

ASSET REVALUATIONS AND EARNINGS MANAGEMENT: EVIDENCE FROM AUSTRALIAN COMPANIES

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Abstract

This paper examines the association between asset revaluations and discretionary accruals (a proxy for earnings management) using a sample of the largest 300 Australian companies. The results from this study indicate that the revaluation of non-current assets is positively associated with discretionary accruals. This finding is consistent with the argument that revaluation of assets reflects higher agency problems in the form of increased earnings management. Additional findings are that discretionary accruals are higher for firms reporting their non-current assets at fair values appraised by directors, than those of firms that use external appraisers. As well, the choice of auditors and the strength of corporate governance can constrain the opportunistic behaviour of managers in the accounting choice to revalue non-current assets.

Keywords: Asset Revaluation; Fair Value; Earnings Management; Accounting Choice; Fair Value Hierarchy

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1 Introduction

Motivations for asset revaluations and their economic consequences have been extensively explored (Standish and Ung, 1982; Easton *et al.*, 1993; Brown *et al.*, 1992). Prior studies indicate that revaluations can be triggered by management incentives with respect to contracting, financial needs and political costs (e.g., Brown *et al.*, 1992; Whittred and Chan, 1992). However, there is limited evidence on whether or not the accounting choice to revalue non-current assets is associated with managerial opportunistic behaviour with respect to earnings management.

Two competing views are given about asset revaluations and earnings management. Some argue that asset revaluations are mainly motivated by incentives to improve the costly contracting process between a company and its claimholders. Specifically, Brown *et al.* (1992), Whittred and Chan (1992), Cotter and Zimmer (1995), and Christensen and Nikolaev (2013) use Australian data and find that highly leveraged companies in danger of violating covenants are more likely to revalue non-current assets. In a survey of chief financial officers conducted by Easton *et al.* (1993), 40 percent of respondents explicitly indicated that revaluations are aimed at decreasing a company's leverage and loosening debt constraints. Hence, a common incentive for asset revaluations is

an improvement of a firm's financial status for contracting purposes.

On the other hand, asset revaluations may reflect lower agency problems provided that managers' primary motivation for revaluation of non-current assets is to signal the fair value of assets to financial statements users and to reduce information asymmetry between managers and shareholders. For example, several studies examine the information content of asset revaluations and document a positive stock market reaction for asset revaluations (Sharpe and Walker, 1975; Standish and Ung, 1982; Easton *et al.*, 1993; Aboody *et al.*, 1999; Danbolt and Rees, 2008). Following this line of literature, revaluation of assets reflects efficiency motivations of the manager or lower agency problems.

This study aims to extend previous research by providing evidence on the association between asset revaluations and managerial opportunistic behaviour with regard to earnings management. Earnings management is measured by using discretionary accruals. Using a sample of the largest 300 firms listed on the Australian Stock Exchange (ASX) firms during the years 2003 to 2007, the findings of this study are that revaluation of non-current assets is positively associated with discretionary accruals, estimated using the *modified Jones model* (1991). This finding is consistent with the argument that revaluation of assets reflects higher agency problems in the form of

decreased earnings quality¹. The explanation for our result is that ex-post an asset revaluation there is the prospect of managers engaging in opportunistic behaviour. For example, Black *et al.* (1998) find that firms will opportunistically sell their non-current assets to realise the unrealised component of earnings from asset revaluations to increase reported profits². Additional findings are that discretionary accruals are higher for firms reporting their non-current assets at fair values appraised by directors, than those of firms that use external appraisers. Last, we provide consistent and strong evidence that the choice of auditors and the strength of corporate governance can constrain the opportunistic behaviours of managers in the use of asset revaluations.

The findings contribute to the literature in several ways. First, this paper extends academic research on managers' motivations to revalue non-current assets. Most of the earlier studies regarding asset revaluations adopted either an information content perspective or a contracting perspective (Sharpe and Walker, 1975; Standish and Ung, 1982; Easton *et al.*, 1993; Aboody *et al.*, 1999; Danbolt and Rees, 2008). These studies have not considered the perspective of the opportunistic behaviour of management. Black *et al.* (1998) argue that when the profit that occurs from a fixed asset sale is estimated on an historical cost basis, revaluations may be used to improve the financial appearance of the firm. Whilst separating the self-interest versus contracting incentives is complicated, this study attempts to provide evidence on the association between asset revaluations and manager's opportunistic behaviour using earnings management. Second, evidence from prior research suggests that the disclosed and recognised fair values are informative to investors³. The results from our study show that companies that used director-valuations had higher discretionary accruals than those that employed external valuers. In other words, the internal director-valuations led to lower earnings quality. Our results suggest that the opportunistic behaviour of directors can increase bias in the amount of the *revaluation increments*, leading to a reduced reliability and informativeness of the revaluation (Cotter and Richardson, 2002).

This finding on internal director-valuations is particularly relevant for accounting standard setters as firms have the choice to undertake revaluations of

non-current assets by either internal directors or by independent valuers under Australian Accounting Standard (AASB) 116 *Property, Plant and Equipment*. Third, results from this study complement several audit fee studies. For example, a few audit fee studies show that the use of fair value accounting is positively associated with audit fees⁴ (Yao *et al.*, 2015; Goncharov *et al.*, 2013 and Ettredge *et al.*, 2013). However, those studies do not directly test if increased audit fees are to compensate for the additional litigation risks of or from the additional audit work involved in estimating fair values. Results from this study can help to indirectly explain findings from these audit fee studies. That is, auditors charge a fee premium to compensate for future litigation risk from managerial opportunistic behaviour. Last, this study contributes to the debate on fair value accounting in the global market. Currently, a heated debate has emerged around the proposition that fair value accounting exacerbated the severity of the 2008 financial crisis (Laux and Leuz, 2010). The results of this study will provide empirical evidence relevant for standard setters and others in their deliberations about the impact of the adoption of fair value accounting.

The remainder of this paper proceeds as follows. Section 2 discusses the institutional background and section 3 develops the hypotheses from the relevant literature. Section 4 presents the sample and research design. Section 5 reports the results. Section 6 summarises the results from robustness and sensitivity tests. Section 7 provides the concluding comments.

2 Institutional background

In Australia, the manager of a firm has discretion whether or not to revalue non-current assets. Asset revaluation refers to the act of recognising a reassessment of the carrying amount of a non-current asset to its fair value as at a particular date. Prior to 2005, the accounting standard for revaluation of assets was AASB 1041 *Revaluation of Non-Current Assets*. Now there are three standards - AASB 116 *Property, Plant and Equipment*, AASB 138 *Intangible Assets*, and AASB 140 *Investment Properties*. Specifically, paragraph 29 of AASB 116 states:⁵

⁴ For example, Yao *et al.* (2015) find that there is a significant increase in the audit fees paid when non-financial assets (PPEs, investment properties and intangible assets) are measured using the 'revaluation model'. However, this study does not investigate whether the use of the fair value model is associated with earnings management proxies.

⁵ Since 1 January 2005, AASB 116 has replaced AASB 1401 in providing guidance on the revaluation for non-current assets. Both standards are consistent except for some aspects. Compared to AASB 1401, AASB 116 reduces discretion for revaluation, for example, the discontinuation of revaluation is prohibited. AASB 116 paragraph 36 does not allow progressive revaluations, instead requiring all assets in a class to be revalued when a single asset in that class is revalued.

¹ Our study does not test if asset revaluations are directly associated with current period's earnings. However, a high amount of discretionary accruals provides an indication of lower quality of earnings, which is a 'red flag' that management may be using aggressive accounting to overstate earnings.

² The rules for asset revaluations are *not* the same as for most financial instruments where the unrealised gain or loss each period has to go to the P&L, not to reserves as with most asset revaluations.

³ See Landsman (2007) for a detailed review of value relevance studies.

An entity shall choose either the cost model in paragraph 30 or the revaluation model in paragraph 31 as its accounting policy and shall apply that policy to an entire class of property, plant and equipment.

According to AASB 116, revaluations of non-current assets can be made on the basis of valuations made by directors or by independent valuers. Based on the accounting rules for asset revaluations listed above, managers are not indifferent to how and when they revalue their firms' assets.

While the contracting explanation discussed above is plausible, the guidelines for accounting for asset revaluations in Australia provide managers with incentives to revalue company's assets to reduce debt covenant constraints or to increase reported profit (e.g. firms may choose to recognise the unrealised component of profits to beat earnings benchmarks or to meet analysts forecast). For example, there is no specific requirement as to the method of revaluation to be used, although AASB 116 requires disclosure of the year of valuation and whether the valuation was carried out by management or an independent valuer; the revaluation reserve included in equity in respect of an item of property, plant and equipment may be transferred directly to retained earnings when the asset is retired or disposed of; directors may approve cash distributions to shareholders from revaluation reserves but they must exercise extreme caution (AASB 116). The discretion provided under Australian accounting standards to choose to revalue non-current assets, a choice not available to managers of US firms, gives us an opportunity to examine managers' discretionary behaviour in this context.

3 Literature review and hypothesis development

Australian firms are permitted to choose between two valuation methods for non-current assets, the cost method ('cost model') or fair value ('revaluation model'). Prior studies demonstrate that firms will revalue their assets for efficient contracting reasons (Brown *et al.*, 1992; Easton *et al.*, 1993; Christensen and Nikolaev, 2013). Specifically, the choice to revalue non-current assets is chosen to signal the liquidation values of assets to creditors, to reduce information asymmetry and to mitigate agency costs.

However, from an agency theory point of view, asset revaluations can also increase agency costs especially with director-valuations as internal directors are less independent than external independent appraisers, providing managers with opportunities to engage in earnings management (Du *et al.*, 2014). Prior research has provided empirical evidence that the discretion available under fair value accounting has provided managers with opportunities to engage in earnings management (Bratten *et al.*, 2013; Fiechter

and Meryer, 2009; and others⁶). In addition, the results from some audit fee studies show that the use of fair value accounting is positively associated with audit fees (Yao *et al.*, 2015; Goncharov *et al.*, 2013 and Ettredge *et al.*, 2013). The results of these studies indirectly suggest that higher audit fees are to compensate auditors for the increased litigation risks incurred by the auditor in estimating fair values.

The use of the 'revaluation model' allows reporting entities to measure their non-current assets at fair value after initial recognition. The most challenging issue with non-financial assets is that relatively few of these assets (e.g. PPE and investment property) are traded in active markets. That is, the fair value of non-financial assets is usually estimated based on unobservable managerial inputs and assumptions (Level 3 inputs⁷), providing managers with incentives to revalue non-current assets for their private benefits, such as performance-based bonuses and promotion. In terms of these two competing views, we develop an alternative hypothesis as follows.

Hypothesis 1 (a): Asset revaluations are positively associated with discretionary accruals (a proxy for earnings management);

Hypothesis 1 (b): Asset revaluations are negatively associated with discretionary accruals (a proxy for earnings management).

AASB 116, AASB 138 and AASB 140 require reporting entities to disclose the appraisers who value the non-financial assets that are measured using the 'revaluation model'. There is no specific requirement on whether the companies should use internal director-valuations or employ external independent appraisers, although AASB 140 recommends an independent valuer for investment properties. One of the criticisms of director-based valuations is that they can suffer from intentional biases. For example, Benston (2008, p. 106) claims that 'dishonest and opportunistic CFOs and CEOs are likely to find fair value accounting a boon to their efforts to manipulate reported net income.' Generally, external valuers have more credibility in estimating asset values because they are independent (Cotter and Richardson, 2002). Therefore, we expect that independent appraisers will constrain opportunistic revaluations because of potential litigation risks.

⁶ See Henry, 2009; Barth *et al.* 1994; Hodder *et al.* 2006; Li and Sloan, 2009; Song, 2008; Fargher and Zhang, 2012; Ramanna and Watts, 2009; Dechow *et al.*, 2010; Shalev *et al.* 2013; Livne *et al.*, 2011.

⁷ AASB 13 *Fair Value Measurement* establishes a fair value hierarchy that categorises into three levels the inputs to valuation techniques used to measure fair value. The fair value hierarchy gives the lowest priority to unobservable inputs (Level 3 inputs).

Hypothesis 2: Discretionary accruals (a proxy for earnings management) are higher for firms reporting their non-current assets at fair values appraised by directors than those of firms that use external appraisers.

Strong corporate governance leads to a more effective control environment of the organisation. The literature has identified the important roles of auditors and the internal corporate governance mechanisms. Generally, financial reports audited by Big 4 auditors are perceived to be of high quality. For example, Francis and Wang (2008) argue that, in order to protect their brand name reputation from legal exposure and reputation risk, Big 4 auditors are in place to constrain aggressive earnings management behaviour from their clients, resulting in more credible earnings announcements. In addition, internal corporate governance mechanisms are established to monitor managers' behaviour and also to ensure the reliability of financial reporting. Extensive research has been conducted relating to the association between earnings management and certain corporate governance practices (Ronen *et al.*, 2006), Tzur and Yaari, 2006; Kao and Chen, 2009; Benkel *et al.*, 2006; Hutchinson *et al.*, 2008; Sebahattin and Harlan, 2009; Raghavan, 2010; Davidson *et al.*, 2005; Peasnell *et al.*, 2005). This stream of research has found that the probability of earnings management is lower in companies with stronger internal corporate governance mechanisms. According to agency theory, asset revaluations can provide managers with opportunities to engage in earnings management especially when the fair value of non-current assets has to be estimated using managerial assumptions and

models. Consistent with the literature, we predict that the Big 4 auditors and strong corporate governance mechanisms can effectively constrain managers' opportunistic behaviour when estimating the fair value of non-current assets.

Hypothesis 3 (a): Big 4 auditors have a negative effect on the association between asset revaluations and discretionary accruals (a proxy for earnings management).

Hypothesis 3 (b): The strength of internal corporate governance mechanisms has a negative effect on the association between asset revaluations and discretionary accruals (a proxy for earnings management).

4 Sample and research model

4.1 Research model

The first hypothesis will be investigated using a model, which predicts the association between the choice of revaluation and earnings management (proxied by the magnitude of discretionary accruals). We cannot detect the motives for asset revaluations by this method but this approach will allow us to assess to some extent whether firms use discretion to opportunistically revalue their assets. This model will be a function of the choice of revaluation as well as a number of firm and industry specific characteristics previously found to explain the extent to which a firm will revalue assets (*e.g.*, Brown *et al.*, 1992; Christensen and Nikolaev, 2013; Easton *et al.*, 1993).

$$DA_{it} = a_0 + a_1 REVALUATION_{it} + a_2 SIZE_{it} + a_3 LEVERAGE_{it} + a_4 ROA_{it} + a_5 BIG4_{it} + a_6 CG_{it} + a_7 IAS_{it} + Year_Dummy + Industry_Dummy \quad (1)$$

Discretionary accruals (DA) are calculated using the *modified Jones model (1991)*, that is, $TA / Assets_{it-1} = \beta_0 + \beta_1(1 / Assets_{it-1}) + \beta_2(\Delta Sales - \Delta Rec / Assets_{it-1}) + \beta_3(PPE / Assets_{it-1}) + \epsilon$, where TA is total accruals (equal to net income minus operating cash flow), Assets are total assets, Sales are total revenues, Rec is account receivable, PPE is the total of plant, property and equipment.

The discretionary accrual is defined as the residual of the regression above. The explanatory variables and control variables include: *REVALUATION* is defined as a dummy variable equal to 1 if the firm revalues assets such as PPE, intangible assets or investment properties in year *t*; *SIZE* is defined as the log of total assets; *LEVERAGE* is defined as the ratio of total debts to total assets; *ROA* is defined as the return on assets equal to net income divided by the average of total assets; *BIG4* is a dummy variable given the value 1 when a Big 4

auditor is used and 0 otherwise; *CG* is the self-constructed corporate governance score⁸; *IAS* is defined as a dummy variable equal to 1 if the year is after 2005 when International Financial Reporting Standards were adopted in Australia.

To test the second hypothesis, we use observations (n=131) where non-current assets are measured at fair values from 2003-2007 to examine

⁸ Six individual control variables measuring corporate governance are analysed to produce a corporate governance score in this study, including size of the board of directors, board independence, duality of the role of board chair and chief executive officer, presence of an audit committee, remuneration committee and nomination committee. These items are based on the *Principles of Good Corporate Governance and Best Practice Recommendations (2010)*. Only size of the board of directors and board independence are continuous variables. The rest of the variables are dichotomous. The corporate governance index will be calculated as the total of corporate governance score divided by six.

the effects of the choice of valuation appraisers ($DIRECTOR_{it}$) on the magnitude of discretionary

accruals. Accordingly, the following fixed-effect model is used:

$$DA_{it} = \alpha_0 + \alpha_1 DIRECTOR_{it} + \alpha_2 SIZE_{it} + \alpha_3 LEVERAGE_{it} + \alpha_4 ROA_{it} + \alpha_5 BIG4_{it} + \alpha_6 CG_{it} + \alpha_7 IAS_{it} + Year_Dummy + Industry_Dummy \quad (2)$$

The variable, $DIRECTOR_{it}$, is included in Equation 2, which is measured as 1 if any of the non-current assets are revalued by internal directors and 0 otherwise. If director-valuations are less credible in ascertaining the values of non-current assets (e.g. low independence) and provide managers with opportunities to engage in earnings management then the coefficient of $DIRECTOR_{it}$ will be positive.

The last hypothesis examines whether the choice of auditors and corporate governance mechanisms have moderating effects on the magnitude of discretionary accruals in the course of assessing fair value estimates. The following fixed-effect model is used to test our hypothesis.

$$DA_{it} = \alpha_0 + \alpha_1 REVALUATION_{it} + \alpha_2 SIZE_{it} + \alpha_3 LEVERAGE_{it} + \alpha_4 ROA_{it} + \alpha_5 BIG4_{it} + \alpha_6 CG_{it} + \alpha_7 IAS_{it} + \alpha_8 BIG4 * REVALUATION_{it} + \alpha_9 CG * REVALUATION_{it} + Year_Dummy + Industry_Dummy \quad (3)$$

Equation 3 is essentially identical to equation 1 with the exception that the independent variable ($REVALUATION$) interacts with the variables, $BIG4$ and CG . If high quality auditors and stronger corporate governance can mitigate the concerns about managers' opportunistic reporting or errors inherent in the estimation, then we predict the coefficients (α_8 and α_9) to be negative.

4.2 Data and Sample

The sample is defined as the ASX 300 listed firms⁹ for the five year sample period from 2003-2007 which incorporates the pre-IFRS adoption period (2003-2004) and post-IFRS adoption period (2005-2007). We manually collect the data on the revaluation of PPE, investment properties and intangible assets by reading the annual reports. All financial variables are downloaded from Aspect Fin Analysis. The sample selection procedures are as follows. First, 326 firm-year observations from the financial sector have been excluded as the business structure of financial companies is different from that of non-financial companies. Second, 138 observations are excluded because of missing values for either one or more variables. Third, 30 firm-year observations are deleted where there is a discrepancy between the GICS industry codes and their classification in the Morningstar database. Finally, we delete the 1st and 99th percentiles of the dependent variable. For testing of hypothesis 1, the final sample consists of 951 firm-year observations from 196 unique companies. Table 1 below outlines the sample selection procedures.

5 Results

5.1 Descriptive statistics

Table 2 presents the description of the asset revaluations by industry. The industry is classified based on the two-digit GICS code downloaded from Aspect Fin Analysis. The assets that firms revalue include PPE, intangible assets and investment properties. The first column shows that 114 firms choose to revalue PPE. These firms are mostly in the Consumer Discretionary, Consumer Staples, Materials and Industrials industries. The second column shows that 12 firms choose to revalue intangible assets. These firms are mostly in the Consumer Discretionary, Materials and Industrials industries. The third column shows that 31 firms choose to revalue investment properties. The fourth column shows that there are a total of 131 firms that choose to revalue any one of the PPE, intangible assets and investment properties. Overall, those firms are mostly in the Consumer Discretionary, Materials and Industrials industries. Interestingly, no firms in the energy, telecommunication services and utilities industries have revalued their assets.

Table 3 shows descriptive statistics for all the test variables. The mean discretionary accruals for companies in the samples is 0.006. The descriptive statistics also show that the average size of sample companies is 3.06 billion with a standard deviation of 7.97 billion, suggesting that the sample covers a wide range of companies. Companies in the sample had total debt of approximately 24% of their assets. In terms of the profitability of these companies, on average, the ROA ratio is 7%, which indicates that more than 50% of companies in the sample reported an accounting profit. Moreover, 90% of the companies were audited by a Big 4 audit firms during the period from 2003-2007. Last, the mean of CG is 77%,

⁹ The Australian top 300 companies were chosen based on the S&P/ASX 300 index as at 2005.

indicating a strong corporate governance structure of sample companies.

Table 1. This table presents the sample selection for the analysis reported in Tables 6

	Firm-years observations
Original observations (ASX 300 * 5 years)	1500
<i>Less:</i>	
Financials	326
Missing financial data	138
Companies that are not applicable to GISC	30
Outliers	55
Final Sample	951
Hypothesis 1 and 3 sample: ASX 300 companies from non-financial industries	951
Hypotheses 2 sample: ASX 300 companies whose non-financial assets (PPE; intangible assets or investment property) were measured at fair values	131

Table 2. This table describes asset revaluation across industries based on the two-digit GICS code. The assets that firm revalues include PPE, intangible assets and investment properties

2-digit GICS	Industry	N	Revaluation of assets			
			PPE(1)	Intangible Assets(2)	Investment Property(3)	All Assets(4)
10	Energy	91	0	0	0	0
15	Materials	230	33	3	9	38
20	Industrials	201	18	3	12	27
25	Consumer Discretionary	163	22	5	10	24
30	Consumer Staples	82	26	0	5	27
35	Health Care	80	11	1	0	11
45	Information Technology	39	4	0	0	4
50	Telecommunication Services	41	0	0	0	0
55	Utilities	24	0	0	0	0
Total		951	114	12	31	131

Table 3. This table provides descriptive statistics for all variables used in the multivariate regression analysis

Continuous Variable	N	Mean	Stand. Dev.	1 st Quartile	Median	3 rd Quartile
DA	951	0.006	0.091	-0.025	0.009	0.036
Assets (\$M)	951	3,060	7,970	256	782	2,420
Leverage	951	0.236	0.185	0.098	0.228	0.329
ROA	951	0.068	0.123	0.042	0.070	0.102
CG	951	0.771	0.181	0.667	0.833	0.833

Dummy Variable	N	Yes	%	No	%
Revaluation	951	131	14%	820	86%
BIG4	951	860	90%	94	10%
Director	131	87	66%	44	34%

Notes: DA is defined as the discretionary accruals which are estimated based on the modified Jones model (1991); Assets are defined as the total assets of a firm; Leverage is defined as the ratio of total debts to total assets; ROA is defined as the return on assets; CG is the self-constructed corporate governance score; Revaluation is defined as a dummy variable equal to 1 if the firm revalues assets such as PPE, intangible assets or investment properties in year t; BIG4 is a dummy variable given the value 1 when a Big 4 auditor is used and 0 otherwise; Director is measured as 1 if any of the non-current assets are revalued by internal directors and 0 otherwise.

In term of accounting choices for non-current assets, 14% of companies in the sample have measured their non-current assets at fair values after initial recognition (the 'revaluation model'), which is a small proportion of the sample, as compared to 86% of companies that applied the 'cost model' to their

non-current assets. Within the companies that have revalued their non-current assets, 66% selected internal directors to estimate any one type of asset value.

Table 4 compares the mean and standard deviation of all variables from the two sub-samples of

companies, those using the ‘cost model’ or those using the ‘revaluation model’.¹⁰ We find that, first, discretionary accruals (t -stat=9.356) of firms that choose the ‘revaluation model’ are significantly higher than those of firms that choose the ‘cost model’ which indirectly supports hypothesis one. Second, the ROA (t -stat= -2.740) and CG (t -stat= -3.745) of firms that have used the ‘revaluation model’ is lower as compared to firms that used the ‘cost model’. This finding suggests that poorly performing firms and firms with weaker corporate governance are more likely to measure their non-current assets at fair values which may enable earnings management.

Pearson correlation coefficients on the variables used in each of the tests are presented in Table 5. The measure of discretionary accruals (DA) is positively correlated with the variables, *Revaluation* and *Leverage* and negatively correlated with *Size*, *ROA*, *BIG4* and *CG* as hypothesised (two tailed p -value 0.01 or 0.05 level).

5.2 Regression results

Table 6 presents the regression results for hypothesis one, whether asset revaluations are associated with discretionary accruals. The dependant variable is discretionary accruals. The experimental variable, *Revaluation_{it}*, is a dummy variable equal to 1 if a firm chooses to measure any of its non-current assets (e.g. PPE, intangible assets or investment properties) at fair values. The results show that discretionary accruals are increasing when non-current assets are measured at fair value (coefficient=0.06, t -stat=7.73) and the result is statistically significant at the 1% level ($p=0.000$). Therefore, hypothesis one is supported. The finding from hypothesis one is consistent with the argument that fair value measurement of non-financial assets increases agency costs. For example, the nature of fair value estimates (e.g. less reliable and highly subjective) can provide managers with opportunities to engage in earnings management. Further, the sign of the coefficients of the control variables: *Size*, *Leverage*, *ROA*, *BIG4* and *CG* are consistent with expectations and prior studies (e.g., Brown *et al.*, 1992; Christensen and Nikolaev, 2013; Easton *et al.*, 1993).

Table 6 also presents the regression results for hypothesis two, the association between discretionary accruals and the choice of appraisers. We use observations ($n=131$) where non-current assets are measured at fair values from 2003-2007 to examine the effects of the choice of valuation appraisers on the

magnitude of discretionary accruals. We include *Director_{it}* as the experimental variable in our regression analysis. The results indicate that companies that selected director-valuations had higher discretionary accruals (coefficient=0.05, t -stat=2.39), which is statistically significant at the 5% level ($p=0.019$). The explanation of this finding is that internal directors are less independent than external independent appraisers, providing managers with opportunities to engage in earnings management.

The regression results for hypothesis three, which investigates whether the choice of auditors and the strength of corporate governance have a moderating effect on the association between asset revaluations and discretionary accruals, are also presented in Table 6. The coefficient on *Revaluation_{it}* alone is positive and statistically significant. The coefficient decreased by 0.25 for firms audited by BIG4 auditors (e.g. *Revaluation*BIG4* coefficient=-0.25, t -stat=-10.08) and for firms with comparatively stronger corporate governance (e.g. *Revaluation*CG* coefficient=-0.25, t -stat=-6.53). Altogether, the results from these tests indicate that good corporate governance mechanisms play an important monitoring role in reducing agency costs induced by fair value estimates.

6 Robustness tests and sensitivity analysis

We perform a number of additional tests to provide robustness to the main results. First, we estimate discretionary accruals based on Kothari *et al.* (2005) model. The results (untabulated) are consistent with the results reported in Table 6, both in terms of the sign of the coefficients and their statistical significance. Second, we test whether debt levels could confound our results. Prior studies find that leveraged companies in danger of violating covenants are more likely to revalue assets (Brown *et al.*, 1992; Whittred and Chan, 1992). Hence, the presence of debt covenants can provide a motivation for managers to exercise their discretion in choosing to revalue non-current assets. We partition the sample by the constraints of a debt covenant, proxied by the ratio of long-term debts to total assets. We continue to reach the same conclusions, indicating that results are not driven by differences in the long-term debt ratio. Third, we test whether firm size alters the results. Specifically, we divided the sample into two sub-samples based on the median of total assets. Results remain unchanged.

¹⁰ The sample is divided into two sub-samples based on the valuation model. Sub-sample 1 ($N=820$) consists of companies whose non-financial assets (PPE; intangible assets or investment property) are measured at cost while sub-sample 2 ($N=131$) consists of companies whose non-financial assets are measured at fair value after initial recognition.

Table 4. Descriptive statistics (independent *t*-test). This table presents the mean and median of all variables in a sub-sample of firms that chooses the revaluation model and a sub-sample of firms that chooses the cost model.

	Fair-value Model N=131		Cost Model N=820		Mean Difference	<i>t</i> -stat
	Mean	SD	Mean	SD		
DA	0.072	0.155	-0.004	0.071	0.076	9.356***
LogTA	8.841	0.728	8.937	0.744	-0.096	-1.387
Leverage	0.229	0.148	0.237	0.190	-0.008	-0.471
ROA	0.041	0.088	0.073	0.127	-0.031	-2.740***
CG	0.716	0.199	0.779	0.176	-0.063	-3.745***
BIG4	0.895	0.308	0.903	0.295	-0.008	-0.307

Notes: DA is defined as the discretionary accruals which are estimated based on the modified Jones model (1991); LogTA is defined as the logarithm of total assets; Leverage is defined as the ratio of total debts to total assets; ROA is defined as the return on assets; CG is the self-constructed corporate governance score; Revaluation is defined as a dummy variable equal to 1 if the firm revalues assets such as PPE, intangible assets or investment properties in year *t*; BIG4 is a dummy variable given the value 1 when a Big 4 auditor is used and 0 otherwise; The number in the parenthesis below is *t*-statistics value. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively

Table 5. Table 5 shows the correlations between variables

	DA	Revaluation	LogTA	Leverage	ROA	BIG4	CG	IAS
DA	1.000							
Revaluation	0.289***	1.000						
LogTA	-0.215***	-0.045	1.000					
Leverage	0.071**	-0.015	0.299***	1.000				
ROA	-0.211***	-0.088***	0.226***	-0.037	1.000			
BIG4	-0.191***	-0.009	0.253***	0.138***	0.048	1.000		
CG	-0.197***	-0.120***	0.405***	0.076**	0.095***	0.232***	1.000	
IAS	0.048	-0.025	0.135***	0.099***	0.038	0.040	0.002	1.000

Notes: DA is defined as the discretionary accruals which are estimated based on the modified Jones model (1991); Revaluation is defined as a dummy variable equal to 1 if the firm revalues assets such as PPE, intangible assets or investment properties in year *t*; LogTA is defined as the logarithm of total assets; Leverage is defined as the ratio of total debts to total assets; ROA is defined as the return on assets; CG is the self-constructed corporate governance score; Revaluation is defined as a dummy variable equal to 1 if the firm revalues assets such as PPE, intangible assets or investment properties in year *t*; BIG4 is a dummy variable given the value 1 when a Big 4 auditor is used and 0 otherwise; The number in the parenthesis below is *t*-statistics value. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

7 Concluding comments

We examine whether asset revaluations are related to earnings management using a sample of the largest 300 Australian firms listed on the ASX for the years 2003 to 2007. The findings indicate that asset revaluations are positively associated with earnings management, proxied by discretionary accruals. Furthermore, companies that use revaluations undertaken by directors have higher discretionary accruals than those that employed external valuers. Last, evidence is provided that the choice of Big 4 auditors and the strength of internal corporate governance mechanisms have a negative impact on the association between asset revaluations and discretionary accruals. Altogether, the results suggest that asset revaluations can significantly increase agency costs if managers tend to act opportunistically for their own benefits. Black *et al.* (1998) argue that when the profit that occurs from a fixed asset sale is

estimated on an historical cost basis, revaluations may be used to improve the financial appearance of the firm. Our results suggest that the opportunistic behaviour of directors can increase bias in the amount of the *revaluation increments*, leading to a reduced reliability and informativeness of the revaluation (Cotter and Richardson, 2002). This study also highlights the important role of strong internal and external corporate governance mechanisms in reducing agency costs caused by asset revaluations.

The study has some limitations. For example, there is a focus on non-financial companies. Thus the results may not be generalisable to firms from the financial industry. Also, we do not examine the impact of global financial crisis (GFC) on managers' incentives to revalue assets. Extending our study to firms in the financial sector and to incorporate the GFC period are important avenues for future research

Table 6 Regression Model: Dependant variable = Discretionary Accruals (DA)

Variable	H1 Coefficient (t-stat)	H2 Coefficient (t-stat)	H3 Coefficient (t-stat)
Intercept	0.25*** (6.45)	0.73*** (4.92)	0.15*** (4.18)
Revaluation	0.06*** (7.73)		0.47*** (15.49)
Director		0.05** (2.39)	
CG	-0.03* (-1.78)	-0.18*** (-3.52)	0.02 (1.03)
CG* Revaluation			-0.25*** (-6.53)
BIG4	-0.05*** (-5.20)	-0.26*** (-8.41)	-0.01 (-1.17)
BIG4* Revaluation			-0.25*** (-10.08)
Size	-0.02*** (-4.99)	-0.03** (-2.03)	-0.02*** (-4.67)
Leverage	0.07*** (4.11)	0.14** (2.36)	0.06*** (3.94)
ROA	-0.09*** (-3.94)	-0.16 (-1.46)	-0.09*** (-4.15)
IAS	0.02 (0.25)	0.03 (1.12)	0.02 (0.25)
Year_Dummy	Yes	Yes	Yes
Indus_Dummy	Yes	Yes	Yes
Firm Fix Effect	Yes	Yes	Yes
Obs. #	951	131	951
Adjusted R-square	0.20	0.62	0.35

Notes: The dependant variable is discretionary accruals. *DA* is defined as the discretionary accruals which are estimated based on the modified Jones model (1991); *Revaluation* is defined as a dummy variable equal to 1 if the firm revalues assets such as PPE, intangible assets or investment properties in year *t*; *Director* is measured as 1 if any of the non-current assets are revalued by internal directors and 0 otherwise; *CG* is the self-constructed corporate governance score; *BIG4* is a dummy variable given the value 1 when a Big 4 auditor is used and 0 otherwise; *Size* is defined as the logarithm of total assets; *Leverage* is defined as the ratio of total debts to total assets; *ROA* is defined as the return on assets; *IAS* is defined as a dummy variable equal to 1 if the year is after 2005 when International Accounting Standard were adopted in Australia. *BIG4* Revaluation* is an interaction variable of *BIG4* and *Revaluation*; *CG* Revaluation* is an interaction variable of *CG* and *Revaluation*.

The number in the parenthesis below is t-statistics value. *, **, and *** indicate significance at 10%, 5%, and 1% level, respectively.

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