otherwise; (4) *QUALISENSI* coded 1 if firms provide qualitative sensitivity analysis fair value measurement according to change in unobservable assumptions and 0 otherwise and (5) *QUANTISENSI* is measured as 1 if firms provide quantitative analysis for that fair value estimates sensitivity analysis and 0 otherwise. Hence, the maximum value is 5 and the minimum is 0
SIZE	The natural logarithm of the market value of equity as at the beginning of the accounting year and is derived from Thomson Reuters DataStream
GROWTH	Market-to-book value ratio as at the beginning of accounting period and is obtained from the Thomson Reuters Datastream
LEV	The ratio of mortgages and other interest-bearing liabilities to the market values of real estate and is obtained from the annual reports of sample firms
CAPRATE	The capitalisation rate or the fundamental rate of return of investment property calculated as net-operating income divided by the market value of property and is obtained from firm annual reports
BIG4	Dummy variable coded 1 if firms employed Big 4 auditing firms and 0 otherwise
RC	Dummy variable which is set equal to 1 if firms have a risk management committee and 0 otherwise. RC is obtained from the annual report
MEET	The frequency of audit committee meetings and is obtained from the annual report
OWN	The percentage of institutional unitholders
FIRM_FE	Firm fixed effect
YEAR_FE	Year fixed effect

Table A1.
Variable definitions

Appendix 2

Company A

	Notes	Consolidated 30 June 2015 US$'000	30 June 2014 US$'000
Income			
Property rental	10(c)	31,219	26,783
Management fee income		488	–
Interest		112	71
Revaluation of investment properties	10	39,828	24,489
Profit on sale of direct properties		2,232	3,784
Total income		73,879	55,127
Expenses			
Direct property expenses	10(c)	(1,306)	(1,051)
Former responsible entity's management fee	19	(1,353)	(2,377)
Employee benefits expense		(1,214)	–
Stapling and asset acquisition costs		(1,438)	(969)
Depreciation and amortisation expense		(29)	–
Administration and other expenses		(744)	(835)
Net loss on fair value of derivative financial instruments		(1,781)	(1,200)
Finance costs	4	(5,048)	(4,131)
Total expenses		(12,913)	(10,563)
Net profit for the year		60,966	44,564
Other comprehensive income		–	–
Total comprehensive income for the year		60,966	44,564

Company B

	Note	2015 US$'000	2014 US$'000
Revenue			
Rent from investment properties	6	55,214	54,187
Interest from cash deposits	7	1,779	2,216
Total revenue		56,993	56,403
Other income			
Fair value increments to investment properties	17	78,790	40,180
Profit/(loss) on disposal of investment property		–	(42)
Other income		53	550
Total other income		78,843	40,688
Total revenue and other income		135,836	97,091
Expenses			
Fair value decrements to derivatives–net	8	5,247	21,203
Finance costs (cash and non-cash)	10	24,507	26,737
Queensland land tax expense		2,093	2,122
Other expenses	9	4,668	4,835
Total expenses		36,515	54,897
Profit/(Loss) before income tax		99,321	42,194

Table A2.
Examples of comprehensive income statements

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