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Duration of equity overvaluation and managers' choice to use aggressive underlying earnings disclosure and accrual-based earnings management
Australian evidence

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The Duration of Equity Overvaluation and Managers' Choice to Use Aggressive Underlying Earnings Disclosure and Accruals Earnings Management: Australian Evidence

Abstract

This paper examines whether the duration of equity overvaluation influences managers' choice to use different earnings management mechanisms, and how corporate governance and the Australian Securities and Investment Commission's underlying earnings disclosure guidelines influence managers' choices. The study uses a sample of Australian Securities Exchange 200 firms between 2009 and 2016. The findings show that on average, firms are more likely to engage in accruals earnings management in the early stage of overvaluation. In the later stages, firms are more likely to disclose underlying earnings aggressively to sustain overvaluation. The study also finds that firms with a high proportion of independent directors on the board prefer to disclose underlying earnings aggressively to sustain the equity overvaluation; firms with a low proportion of independent directors on the board prefer to use both accruals earnings management and aggressive underlying earnings disclosure to sustain the overvaluation. Another finding is that firms that conform to the Commission's underlying earnings disclosure guidelines use neither accruals earnings management nor aggressive underlying earnings disclosure to sustain overvaluation, but firms that do not conform to the guidelines use both of these mechanisms to sustain overvaluation.

1. Introduction

Since earnings and their growth are key components determining firm value, managers are highly motivated to increase earnings and their growth expectations, which ultimately inflate firm value to increase stock prices (Adams et al., 2009; Badertscher, 2011; Brown and Caylor, 2005; Graham et al., 2005). Evidence shows that managers' wealth increases as a firm's stock price increases, because their compensation is associated with the stock price via stock performance-based incentives (Bergstresser and Philippon, 2006). Moreover, managers' job security in the executive labour market typically increases with strong performance of the firm's stock, with a manager being less likely to lose their job when stock is performing well (Jensen, 2005). These motivations typically stimulate managers to strive for higher stock prices. Studies have found that managers are fully aware of opportunities to manage earnings, and earnings management is the main approach used by managers to obtain their desired economic outcomes because investors are unlikely to uncover earnings management (Badertscher, 2011; Nelson et al., 2002, 2003; Xie, 2001). However, the aggregate shareholders' value destroyed by earnings management far exceeds that of high-profile fraud cases (Badertscher, 2011; Graham et al., 2005).

Jensen's (2005) agency theory of overvalued equity suggests that when a firm's stock price becomes overvalued, the firm maintains the overvaluation by participating in a variety of earnings management choices. Previous research has provided empirical evidence consistent with Jensen's (2005) conjecture. For instance, Efendi et al. (2007) demonstrated that firms exhibiting signs of overvaluation in the years prior to engaging in non-statutory earnings management increase managers' stock compensation incentives to sustain the overvalued stock prices. Badertscher (2011) indicated that overvaluation is an important determinant of earnings management decisions. This author found that managers participate in accruals earnings management in the early stage of overvaluation, then move to real activities earnings management to sustain the overvaluation of the equity, and in the later stages, managers tend to engage in non-generally accepted accounting principles (non-GAAP) earnings management. Although several studies have investigated the correlation between overvaluation of equity and earnings management, there is still

limited empirical evidence for the correlation between the duration of overvaluation and the management's choice of alternative earnings management mechanisms (Badertscher, 2011).

This paper first examines whether the duration of overvaluation affects managers' decisions to use different earnings management mechanisms. It investigates whether the duration of equity overvaluation affects managers' choice to use accruals earnings management and aggressive underlying earnings disclosure. The results demonstrate that, on average, in the early stage of overvaluation, managers are more likely to use accruals earnings management. In the later stage, they run out of accruals earnings management choices and resort to aggressive underlying earnings disclosure to maintain overvaluation. Second, this paper investigates whether corporate governance influences managers' choice of using different earnings management mechanisms. The results show that firms with a high proportion of independent directors on the board do not choose accruals earnings management to sustain overvaluation, but prefer to disclose underlying earnings aggressively in the later stage of overvaluation. Firms with a low proportion of independent directors are more likely to use both earnings management mechanisms to sustain overvaluation. Lastly, this paper examines the impact of the Australian Securities and Investment Commission (ASIC) underlying earnings disclosure guidelines on the management's choice of using earnings management mechanisms. As the ASIC guidelines are voluntary, we examine the influence of overvaluation on the choice of using earnings management mechanisms by firms that conform to the guidelines and by those that do not. We find that firms that conform to the ASIC underlying earnings disclosure guidelines do not use either accruals earnings management or aggressive underlying earnings disclosure to sustain overvaluation. However, firms that do not conform to the ASIC underlying earnings disclosure guidelines are more likely to use both accruals earnings management and aggressive underlying earnings disclosure to sustain overvaluation.

The additional test investigates whether the constraints of using accruals earnings management encourage managers to engage in aggressive underlying earnings disclosure. This study finds that equity-overvalued firms with a high level of accruals earnings management constraints only engage in aggressive underlying earnings disclosure to maintain overvaluation.

This paper contributes to the literature on equity overvaluation and earnings management by examining whether managers alternate between accruals earnings management and aggressive underlying earnings disclosure to sustain overvaluation. Three previous studies have examined the association between aggressive non-statutory earnings reporting (pro forma earnings) with within-statutory earnings management techniques (accruals earnings management and/or real activities earnings management) (Black et al., 2014; Doyle et al., 2013; Elshafie et al., 2010). All three studies found that managers alternate between accruals earnings management and aggressive non-GAAP earnings reporting. However, they did not examine whether the duration of equity overvaluation incentives affects managers' choice of using accruals earnings management and aggressive underlying earnings disclosure. Second, while previous studies have examined the relationship between non-GAAP earnings and accruals earnings management using the absolute value of accruals earnings management, this paper examines whether managers use aggressive underlying earnings disclosure and income-increasing accruals earnings management alternatively or simultaneously. Third, this paper empirically tests Jensen's (2005) agency theory of overvalued equity. Badertscher (2011) examined overvaluation and managers' choice of non-statutory earnings management, and found that overvalued firms are more likely to engage in non-GAAP earnings management than firms that are not overvalued. However, Badertscher (2011) defined non-GAAP earnings management as firms that identified restatement announcements that raised questions about the quality of financial reporting. It is not clear whether managers use aggressive non-GAAP earnings reporting as an earnings management tool to substitute for other earnings management tools, to sustain overvalued equity. This paper extends Badertscher's (2011) study by investigating how the duration of overvalued firms affects managers' use of accruals earnings management and aggressive underlying earnings (similar to non-GAAP earnings in the US) disclosure. Lastly, this is the first paper to examine whether corporate governance and ASIC's underlying earnings disclosure guidelines influence managers' decision-making on using different earnings management techniques to sustain overvaluation. We extend the results of Baderscher (2011) in that we not only find that on average, managers use earnings management mechanisms alternatively to sustain the equity overvaluation, but we also find that if firms have a lower proportion of independent directors or do not conform to the ASIC underlying earnings guidelines, then

managers prefer to use earnings management mechanisms simultaneously to sustain the equity overvaluation.

We have organised the paper as follows. Section 2 provides a literature review. Section 3 develops the hypotheses. Section 4 describes the research design of this study. Section 5 presents the descriptive statistics, Pearson and Spearman correlations, and regressions results. Section 6 provides the additional test, and Section 7 concludes.

2. Literature review

2.1. Underlying earnings

Underlying earnings are calculated based on the judgements of the preparer and reflect the core/recurring business activities of reporting firms. They are voluntarily reported earnings on a basis other than the International Financial Reporting Standards (IFRS), or in line with IFRS and then adjusted by firm managers (Australian Institute of Company Directors [AICD] and Financial Services Institute of Australasia [FINSIA], 2009). Firms use various labels to describe underlying earnings, including pro forma earnings; normalised earnings; underlying earnings before interest and taxes (EBIT); underlying earnings before interest, taxes, depreciation, and amortisation (EBITDA); earnings before exceptional items; results excluding exceptional items; results before non-recurring items; results before significant items; results before special items; results before specific items; adjusted earnings before interest, tax, depreciation, and amortisation; or adjusted operating earnings (AICD and FINSIA, 2009; Ernst and Young, 2007). The underlying earnings used in this paper represent all such terms because they provide an alternative to statutory earnings. Although there is no general agreement on computing underlying earnings, generally significant non-recurring items and IFRS-driven unrealised gains and losses are often excluded (AICD and FINSIA, 2009).

The adoption of underlying earnings is a common phenomenon in Australian firms. For example, Woodside Petroleum Limited's 2012 annual report documented that 'underlying net profit after tax was $2,061 million, which was a 25% increase on the 2011 figure' (Woodside Petroleum, 2012, p. 4). Boral Limited documented a net statutory loss of $91 million, while underlying profits after tax was a positive $132

million in its 2010 annual report (Boral, 2010, p. 23). A study conducted by KPMG in 2009 found that 84% of firms on the ASX 100 Index presented underlying earnings as a response to growing dissatisfaction with statutory earnings as representative of firms' actual economic performance (KPMG, 2009). In 2012, 32 of 50 ASX Index firms chose to report financial results using underlying earnings of economic performance in addition to statutory earnings (KPMG, 2013). Recently, investors have focused more on underlying earnings than on conventional statutory earnings, because underlying earnings are considered a proxy for a firm's ongoing profitability, an approach that is useful for evaluation (AICD and FINSIA, 2009; KPMG, 2009).

Previous studies have found that managers may use their discretion in defining non-statutory earnings (i.e., pro forma earnings) in an aggressive manner, considering some actual recurring expenses as non-recurring expenses to exclude for current earnings determination, resulting in a firm with favourable pro forma earnings in the context of the US (Bowen et al., 2005; Doyle et al., 2003, 2013; McVay et al., 2006). By aggressively defining the pro forma earnings (shifting recurring expenses to non-recurring items to make non-statutory earnings higher than GAAP earnings), managers can achieve their personal interests with fewer costs than real activities and accruals-based earnings management. The joint policy guidance paper produced by the Australian Institute of Company Directors (AICD) and Financial Services Institute of Australasia (FINSIA) argues that a long lead time in producing financial statements makes non-statutory reporting necessary (AICD and FINSIA, 2009). The publication of non-statutory reporting is termed as underlying earnings, presented with a reconciliation between statutory earnings and underlying earnings (AICD and FINSIA, 2009; Sek and Taylor, 2011). As explained by the AICD and FINSIA (2009) report, underlying earnings is statutory profits adjusted to present a directors' assessment of the results of the ongoing activities of the firm (p. 7). The Australian Securities and Investment Commission (ASIC) Regulatory Guidance 230 provides the following statement in relation to non-IFRS (i.e., non-statutory profits) financial information calculation: "A clear explanation should be provided about how the non-IFRS financial information is calculated" (ASIC, 2011b, p. 18). It further states in relation to reconciliation: "A reconciliation between the non-IFRS and IFRS financial information should be provided, separately itemising and explaining each significant adjustment. Where reconciling items are components of IFRS financial information,

they should be capable of being reconciled to the financial report. Where a reconciling item cannot be extracted directly from the financial report, the reconciliation should show how the figure is calculated. Where comparative non-IFRS financial information is presented for a previous period, a reconciliation to the corresponding IFRS financial information should be provided for that previous period" (ASIC, 2011b, p. 18). In implementing the guideline in practice, for instance, the BHP 2017 Annual Report states under "Alternative performance measures" that "we use various alternate performance measures to reflect our underlying performance. Our two primary measures of performance are Underlying attributable profit and Underlying EBITDA. These measures, and other alternate performance measures, are reconciled below and defined in section 1.12.5" (BHP, 2017, p. 74, first paragraph).

There is no specific (Auditing Standard) requirement for external auditors "to audit" underlying profits as these are non-IFRS profit. However, if a Disclosure Reconciliation of Underlying Profits to Statutory Profits is presented, the auditor needs to check the reasonableness of the reconciliation. Also, *ASA 720 The Auditor's Responsibilities Relating to Other Information* addresses financial and non-financial information presented in Other Information (e.g., Annual Report) versus the Financial Report (Financial Statements), as follows:

Paragraph 14 (p. 9). The auditor shall read the other information and, in doing so:
a. Consider whether there is a material inconsistency between the other information and the financial report. As the basis for this consideration, the auditor shall, to evaluate their consistency, compare selected amounts or other items in the other information (that are intended to be the same as, to summarise, or to provide greater detail about, the amounts or other items in the financial report) with such amounts or other items in the financial report; and (Ref: Para. A25–A29)
b. Consider whether there is a *material inconsistency* between the other information and the auditor's knowledge obtained in the audit, in the context of audit evidence obtained and conclusions reached in the audit. (Ref: Para. A30–A36)

Paragraph 15 (p. 9). While reading the other information in accordance with paragraph 14 of this Auditing Standard, the auditor shall remain alert for indications

that the other information not related to the financial report or the auditor's knowledge obtained in the audit appears to be materially misstated. (Ref: Para. A24, A37–A38)

Also applicable is *Scope of ASA 720 The Auditor's Responsibilities Relating to Other Information*, as per paragraphs 1-9 and the Objectives as per paragraph 11 of the *ASA720* Auditing Standard. It is worth noting paragraphs 2 and 3:

Paragraph 2 (p. 7): This Auditing Standard is written in the context of an audit of a financial report by an independent auditor. Accordingly, the objectives of the auditor in this Auditing Standard are to be understood in the context of the overall objectives of the auditor as stated in paragraph 11 of ASA 200. The requirements in the Australian Auditing Standards are designed to enable the auditor to achieve the objectives specified in the Australian Auditing Standards, and thereby the overall objectives of the auditor. The auditor's opinion on the financial report does not cover the other information, nor does this Auditing Standard require the auditor to obtain audit evidence beyond that required to form an opinion on the financial report.

Paragraph 3 (p. 7): This Auditing Standard requires the auditor to read and consider the other information because other information that is materially inconsistent with the financial report or the auditor's knowledge obtained in the audit may indicate that there is a material misstatement of the financial report or that a material misstatement of the other information exists, either of which may undermine the credibility of the financial report and the auditor's report thereon. Such material misstatements may also inappropriately influence the economic decisions of the users for whom the auditor's report is prepared.

Moreover, unlike accruals earnings management and real activities earnings management, bottom-line net income is unaffected by using aggressive non-statutory earnings disclosure (Fan et al., 2010). Studies have found that when firms have limited opportunities to engage in accruals and/or real activities earnings management, they are more likely to aggressively disclose pro forma earnings (Black et al., 2014; Doyle et al., 2013; Elshafie et al., 2010).

A few recent studies have examined underlying earnings disclosure in Australia. For example, Sek and Taylor (2011) described how Australian banks report various measures of underlying earnings over time. Cameron et al. (2012) demonstrated the underlying earnings of the top 50 ASX-listed non-mining companies between 2007 and 2009. However, no studies have examined whether the equity overvaluation serves as an incentive for managers to alternate accruals earnings management and aggressive underlying earnings disclosure. Further, none have investigated the effect of ASIC's 2011 underlying earnings disclosure guidelines on managers' use of aggressive underlying earnings disclosure to sustain the overvaluation, and how firms' corporate governance and ASIC underlying earnings disclosure guidelines impact on the decision-making of managers to use earnings management mechanisms to sustain the equity overvaluation.

2.2. Agency theory of overvalued equity and earnings management

Several studies have examined earnings management behaviours based on the agency theory of overvalued equity. Using a sample of US data from 1964 to 2003, Chi and Gupta (2009) were the first to investigate the association between equity overvaluation and accruals management and to examine how overvaluation-induced earnings management affects a firm's future performance. The authors found that equity overvaluation intensifies accruals management, which confirms Jensen's (2005) conjecture that equity overvaluation encourages managers to manage earnings. Houmes and Skantz (2010) demonstrated that overvalued equity is an incentive for a manager's share option compensation, regardless of other reasons for overvaluation. Habib et al. (2013) examined the relationship between overvalued equity firms and audit fees in the US context. Their results show that auditors charge higher audit fees from clients that use aggressive earnings management because these firms have an incentive to overvalue equity. Marciukaityte and Varma (2008) examined the agency costs of overvaluation equity in earnings management by investigating a sample of 526 earnings management firms between 1990 and 2001. Their study found that considerable overvaluation of equity pushes managers to manage earnings, but when investors notice earnings restatements, managers correct the misstated overvaluation, which results in a loss of confidence in the managers.

Extending Marciukaityte and Varma's (2008) study, Baderstcher (2011) focused on the degree and duration of overvaluation on the 'evolution' of earnings management, from accruals management to manipulating real activities, to non-GAAP earnings management. The study found that managers engage in accruals earnings management at the early stage of overvaluation, then resort to real activities earnings management to sustain their overvaluation. At the later stage of overvaluation, managers are more likely to engage in non-GAAP earnings management. These results suggest that equity overvaluation plays a significant role in managers choosing alternative earnings management mechanisms during the duration of equity overvaluation. Coulton et al. (2014) examined the extent to which overvalued equity motivates firms to beat earnings benchmarks, and whether beating the benchmark can be interpreted as income-increasing earnings management. The authors provided evidence that overvaluation-related incentives encourage earnings management, and that overvalued benchmark beaters have higher levels of abnormal accruals than other firms that beat benchmarks.

3. Development of hypotheses

Jensen (2005) proposed that the agency costs of overvalued equity stem from managers who cannot (except through pure luck) produce an earnings performance to maintain an overvalued stock price without participating in earnings management techniques. Managers manage earnings so that they do not have to report a firm's true value as being lower than expected earnings, and thus be severely punished by the market (Skinner and Sloan, 2002). According to the agency theory of overvalued equity, managers of overvalued firms not only reject market correction of overvalued stock prices, but also tend to sustain overvaluation by engaging in earnings management that increases reported earnings. This is because overvaluation is an instant step towards increasing managers' welfare via incentives such as the bonuses and stock options that are usually connected with firm performance (Badertscher, 2011). The underlying assumption of this study, which builds on Jensen's (2005) agency theory of overvalued equity, is that equity overvaluation may lead to earnings management, and managers are likely to use different earnings management mechanisms during the duration of equity overvaluation.

There are many earnings management choices that managers can use to disguise true economic performance and sustain equity overvaluation. The flexibility of accounting reporting policy provides opportunities for managers to engage in earnings management that makes the firm appear less risky or more profitable than it really is (Fields et al., 2001; Graham et al., 2005). In deciding the type of earnings management to utilise, managers must consider the expected costs and benefits of alternative earnings management mechanisms. Each accounting choice has its costs and benefits, but the net incentives (benefits minus costs) will ultimately determine the management's choice of alternative earnings management mechanisms (Desai et al., 2006; Palmrose et al., 2004).

Accruals earnings management is a popular choice because it has no first-order effect on cash flows, and it can be completed at the end of a period once the amount of pre-accrual management earnings is known (Badertscher, 2011; Doukakis, 2014; Gunny, 2010). However, accruals earnings management has limitations. First, aggressive choices about accruals are at a higher risk of regulatory litigation and scrutiny because accrual accounting choices are subject to auditor scrutiny, and high levels of accrual manipulation tend to be detected by regulators (Graham et al., 2005), especially for publicly listed firms. Second, the reversing nature of accruals earnings management can be problematic because a firm can reverse the previous year's accruals earnings management in order to influence the current year's earnings (Badertscher, 2011). The reversing nature of accruals may limit the flexibility in applying accrual earnings management. Some studies argue that firms that used accrual earnings management extensively in previous periods tend to use other earnings management techniques in the current period, especially if they have a continued motivation to manage earnings (Alhadab et al., 2015; Gunny, 2010).

From a valuation perspective, if the probability of detecting an earnings management technique as material misstatements is low, it is less costly than other earnings management techniques (Badertscher et al., 2012). Aggressive underlying earnings disclosure enables management to manage earnings by large amounts without reversing them, thus enabling management to achieve specific benchmarks and sustain overvalued equity (Badertscher, 2011; Black et al., 2014). However, aggressive underlying earnings disclosure is not without costs. Studies find that

aggressive non-statutory earnings reporting is an egregious form of earnings management because share prices decline severely when investors detect opportunistic non-statutory earnings reporting, decreasing managers' reputations (Desai et al., 2006; Graham et al., 2005; Mizik and Jacobson, 2007; Palmrose et al., 2004).

Along with the agency theory of overvalued equity conjecture, this paper posits that the duration of overvaluation affects managers' decisions to use earnings management mechanisms. Specifically, in the early stage of overvaluation, managers are more likely to use accruals earnings management. Because accruals earnings management has limitations, this paper argues that the longer the duration of a firm's equity overvaluation, the greater the manager's incentive to disclose underlying earnings in an aggressive manner to sustain the overvalued equity. Therefore, the following hypothesis is presented:

H1: The longer firms are overvalued, the more likely it is that managers will disclose underlying earnings aggressively.

The form of corporate governance that can reduce accruals earnings management is not a new topic. Recent studies have focused on examining whether corporate governance has a moderating effect on the quality of non-GAAP reporting. For example, Frankel et al.'s (2011) study was the first that examined the relationship between non-GAAP earnings and the percentage of independent directors on the board. Their findings show that firms with a high percentage of independent directors on the board exclude items from non-GAAP earnings, suggesting that companies with higher corporate governance are more likely to report non-GAAP earnings efficiently. However, their study does not provide direct evidence on whether firms with weak corporate governance report non-GAAP earnings to mislead investors. Jennings and Marques (2011) extend Frankel et al.'s (2011) study by using two attributes of corporate governance: percentage of shares held by institutions and percentage of independent directors on the board. They provide strong evidence that corporate governance can prevent investors from being misled by non-GAAP adjustments and earnings disclosed in quarterly earnings announcement press releases. Entwistle et al. (2012) examine whether firms with stronger credibility attributes (i.e., high corporate governance, higher quality auditors, and higher historical information quality) are

perceived as providing more credible non-GAAP exclusions than those with weaker credibility attributes. These authors find that investors view better-governed firms, firms audited by high-quality auditors, and higher historical information quality firms as providing more credible non-GAAP exclusions, and investors price the non-GAAP reporting firms with strong credibility attributes higher than those with poor credibility attributes. Isidro and Marques (2014) find that a high-quality board can restrain opportunistic management with non-GAAP earnings reporting behaviour, particularly by reducing the opportunistic emphasis given to non-GAAP earnings reporting in press releases.

The above studies provide evidence that corporate governance plays an important role in monitoring and reducing management's earnings management behaviour. Our study attempts to examine whether corporate governance influences the decision-making of managers to choose earnings management mechanisms to sustain equity overvaluation. As this is the first study in Australia to investigate the influence of corporate governance on managers' use of different earnings management mechanisms, hypothesis 2 is stated in null form below:

H2: Corporate governance does not influence managers' choice of using earnings management mechanisms.

Studies conducted in countries where compliance with non-GAAP earnings reporting is compulsory (e.g., the US), have found that the compulsory introduction of non-GAAP guidelines can significantly increase the quality of non-GAAP earnings reported. Opportunistic non-GAAP reporting is decreased (Bowen et al., 2005) and misleading reporting practices are also decreased (Entwistle et al., 2006). The probability that firms will disclose non-GAAP earnings to meet or beat forecasts declines (Heflin and Hsu, 2008), and confidence in the market increases (Marques, 2006). Unlike in the US,[1] there are no compulsory regulations that govern managers'

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[1] The Securities Exchange Commission (SEC) introduced Regulation G (Reg G), item 10(e) of Regulation S-K , and item 12 to govern non-GAAP earnings reported outside financial statements in 2003. Reg G includes all the public reporting of non-GAAP financial valuation containing conference calls, press releases, presentations to investors, and other forms of media. In order to establish transparency in calculating non-GAAP earnings, the regulation demands that the reporters reconcile non-GAAP earnings with GAAP earnings. While the SEC attempts to ensure non-GAAP earnings

disclosure of underlying earnings in Australian firms. The ASIC issued its *Consultation Paper 150* in March 2011, proposing guidelines to minimise any adverse effect that may result from firms' underlying earnings disclosures. These guidelines state the following: (i) managers should explain the calculation of underlying earnings and why it is important to report underlying earnings; (ii) firms should not give greater prominence to underlying earnings than to IFRS information; (iii) managers should provide a reconciliation between underlying earnings and IFRS earnings; and (iv) firms should consistently report underlying earnings (ASIC, 2011a). In December 2011, ASIC published its *Regulatory Guide 230: Disclosing Non-IFRS Financial Information* as a guide to clarify reporting of underlying earnings, with the aim of preventing users being misled by underlying earnings reporting. ASIC's *Regulatory Guide 230* states that firms can disclose underlying earnings in communications such as directors' reports, press releases, notes to financial statements, and analyst briefings; but that reporting should not mislead financial statement users by giving greater prominence to underlying earnings than IFRS earnings information. Firms can disclose underlying earnings when such reporting assists in providing a true and fair view of financial statements. Firms must also reconcile underlying earnings and IFRS earnings by showing and explaining adjustments (ASIC, 2011b). These guidelines are similar to Reg G in the US; however, it is mandatory for US firms that disclose underlying earnings to follow Reg G, while it is voluntary for Australian firms that disclose underlying earnings to follow the ASIC's guidelines. This study examines the influence of the ASIC guidelines on managers' decisions to implement aggressive underlying earnings disclosure and accruals earnings management. The third hypothesis is presented in null form below:

H3: *The ASIC underlying earnings disclosure guidelines do not influence managers' choice of using earnings management mechanisms.*

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reporting is useful and has not been completed in a misguided manner, it does not prohibit non-GAAP reporting (SEC, 2003).

4. Research design

4.1. Data and sample selection

This study used a sample of ASX 200 firms from 2009 to 2016. Financial data information was obtained from the DatAnalysis database. ASX 200 firms were selected as the sample frame because the ASX 200 is recognised as the primary investment benchmark in Australia. ASX 200 firms cover approximately 78% of Australian equity market capitalisation. This paper sets out to examine the post-IFRS period, so 2006, 2007, and 2008 were avoided because in the three years following the adoption of IFRS many changes were made to financial reporting processes and systems in Australian firms that were adopting IFRS standards. To collect the underlying earnings data, we searched information about underlying earnings in the annual reports available in the Annual Reports Online database and DatAnalysis, using the keywords underlying, adjusted, normalised, earnings before, profit before, and pro forma. Following Black and Christensen (2009), we excluded EBIT and EBITDA because they are commonly reported as standard steps in the income statement. Table 1 illustrates the detailed sample selection process. The study found that 658 firm-year observations out of 927 firm-year observations in the sample disclosed underlying earnings; and that 491 firm-year observations out of 927 firm-year observations in the sample disclosed underlying earnings figures greater than statutory earnings figures over eight observation years.

Table 1: sample selection

	Firm-year observations
Top ASX200 firms	1200
Exclusions:	
Banks	24
Insurance	16
Diversified financials	36
Real estate	76
Missing data	121
Final group investigated	927
Underlying earnings reporting	658
Reported underlying earnings are greater than statutory earnings	491

4.2. Measurement of accruals earnings management

4.2.1. Accruals quality

The quality of accruals is very important in determining the reliability of earnings information for users, as it takes the view that high-quality earnings map more closely into cash flows (Harris et al., 2000). Dechow and Dichev (2002) viewed the accruals matching function to cash flows as very important, because accruals expect future cash collections/payments and reverse them when cash previously recognised in accruals is received/paid. Thus, Dechow and Dichev (2002) proposed and tested the quality of accruals based on the observation that the total current working capital accrual earnings maps into operating cash flows in the previous period, the current period, and the next period. The unexplained portion of the variation in working capital accruals is an inverse measure of accruals quality (a larger unexplained portion indicates poorer quality), and the wider variation in the unexplained portion in working capital accruals indicates low-quality accruals (Francis et al., 2005).

The measure of accruals quality used in this paper is based on Dechow and Dichev's (2002) measure, where the unexplained portion of the variation in working capital accruals is measured as the standard deviation in the residuals using a five-year rolling window that ends in 2012 for firm j, year t in the following multivariate equation (1):

$$TCA_{j,t} = \alpha_0 + \alpha_1 CFO_{j,t-1} + \alpha_2 CFO_{j,t} + \alpha_3 CFO_{j,t+1} + v_{j,t} \quad (1)$$

Where: j-firm-year observations; t-years from 2005 to 2012; $TCA_{j,t}$ is firm j's current accruals in year t, $= (\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STD_{j,t})$, scaled by the total assets at the beginning of year t; $CFO_{j,t}$ is cash flow from operations in year t, calculated as earnings before tax ($E_{j,t}$) less total accruals ($TA_{j,t}$),[2] scaled by the total assets at the

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[2] $TA_{j,t} = \Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STD_{j,t} - DEPN_{j,t}$; $\Delta CA_{j,t} =$ firm j's change in current assets between year t-1 and t, scaled by total assets at the beginning of year t; $\Delta CL_{j,t} =$ firm j's change in current liabilities between year t-1 and t, scaled by total assets at the beginning of year t; $\Delta Cash_{j,t} =$ firm j's change in cash between year t-1 and t, scaled by total assets at the beginning of year t; $\Delta STD_{j,t} =$ firm j's change in debt in current liabilities between year t-1 and t, scaled by total assets at the beginning of year t; $DEPN_{j,t} =$ firm j's depreciation and amortisation expenses in year t, scaled by total assets at the beginning of year t.

beginning of year t; and $v_{j,t}$ is residuals from Equation (1) representing accrual quality ($AQ_{j,t}$).

4.2.2. Innate factors of firms and discretional accruals earnings management

Accruals quality is jointly determined by the relevance of underlying financial performance and by the ability of the accounting system to measure performance (Dechow et al., 2010). Therefore, accruals quality is affected by two factors: those that reflect the innate features of firms, and those that reflect discretionary sources. Innate features are derived from business models, and the operating risk and operating environments. Previous studies have shown that innate factors account for around 50% of variations in the accruals quality metric (Francis et al., 2005, 2008). Discretionary sources stem from the process of financial reporting and include the managerial financial reporting implementation decisions, judgements and estimates, monitoring and governance, and regulatory scrutiny (Dechow et al., 2010; Francis et al., 2005, 2008).

To separate the innate and discretionary accruals components from accruals quality, (i) company size, (ii) standard deviation of cash flow from operations, (iii) standard deviation of sales, (iv) length log operating cycle, (v) the incidence of earnings losses, and (vi) earnings variability are selected as innate factors.[3] Those six innate factors are regressed on accruals quality ($AQ_{j,t}$) as follows:

$$AQ_{j,t} = a_0 + a_1 Size_{j,t} + a_2 Opcycle_{j,t} + a_3 NegEarn_{j,t} + a_4 Cfo_{j,t} + a_5 Sales_{j,t} + a_5 SDE_{j,t} + e_{j,t} \quad (2)$$

Where: j-firm-year observations, t-years from 2009 to 2016; $AQ_{j,t}$ is the standard deviation of residuals from Equation (1) for firm j, year t-$v_{j,t}$; $Size_{j,t}$ is natural logarithm of the total assets for firm j, year t; $Opcycle_{j,t}$ is natural logarithm of days of accounts receivable plus days of inventory for firm j, year t; $Cfo_{j,t}$ is standard deviation of cash flows from operations scaled by beginning total assets, computed using a five-year rolling window until 2016 for firm j, year t; $Sales_{j,t}$ is standard

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[3] Following Francis et al.'s (2005) study, this paper includes company size, standard deviation of cash flow from operations, standard deviation of sales, length logarithm operating cycle and incidence of earnings losses affecting accruals quality as firms' innate factors. Previous studies have found that earnings variability is highly related to accruals quality, and suggest greater variability in earnings and lower accruals quality (Dechow and Dichev, 2002; Francis et al., 2004, 2005). Therefore, earnings variability is included as an innate factor affecting accruals quality.

deviation of sales revenue scaled by beginning total assets, computed using a five-year rolling window until 2016 for firm j, year t; and *NegEarn*$_{j,t}$ is firm's proportion of losses over the previous five years for firm j, year t. *SDE*$_{j,t}$ is measured by the standard deviation of earnings before tax using a five-year rolling window until 2016 for firm j, year t.

Consistent with Francis et al. (2005), Equation (2) is measured by cross-section by industry for each year. Since the cross-sectional models require at least 10 firms in one industry (Aldamen and Duncan, 2013), this study combined the three smallest industry groups into one, giving a total of six industries for each year. The industry type is based on the Global Industry Classification Standard industry sector. Eight industries were included in the sample: energy, materials, industrials, consumer discretionary, healthcare, software, telecommunication services, and utilities. The telecommunication services (six firms) and the utilities (six firms) were combined into one group. Software was included in the healthcare category as it is a high-tech industry (three firms) for the purpose of measuring cross-sectional Equation (2).[4] This paper examines the influence of income-increasing accruals earnings management on equity overvaluation and expects that when managers are less likely to use income-increasing accruals earnings management, they tend to use income-increasing underlying exclusions to overvalue firms' equity. Thus, following previous studies (Baber et al., 2011; Laksmana and Yang, 2014), this paper measures the income-increasing accruals earnings management (*InAM*$_{j,t}$) by a dummy variable such that the positive residuals of Equation (2)-e$_{j,t}$ are coded as '1', and '0' otherwise. The predicted values from Equation (2) are the estimated accruals innate factors of firms.

4.3. Measurement of overvaluation

Following Habib et al.'s (2013) study, this paper measures the value of equity using positive lagged P/E ratios and positive lagged P/B ratios as proxy for equity overvaluation.[5] The P/E ratio was traditionally used to value companies because P/E

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[4] This paper follows Aldamen and Duncan's (2013) measurement of industry type. In that study, telecommunication services and utilities were combined into one industry group to measure the cross-sectional model.

[5] Empirical evidence finds that equity overvaluation is positively related to the subsequent income-increasing earnings management (Chi and Gupta, 2009), and highly valued firms tend to use discretionary accruals to manage earnings upwards in the year following the overpricing (Houmes and

valuation is a substitute for the well-established discounted earnings model. However, the applicability of P/E ratios in valuation has been challenged by both practitioners and academics (How and Howe, 2001; Kim and Ritter, 1999). Since transitory earnings account for a large part of profits and an increasing number of firms engage in earnings management, the usefulness of earnings in valuation declines (Collins et al., 1997, 1999) due to issues connected with P/E ratios, where P/B ratios have become an increasingly important valuation price-multiple. Studies have shown that when the equity's book value is compared to dividends and earnings, the equity book value had the highest explanatory power of empirical models (Collins et al., 1997, 1999). However, since different firms identify various numbers of intangible assets on their books, the price-multiple calculated using the book value of equity might not be applied to firms with different proportions of unrecognised intangible assets (How et al., 2007, p. 106). Since the P/E ratios and P/B ratios have limitations, the valuation of equity is measured by the average of lagged P/E ratios and lagged P/B ratios in this paper.[6] Using aggregative measurement by averaging the two is appropriate because lagged P/E ratios and lagged P/B ratios present one factor (see Table 3, Panel B factor analysis). This research design is framed to be consistent with Jensen's (2005) view that equity overvaluation drives managers to manipulate earnings (see Appendix for variables proxy and measurement).

To identify equity-overvalued firms, firms are ranked based on the $PEPB_{j,t}$ ratio for each year, where those firms in the highest quartile rank[7] of $PEPB_{j,t}$ indicate equity overvaluation. To capture the notion of sustained equity overvaluation or duration of equity overvaluation, this paper identifies firms that have been in the top quartile of $PEPB_{j,t}$ for 1 ($Over1_{j,t}$), 2($Over2_{j,t}$), 3($Over3_{j,t}$), 4($Over4_{j,t}$), 5 or more than 5 ($Over5_{j,t}$) consecutive years.

4.4. Duration of equity overvaluation and earnings management (H1)

The models for testing H1 were designed as follows:

Skantz, 2010). This study, following Habib et al. (2013), uses lagged measurements. This paper also trimmed the top and the bottom one percent of the sample.

[6] P/E ratios and P/B ratios have been ranked as high and low; the PEPB is the average of the rankings.

[7] Unlike Badertscher (2011), this paper uses quartile value rather than quintile value, due to the small sample size. Therefore, following Habib et al.'s (2013) study, this paper measures overvalued equity using quartile values.

$EM_{j,t}=a_0+\sum b_{0\text{-}5}Over_{(i)j,t}+c_1Controls_{j,t}+ c_2Year\ effects +c_3Industry\ effects +e_{j,t}$ (3)

Where: j-firm-year observations, t-years from 2009 to 2016.

Dependent variables: $EM_{j,t}$ is either $InEx_{j,t}$ or $InAM_{j,t}$. $InEx_{j,t}$ is aggressive underlying earnings disclosure measured by a dummy variable that equals 1 if j firm discloses an underlying earnings number that is greater than the statutory earnings in year t, and 0 otherwise. $InAM_{j,t}$ is income-increasing accruals earnings management, where it equals 1 if residuals ($e_{j,t}$) of Equation (2) is positive, or 0 otherwise.

Independent variables: $Over_{(i)j,t}$ is a dummy variable equal to 1 if j firm has been in the top quartile of $PEPB_{j,t}$ for (i) consecutive years, and 0 otherwise. Specifically, $Over_{1j,t}$ equals 1 if j firm was overvalued for one year during the sample years, and 0 otherwise. $Over_{2j,t}$ equals 1 if j firm was overvalued for two consecutive years during the sample years, and 0 otherwise. $Over_{3j,t}$ equals 1 if j firm was overvalued for three consecutive years during the sample years, and 0 otherwise. $Over_{4j,t}$ equals 1 if j firm was overvalued for four consecutive years during the sample years, and 0 otherwise. $Over_{5j,t}$ equals 1 if j firm was overvalued for five or more than five consecutive years during the sample years, and 0 otherwise.

Control variables: Following the literature, this paper includes several control variables that influence the likelihood of firm equity overvaluation and earnings management.

Accruals-specific controls: Following previous studies (Badertscher, 2011; Black et al., 2014; Cohen and Zarowin, 2010), this paper includes an indicator variable $Litigation_{j,t}$ that equals 1 if j firm is in a high litigation risk industry to capture the litigation penalties.[8] This paper includes $Litigation_{j,t}$ as a specific control variable because accrual earnings management is more likely than aggressive underlying earnings disclosure to be detected and punished, so greater perceived litigation penalties should decrease the tendency for accruals earnings management.

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[8] Following Barton and Simko (2002) and Cohen and Zarowin (2010), high litigation industries are pharmaceuticals/biotechnology, software, and service industries. Pharmaceuticals/biotechnology is a sub-group of the healthcare sector.

Another specific control variable for accruals widely recorded in the accounting literature is Big4 auditors. Following previous studies (Badertscher, 2011; Black et al., 2014; Doukakis, 2014), this paper includes $Big4_{j,t}$ as a specific control variable that is measured by a dummy variable that equals 1 if j firm's auditor comes from Big 4 audit companies, and 0 otherwise. This variable is included because the previous literature suggests that auditors play a monitoring role, and the presence of a Big 4 auditor restricts accrual earnings management practices (Francis and Wang, 2008). It is expected that increased scrutiny enhances the probability of discovering accrual earnings management, but it should not affect a manager's decision to aggressively disclose underlying earnings because it typically falls outside an auditor's responsibility.

Underlying earnings-specific controls: Previous research indicates that meeting earnings targets and avoiding current statutory losses is a useful way of explaining pro forma earnings disclosures. These studies suggest that managers have strong incentives to manipulate non-statutory earnings when firms miss their earnings target or make current statutory earnings losses (Barth et al., 2012; Black and Christensen, 2009; Doyle et al., 2013; Elshafie et al., 2010; Hitz, 2010; Isidro and Marques, 2014). This paper includes the dummy variable $Loss_{j,t}$, which equals 1 if j firm makes a current statutory earnings loss in year t, and 0 otherwise, while the dummy variable $Meet_{j,t}$ equals 1 if j firm's current statutory earnings are greater than or equal to previous statutory earnings, and 0 otherwise.

General control variables include $Leverage_{j,t}$ (DeFond and Jiambalvo, 1994; Doukakis, 2014; Francis and Wang, 2008); firm growth measured by market-to-book ratio ($MtoB_{j,t}$) and sales growth ($SalesG_{j,t}$) (Black et al., 2014; Doyle et al., 2013; Lougee and Marquardt, 2004; Zang, 2012); firm profitability, measured by return of equity ($ROE_{j,t}$) (Doukakis, 2014; Doyle et al., 2007, 2013; Frankel et al., 2011); and capital intensity ($Capital_{j,t}$) (Baginski et al., 1999; Francis et al., 2004). This study also includes net operating assets at the beginning of the year as a control variable, because previous net operating assets—which indicate the balance sheet constraints—affect current managers' decisions to use earnings management (Badertscher, 2011). Net operating assets at the beginning of a year ($NOA_{j,t}$) are measured by shareholders' equity; minus cash, cash equivalent, plus total debt, divided by lagged sales for firm j,

at the beginning of year t. Firm size ($Mktcap_{j,t}$) is measured by the natural logarithm of market capitalisation at the beginning of year t (Doukakis, 2014; Ettredge et al., 2005; Lundholm and Myers, 2002). This paper includes the year and industry effects to control the unobservable confounding variables that differ from time to time, but are constant across industries, and the unobservable confounding variables that differ across industries, but are constant over time. Corporate governance is measured by the percentage of independent directors on the board ($IND_{j,t}$) in relation to the total number of directors on the board. We obtained corporate governance data from the corporate governance section of the annual report of each firm.

This study includes underlying earnings disclosure or accruals earnings management, because control variables in previous studies indicated that accrual earnings management and non-statutory earnings disclosures are substitute mechanisms of earnings management (Black et al., 2014; Cohen et al., 2008; Doukakis, 2014; Doyle et al., 2013; Elshafie et al., 2010). If the dependent variable is accruals earnings management ($InAM_{j,t}$) then it controls for the aggressive underlying earnings disclosures ($InEx_{j,t}$); and the contrary also applies.

To examine the influence of corporate governance in H2, we divided our sample into two sub-samples: firms with high corporate governance versus firms with low corporate governance. Each year is ranked on $IND_{j,t}$ and the upper quartile of $IND_{j,t}$ is selected as a proxy of high corporate governance, while the lower quartile of $IND_{j,t}$ is selected as a proxy of low corporate governance.

To examine H3—that is, whether ASIC underlying earnings guidelines in 2011 would impact managers' decision-making in using different earnings management techniques to sustain equity overvaluation—we examined the post-ASIC underlying earnings guidelines period (2013–2016)[9] and restricted our sample to the firms that disclosed underlying earnings. As the guidelines are voluntarily followed by firms, we divided our sample into two sub-samples: firms that voluntarily conform to the guidelines and firms that do not voluntarily conform to the guidelines to disclose underlying earnings. If a firm conforms to all of ASIC's guidelines—(i) firms explain the calculation of underlying earnings and why it is important to report them; (ii)

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[9] We avoid 2011 and 2012, as we want to leave time for firms to familiarise themselves with the guidelines.

firms do not provide greater prominence to underlying earnings than to IFRS earnings; (iii) firms provide a reconciliation between underlying earnings and IFRS earnings; and (iv) firms consistently report underlying earnings (ASIC, 2011a, 2011b)—over the four reporting periods from 2013 to 2016, then the study considers the firm as compliant.

5. Analysis and results

5.1. Descriptive statistics

Table 2 documents the descriptive statistics of the variables for earnings management and equity overvaluation variables, and shows the differences between the top and bottom quartiles. For the earnings management mechanisms ($InAM_{j,t}$: income-increasing accruals earnings management, and $InEx_{j,t}$: aggressive underlying earnings disclosure), the median of $InAM_{j,t}$ (0.000) is lower than the median of $InEx_{j,t}$ (1.000), which means that sample firms are more likely to disclose underlying earnings aggressively. Looking at the overvaluation variables, the mean and median of $PE_{j,t}$ (15.274 and 14.190, respectively) are higher than the mean and median of $PB_{j,t}$ (2.607 and 1.830, respectively). The mean (median) of $PBPE_{j,t}$ is 8.940 (8.190), with an interquartile range of (5.870) to (11.285).

Table 2: Descriptive statistics for variables

Variable	Obs	Mean	LowQ	Median	TopQ	Std. Dev.
$InAM_{j,t}$	927	0.406	0.000	0.000	1.000	0.491
$InEx_{j,t}$	927	0.530	0.000	1.000	1.000	0.499
$IND_{j,t}$	927	0.697	0.600	0.750	0.833	0.171
$PE_{j,t}$	927	15.274	10.150	14.190	18.970	8.541
$PB_{j,t}$	927	2.607	1.120	1.830	3.080	2.379
$PBPE_{j,t}$	927	8.940	5.870	8.190	11.285	4.759

Note: $InAM_{j,t}$ is positive of 'abnormal' accruals (the positive of residuals ($e_{j,t}$) from Equation (2)), which represents income-increasing accruals earnings management for firm j, year t. $InEx_{j,t}$ is a dummy variable which equals 1 if j firm discloses underlying earnings greater than statutory earnings in year t, and 0 otherwise. $IND_{j,t}$ is percentage of independent directors on the board. $PE_{j,t}$ is price-to-earnings ratio for j firm in year t, which is collected from DatAnalysis database. $PB_{j,t}$ is price-to-book ratio for j firm in year t, which is collected from DatAnalysis database. $PBPE_{j,t}$ is average of $PE_{j,t}$ and $PB_{j,t}$ for firm j in year t.

5.2. Pearson and Spearman correlations and factor analysis

Table 3, Panel A shows the Pearson and Spearman correlations of key variables. $InEx_{j,t}$ is significant and negatively correlated with $InAM_{j,t}$ under Spearman correlation (correlation = -0.002, p-value = 0.046) and Pearson correlation (correlation = -0.043, p-value = 0.040). These results confirm those of previous studies (Black et al., 2014; Doyle et al., 2013; Elshafie et al., 2010), where accruals earnings management and aggressive underlying earnings disclosures are substitute earnings management mechanisms. Moving on to the correlations between earnings management mechanisms and overvaluation measurements, $InAM_{j,t}$ is significant and positively correlated to $Over_{1j,t}$ and $Over_{2j,t}$ under both the Pearson and Spearman correlation tests. $InEx_{j,t}$ is significant and positively correlated to $Over_{3j,t}$, $Over_{4j,t}$, and $Over_{5j,t}$ under Pearson and Spearman correlations. Table 3, Panel B presents the factor analysis for measuring overvaluation, and indicates that the PE and PB ratios represent one factor. Therefore, in this paper it is appropriate to combine the two measurement ratios into one variable to represent a firm's valuation measurement.

Table 3: Pearson and Spearman correlations and factor analysis

Table 3 Panel A: Pearson and Spearman correlations for variables

	$InAM_{j,t}$	$InEx_{j,t}$	$IND_{j,t}$	$Over_{1j,t}$	$Over_{2j,t}$	$Over_{3j,t}$	$Over_{4j,t}$	$Over_{5j,t}$
$InAM_{j,t}$	1.000	-0.043**	0.021	0.030**	0.058**	0.014	0.019	0.036
		(0.040)	(0.525)	(0.045)	(0.048)	(0.640)	(0.518)	(0.226)
$InEx_{j,t}$	-0.002**	1.000	0.168***	0.015	0.009*	0.035**	0.004**	0.066***
	(0.046)		(0.000)	(0.620)	(0.075)	(0.029)	(0.035)	(0.001)
$IND_{j,t}$	0.021	0.176***	1.000	0.057*	-0.022	-0.016	-0.089***	-0.008
	(0.524)	(0.000)		(0.083)	(0.504)	(0.619)	(0.006)	(0.816)
$Over_{1j,t}$	0.023**	0.010	0.052	1.000	-0.019	-0.013	-0.017	-0.057*
	(0.042)	(0.750)	(0.116)		(0.529)	(0.658)	(0.564)	(0.052)
$Over_{2j,t}$	0.071**	0.002*	-0.024	-0.021	1.000	-0.016	-0.021	-0.071**
	(0.029)	(0.081)	(0.472)	(0.527)		(0.583)	(0.473)	(0.016)
$Over_{3j,t}$	0.008	0.036**	-0.021	-0.015	-0.019	1.000	-0.015	-0.050*
	(0.810)	(0.027)	(0.518)	(0.657)	(0.572)		(0.614)	(0.090)
$Over_{4j,t}$	0.015	0.019**	-0.066**	-0.019	-0.025	-0.017	1.000	-0.065**
	(0.659)	(0.045)	(0.043)	(0.555)	(0.453)	(0.598)		(0.027)
$Over_{5j,t}$	0.006	0.104***	-0.003	-0.065**	-0.082**	-0.058*	-0.077**	1.000
	(0.865)	(0.002)	(0.929)	(0.047)	(0.012)	(0.077)	(0.019)	

p-value in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Pearson (above) and Spearman (below) correlations

Table 3 Panel B: Factor analysis for overvaluation variables

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1 (PB ratios)	1.182	0.365	0.5912	0.5912
Factor2 (PE ratios)	0.818	0.000	0.4088	1.0000
Number of obs	927			
Retained factors	1			
Number of params	1			
chi2(1)	31.62			
Prob>chi2	0			

Note: $Over_{1j,t}$ equals 1 if j firm is overvalued for one year during the sample years, and 0 otherwise. $Over_{2j,t}$ equals 1 if j firm is overvalued two consecutive years during the sample years, and 0 otherwise. $Over_{3j,t}$ equals 1 if j firm is overvalued three consecutive years during the sample years, and 0 otherwise. $Over_{4j,t}$ equals 1 if j firm is overvalued four consecutive years during the sample years, and 0 otherwise. $Over_{5j,t}$ equals 1 if j firm is overvalued five or more than five consecutive years during the sample years, and 0 otherwise. $InAM_{j,t}$ is positive of 'abnormal' accruals (the positive of residuals ($e_{j,t}$) from Equation (2)), which represents income-increasing accruals earnings management for firm j, year t. $InEx_{j,t}$ is a dummy variable which equals 1 if j firm discloses underlying earnings greater than statutory earnings in year t, and 0 otherwise. $IND_{j,t}$ is percentage of independent directors on the board.

5.3. Regression results

5.3.1. Results for duration of overvaluation and earnings management mechanisms (H1)

Table 4 shows the results of H1 using the time–industry fixed-effects logit regression model. The first and second models are tested with dependent $InAM_{j,t}$ and $InEx_{j,t}$, respectively. The results of the first model show that $InAM_{j,t}$ is significant and positively related to $Over_{1j,t}$ (coefficient = 0.571, p-value = 0.025) and to $Over_{2j,t}$ (coefficient = 1.507, p-value = 0.065), while $Over_{3j,t}$ $Over_{4j,t}$, and $Over_{5j,t}$ are not significantly associated with $InAM_{j,t}$. The results of the first model suggest that in the early stage of overvaluation, firms are more likely to engage in income-increasing accruals earnings management. In the later stage of overvaluation, managers are less likely to use income-increasing accruals earnings management. This could be explained by the reversing nature of accruals earnings management, where managers' ability to use income-increasing accruals earnings management decreases. The second model demonstrates that $InEx_{j,t}$ is significant and positively associated with $Over_{3j,t}$ (coefficient = 0.877, p-value = 0.007), $Over_{4j,t}$ (coefficient = 1.007, p-value = 0.027),

and $Over_{5j,t}$ (coefficient = 0.939, p-value = 0.002), so after a firm has been overvalued in the early stage using income-increasing earnings management, firms tend to sustain their equity overvaluation by engaging in aggressive underlying earnings disclosure to define underlying earnings as higher than statutory earnings. The results of Table 4 demonstrate that after an extended period of equity overvaluation, firms are unable to engage in further accruals earnings management, so resort to disclosing underlying earnings aggressively.

Table 4: Regression results for overvaluation and earnings management (H1)

	$InAM_{j,t}$ as dependent variable			$InEx_{j,t}$ as dependent variable		
	Coef.	z	P>z	Coef.	z	P>z
$Over_{1j,t}$	0.571**	2.240	0.025	0.177	0.300	0.763
$Over_{2j,t}$	1.507*	1.850	0.065	0.783*	1.670	0.096
$Over_{3j,t}$	0.912	1.200	0.293	0.877***	2.690	0.007
$Over_{4j,t}$	-0.185	-0.290	0.225	1.007**	2.210	0.027
$Over_{5j,t}$	-0.125	-0.400	0.464	0.939***	3.090	0.002
AM specific						
$Big4_{j,t}$	-0.888**	-2.110	0.035			
$Litigation_{j,t}$	-0.952	-1.560	0.119			
UE specific						
$Meet_{j,t}$				-0.514***	-2.930	0.003
$Loss_{j,t}$				1.786***	6.760	0.000
General controls						
$InEx_{j,t}$	-0.766***	-3.920	0.000			
$InAM_{j,t}$				-0.767***	-3.950	0.000
$Leverage_{j,t}$	0.486	1.130	0.257	1.413***	2.960	0.003
$SalesG_{j,t}$	-0.158	-0.410	0.680	-0.146	-0.400	0.687
$MtoB_{j,t}$	-0.111	-1.550	0.121	-0.154***	-3.010	0.003
$Mktcap_{j,t}$	0.183***	2.610	0.009	0.095	1.640	0.101
$NOA_{j,t}$	-0.275*	1.880	0.060	0.002	0.240	0.807
$ROE_{j,t}$	-0.002	-0.410	0.685	0.003	1.390	0.164
$Capital_{j,t}$	0.046	0.210	0.831	-0.139	-0.790	0.427
$IND_{j,t}$	0.368	0.670	0.502	1.761***	3.690	0.000
_cons	-0.600	-0.690	0.489	-1.642**	-2.440	0.015
Year effects	YES			YES		
Industry effects	YES			YES		
Number of obs	927			927		
Pseudo R^2	28.30%			17.00%		

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: $Over_{1j,t}$ equals 1 if j firm is overvalued one year during the sample years, and 0 otherwise. $Over_{2j,t}$ equals 1 if j firm is overvalued two consecutive years during the sample years, and 0 otherwise. $Over_{3j,t}$ equals 1 if j firm is overvalued three consecutive years during the sample years, and 0 otherwise. $Over_{4j,t}$ equals 1 if j firm is overvalued four consecutive years during the sample years, and 0 otherwise. $Over_{5j,t}$ equals 1 if j firm is

overvalued five or more than five consecutive years during the sample years, and 0 otherwise. $Size_{j,t}$ is natural logarithm of the total assets for firm j, year t; $Opcycle_{j,t}$ is natural logarithm of days of accounts receivable plus days of inventory for firm j, year t; $Cfo_{j,t}$ is standard deviation of cash flows from operations scaled by beginning total assets, computed using a 5-year rolling window ended in year 2012 for firm j, year t; $Sales_{j,t}$ is standard deviation of sales revenue scaled by beginning total assets, computed using a 5-year rolling window ended in 2012 for firm j, year t; $NegEarn_{j,t}$ is firm's proportion of losses over the prior 5 years for firm j, year t. $Big4_{j,t}$ equals 1 if j firm is audited by Big 4 auditors, and 0 otherwise. $SDE_{j,t}$ is measured by standard deviation of earnings before tax using a 5-year rolling window ending in 2012 for firm j, year t. $Litigation_{j,t}$ equals 1 if j firm is in pharmaceuticals/biotechnology, software, or services industries, and 0 otherwise. $Meet_{j,t}$ is a dummy variable that equals 1 if j firm's earnings before tax in year t is greater than or equals to earnings before tax in year t-1, and 0 otherwise. $Loss_{j,t}$ is a dummy variable that equals 1 if j firm reports statutory earnings in year t, and 0 otherwise. $MtoB_{j,t}$ is the market-to-book equity ratio for firm j in year t. $ROE_{j,t}$ is earnings before tax divided by average equity for firm j in year t. $Leverage_{j,t}$ is measured by short-term and long-term debt divided by total assets for firm j, year t. $NOA_{j,t}$ is measured by shareholders' equity less cash and cash equivalent plus total debt at the beginning of the year divided by lagged sales. $SalesG_{j,t}$ is the sales for firm j, year t minus the sales for firm j, year t-1, then divided by the sales for firm j, year t. $MktCap_{j,t}$ is measured as the natural logarithm of the market capitalisation of the firm at the beginning of year t for firm j. $Capital_{j,t}$ is capital intensity measured by the ratio of net book value of property, plant, and equipment to total assets for firm j, year t. $IND_{j,t}$ is percentage of independent directors on the board.

5.3.2. The influence of corporate governance on managers' choice of using earnings management mechanisms (H2)

Table 5 shows the time–industry fixed-effects logit regression results for H2. The first and second models show the results of firms with high corporate governance (i.e., a high proportion of independent directors), while the third and fourth models show the results of firms with low corporate governance (i.e., a low proportion of independent directors). The results show that for the high corporate governance firms, only $Over_{1j,t}$ is very weakly significant and positively related with $InAM_{j,t}$ (coefficient = 0.866, p-value = 0.096); but $Over_{4j,t}$ and $Over_{5j,t}$ are significant and positively associated with $InEx_{j,t}$ (coefficient = 0.057, p-value = 0.043; coefficient = 0.232, p-value = 0.020, respectively). In the low corporate governance firms, $InAM_{j,t}$ is significant and positively related with $Over_{1j,t}$ (coefficient = 2.110, p-value = 0.053), $Over_{2j,t}$ (coefficient = 1.572, p-value = 0.022), $Over_{3j,t}$ (coefficient = 2.493, p-value = 0.004), and $over_{4j,t}$ (coefficient = 2.058, p-value = 0.010); $InEx_{j,t}$ is significant and positively associated with $Over_{3j,t}$ (coefficient = 2.176, p-value = 0.034), $Over_{4j,t}$ (coefficient = 0.112, p-value = 0.049), and $Over_{5j,t}$ (coefficient = 0.586, p-value = 0.000). The results suggest that corporate governance could constrain managers to apply accruals earnings management to sustain the early years of equity overvaluation, but could not restrain managers from using aggressive underlying earnings disclosure the later years of equity overvaluation. Specifically, the managers in high corporate governance firms sustain the later stage of equity overvaluation by aggressive underlying earnings

disclosure. The managers in low corporate governance firms apply both earnings management mechanisms to sustain equity overvaluation.

Table 5: Regression results for impact of corporate governance on overvaluation and earnings management (H2)

	Firms with a high proportion of independent directors on the board		Firms with a low proportion of independent directors on the board	
	InAM	InEx	InAM	InEx
	Coef.	Coef.	Coef.	Coef.
$Over_{1j,t}$	0.866*	-0.833	2.110**	0.067
	(0.096)	(0.317)	(0.053)	(0.931)
$Over_{2j,t}$	1.379	0.118	1.572**	0.453
	(0.284)	(0.697)	(0.022)	(0.476)
$Over_{3j,t}$	-1.243	0.848	2.493***	2.176**
	(0.611)	(0.974)	(0.004)	(0.034)
$Over_{4j,t}$	1.425	0.057**	2.058**	0.112**
	(0.272)	(0.043)	(0.010)	(0.049)
$Over_{5j,t}$	0.359	0.232**	0.641	0.586***
	(0.400)	(0.020)	(0.551)	(0.000)
AM specific				
$Big4_{j,t}$	1.981**		0.571	
	(0.025)		(0.478)	
$Litigation_{j,t}$	2.706		-0.081	
	(0.988)		(0.943)	
UE specific				
$Meet_{j,t}$		-0.123		-0.699*
		(0.636)		(0.084)
$Loss_{j,t}$		0.923***		1.025**
		(0.002)		(0.060)
General controls				
$InEx_{j,t}$	-0.689**		0.477	
	(0.049)		(0.304)	
$InAM_{j,t}$		-0.886**		-0.514
		(0.012)		(0.272)
$Leverage_{j,t}$	1.603**	0.573	0.852	0.737
	(0.042)	(0.245)	(0.350)	(0.370)
$SalesG_{j,t}$	-0.111	0.008	0.225	0.796
	(0.481)	(0.933)	(0.772)	(0.260)
$MtoB_{j,t}$	0.019	0.013	-0.495***	-0.100
	(0.836)	(0.343)	(0.004)	(0.487)
$Mktcap_{j,t}$	0.220**	0.364***	-0.397*	0.083
	(0.038)	(0.000)	(0.076)	(0.587)
$NOA_{j,t}$	-0.008*	0.002	-0.566*	0.054
	(0.096)	(0.797)	(0.093)	(0.723)
$ROE_{j,t}$	0.004	0.009	0.007	-0.020
	(0.648)	(0.940)	(0.664)	(0.410)

Capital$_{j,t}$	0.058	0.458***	0.625	-0.236
	(0.716)	(0.002)	(0.256)	(0.614)
_cons	-5.017***	-3.929***	2.140	0.368
	(0.000)	(0.000)	(0.323)	(0.815)
Table 5 continued				
Year effects	YES	YES	YES	YES
Industry effects	YES	YES	YES	YES
Number of obs	232	232	232	232
Pseudo R^2	42.4%	21.2%	39.0%	17.7%

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ p-value in parentheses

Note: Over$_{0j,t}$ equals 1 if j firm is overvalued once during the sample years from 2009 to 2012, and 0 otherwise. Over$_{1j,t}$ equals 1 if j firm is overvalued one year during the sample years, and 0 otherwise. Over$_{2j,t}$ equals 1 if j firm is overvalued two consecutive years during the sample years, and 0 otherwise. Over$_{3j,t}$ equals 1 if j firm is overvalued three consecutive years during the sample years, and 0 otherwise. Over$_{4j,t}$ equals 1 if j firm is overvalued four consecutive years during the sample years, and 0 otherwise. Over$_{5j,t}$ equals 1 if j firm is overvalued five or more than five consecutive years during the sample years, and 0 otherwise. Big4$_{j,t}$ equals 1 if j firm is audited by Big 4 auditors, and 0 otherwise. Litigation$_{j,t}$ equals 1 if j firm is in pharmaceuticals/biotechnology, software, or services industries, and 0 otherwise. Meet$_{j,t}$ is a dummy variable that equals 1 if j firm's earnings before tax in year t is greater than or equal to earnings before tax in year t-1, and 0 otherwise. Loss$_{j,t}$ is a dummy variable that equals 1 if j firm reports statutory earnings in year t, and 0 otherwise. MtoB$_{j,t}$ is the market-to-book equity ratio for firm j in year t. ROE$_{j,t}$ is earnings before tax divided by average equity for firm j in year t. Leverage$_{j,t}$ is measured by short-term and long-term debt divided by total assets for firm j, year t. NOA$_{j,t}$ is measured by shareholders' equity less cash and cash equivalent plus total debt at the beginning of the year divided by lagged sales. SalesG$_{j,t}$ is the sales for firm j, year t minus the sales for firm j, year t-1, then divided by the sales for firm j, year t. MktCap$_{j,t}$ is measured as the natural logarithm of the market capitalisation of the firm at the beginning of year t for firm j. Capital$_{j,t}$ is capital intensity measured by the ratio of net book value of property, plant, and equipment to total assets for firm j, year t.

5.3.3. The influence of ASIC underlying earnings guidelines on using earnings mechanisms (H3)

Table 6 shows the year industry fixed-effects logit regression results for H3. As ASIC guidelines are voluntarily followed by reporting firms, we investigate two sub-samples (i.e., firms that conform to ASIC guidelines and firms that do not conform to ASIC guidelines) to understand the influence of the guidelines on managers' choice of earnings managements to sustain overvaluation. We focus on the post-ASIC period (i.e., 2013–2016) and limit our analysis to the observations that disclose underlying earnings to test H3. The first and second models present the results for the sample with the observations that conform to ASIC underlying earnings disclosure guidelines, while the third and fourth models show the results for the sample with the

observations that do not conform to ASIC underlying earnings disclosure guidelines. The results show that for the compliant firms, only $Over_{2j,t}$ is significant and positively associated with $InEx_{j,t}$ (coefficient = 0.897, p-value = 0.046), none of the others overvaluations are related to either $InAM_{j,t}$ or $InEx_{j,t}$; for the non-compliant firms, $InAM_{j,t}$ is significant and positively related to $Over_{1j,t}$ (coefficient = 4.102, p-value = 0.050), $Over_{2j,t}$ (coefficient = 2.778, p-value = 0.003), $Over_{3j,t}$ (coefficient = 0.313, p-value = 0.061); $InEx_{j,t}$ is significant and positively associated with $Over_{2j,t}$ (coefficient = 1.442, p-value = 0.007), $Over_{3j,t}$ (coefficient = 2.797, p-value = 0.003), $Over_{4j,t}$ (coefficient = 0.983, p-value = 0.056). The results suggest that firms that conform to the ASIC guidelines are less likely to use earnings mechanisms to sustain equity overvaluation, while non-compliant firms use both accruals earnings management and aggressive underlying earnings disclosure to sustain equity overvaluation.

Table 6: Regression results for impact of ASIC underlying earnings disclosure guidelines on overvaluation and earnings management (H3)

	Firms that voluntarily conform to the guidelines		Firms that do not voluntarily conform to the guidelines	
	InAM	InEx	InAM	InEx
	Coef.	Coef.	Coef.	Coef.
$Over_{1j,t}$	0.907	0.269	4.102**	1.095
	(0.256)	(0.537)	(0.050)	(0.463)
$Over_{2j,t}$	1.167	0.897**	2.778***	1.442***
	(0.162)	(0.046)	(0.003)	(0.007)
$Over_{3j,t}$	0.529	0.272	0.313*	2.797***
	(0.537)	(0.556)	(0.061)	(0.003)
$Over_{4j,t}$	1.543	-1.138	-0.596	0.983**
	(0.397)	(0.113)	(0.455)	(0.056)
AM specific				
$Big4_{j,t}$	-0.571**		-0.204	
	(0.025)		(0.820)	
$Litigation_{j,t}$	-2.116***		-2.870***	
	(0.002)		(0.002)	
UE specific				
$Meet_{j,t}$		-0.624		-1.085***
		(0.211)		(0.004)
$Loss_{j,t}$		3.189***		2.650***
		(0.000)		(0.000)
General controls				
$InEx_{j,t}$	-1.764		1.839**	
	(0.268)		(0.018)	
$InAM_{j,t}$		-0.581		1.522**

	(1)	(2)	(3)	(4)
	(0.611)		(0.018)	
Leverage$_{j,t}$	0.931	5.010**	0.702	2.880**
	(0.818)	(0.014)	(0.773)	(0.015)
SalesG$_{j,t}$	0.489	0.753	-3.195*	0.731
	(0.911)	(0.599)	(0.051)	(0.358)
MtoB$_{j,t}$	0.469	0.091	-0.100	-0.241***
	(0.479)	(0.653)	(0.476)	(0.006)
Mktcap$_{j,t}$	0.433	-0.127	0.445	-0.067
	(0.504)	(0.577)	(0.125)	(0.576)
NOA$_{j,t}$	-1.787**	0.331	-0.793**	0.001
	(0.041)	(0.162)	(0.031)	(0.928)
ROE$_{j,t}$	0.005	0.005	-0.006	0.006
	(0.850)	(0.434)	(0.659)	(0.257)
Capital$_{j,t}$	8.492	0.479	0.272	-1.362**
	(0.158)	(0.764)	(0.810)	(0.047)
IND$_{j,t}$	-8.646**	0.187	4.831	1.071
	(0.015)	(0.910)	(0.162)	(0.226)
_cons	-8.771	1.382	-1.868	2.808**
	(0.114)	(0.499)	(0.450)	(0.027)

Table 6 continued

	(1)	(2)	(3)	(4)
Year effects	YES	YES	YES	YES
Industry effects	YES	YES	YES	YES
Number of obs	152	152	187	187
Pseudo R^2	47.0%	26.6%	31.9%	29.4%

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ p-value in parentheses

Note: Over$_{0j,t}$ equals 1 if j firm is overvalued once during the sample years from 2009 to 2012, and 0 otherwise. Over$_{1j,t}$ equals 1 if j firm is overvalued one year during the sample years, and 0 otherwise. Over$_{2j,t}$ equals 1 if j firm is overvalued two consecutive years during the sample years, and 0 otherwise. Over$_{3j,t}$ equals 1 if j firm is overvalued three consecutive years during the sample years, and 0 otherwise. Over$_{4j,t}$ equals 1 if j firm is overvalued four consecutive years during the sample years, and 0 otherwise. Over$_{5j,t}$ equals 1 if j firm is overvalued five or more than five consecutive years during the sample years, and 0 otherwise. Big4$_{j,t}$ equals 1 if j firm is audited by Big 4 auditors, ad 0 otherwise. Litigation$_{j,t}$ equals 1 if j firm is in pharmaceuticals/biotechnology, software, or services industries, and 0 otherwise. Meet$_{j,t}$ is a dummy variable that equals 1 if j firm's earnings before tax in year t is greater than or equal to earnings before tax in year t-1, and 0 otherwise. Loss$_{j,t}$ is a dummy variable that equals 1 if j firm reports statutory earnings in year t, and 0 otherwise. MtoB$_{j,t}$ is the market-to-book equity ratio for firm j in year t. ROE$_{j,t}$ is earnings before tax divided by average equity for firm j in year t. Leverage$_{j,t}$ is measured by short-term and long-term debt divided by total assets for firm j, year t. NOA$_{j,t}$ is measured by shareholders' equity less cash and cash equivalent plus total debt at the beginning of the year divided by lagged sales. SalesG$_{j,t}$ is the sales for firm j, year t minus the sales for firm j, year t-1, then divided by the sales for firm j, year t. MktCap$_{j,t}$ is measured as the natural logarithm of the market capitalisation of the firm at the beginning of year t for firm j. Capital$_{j,t}$ is capital intensity measured by the ratio of net book value of property, plant, and equipment to total assets for firm j, year t. Limit the observations that report underlying earnings from 2013 to 2016 (total 339; 38 firms conform to guidelines over four years, leaving 187 observations as non-compliance firms).

6. Additional tests

6.1. Limited ability using accruals earnings management

To provide further evidence on how earnings management choices interact as the duration of overvaluation increases, this study examines a subset of firms that are

likely to be constrained in their ability to manage earnings through accruals. According to Jensen (2005), the duration of overvaluation motivates managers to engage in different earnings management techniques. This paper assumes that if the firm has a limited ability to use accruals earnings management, it will be more likely to engage in aggressive underlying earnings disclosure. We expect that accruals earnings management constrained firms are more likely to engage in aggressive underlying earnings disclosure to sustain overvaluation.

As overvalued firms decide to manage reported earnings, this section investigates whether the constraints of using accruals earnings management would encourage managers to disclose underlying earnings, or to disclose them in an aggressive manner. Due to the constrained flexibility of accruals, the ability of managers to manage accruals upwards in the current period is limited by accrual management activities in previous periods. This paper follows previous studies (Badertscher, 2011; Barton and Simko, 2002; Zang, 2012), where net operating assets ($NOA_{j,t}$) are used as a proxy for the extent of accruals management in previous periods to represent a firm's ability to manage earnings using accruals. If the net operating assets at the beginning of the year are high, managers' abilities to use accruals to manipulate earnings are reduced in the current year because the balance sheet and income statement are articulated. Therefore, abnormal accruals shown in past earnings can also be shown in net assets, and hence the latter are overstated when firms have practised accruals management previously (Barton and Simko, 2002; Black et al., 2014; Zang, 2012). As the underlying earnings exclusions do not include a practical accounting system entry (there are no debits and credits adjustments required), aggressive underlying earnings disclosure is not necessarily constrained by the balance sheet, as accruals would be (Doyle et al., 2013).

To investigate whether firms with constraints in engaging accruals earnings management are more likely to disclose underlying earnings aggressively to sustain the equity overvaluation, this section focuses on a sub-sample of firms that are constrained in their ability to engage in accruals earnings management. This is measured by net operating assets ($NOA_{j,t}$). High values of $NOA_{j,t}$ represent low ability to manipulate earnings using accruals in the current year. To calculate the high values

of $NOA_{j,t}$, each year is ranked on $NOA_{j,t}$ and the upper quartile of $NOA_{j,t}$ is selected as a proxy of accruals constraining firms.

These results (presented in Table 7) find that firms with limited accruals earnings management options do not engage in accruals earnings management. As the duration of overvaluation increases, they disclose underlying earnings aggressively to maintain overvaluation. Specifically, the first model finds that $Over_{2j,t}$ is significant and negatively associated with $InAM_{j,t}$ (coefficient = -0.205, p-value = 0.020)[10], while the second model finds that $InEx_{j,t}$ is significant and positively associated with $Over_{2j,t}$ (coefficient = 0.515, p-value = 0.042), $Over_{3j,t}$ (coefficient = 0.790, p-value = 0.008), $Over_{4j,t}$ (coefficient = 1.855, p-value = 0.042), and $Over_{5j,t}$ (coefficient = 0.807, p-value =0.000). The results of Table 7 suggest that if accruals-constrained firms find it hard to apply accruals earnings management, they tend to disclose underlying earnings aggressively to sustain the overvaluation.

Table 7: Regression results for additional analysis (limited ability of using accruals earnings management)

	$InAM_{j,t}$ as dependent variable			$InEx_{j,t}$ as dependent variable		
	Coef.	z	P>z	Coef.	z	P>z
$Over_{1j,t}$	0.726	1.190	0.138	0.629	0.070	0.393
$Over_{2j,t}$	-0.205**	4.190	0.020	0.515**	2.040	0.042
$Over_{3j,t}$	-2.275	2.710	0.950	0.790***	5.850	0.008
$Over_{4j,t}$	-1.613	-1.040	0.297	1.855**	2.040	0.042
$Over5_{j,t}$	1.535	1.200	0.230	0.807***	5.980	0.000
AM specific						
$Big4_{j,t}$	-0.804	-0.910	0.360			
$Litigation_{j,t}$	2.204**	1.960	0.050			
UE specific						
$Meet_{j,t}$				-0.345	-0.880	0.378
$Loss_{j,t}$				3.267***	4.060	0.000
General controls						
$InEx_{j,t}$	-0.708**	-2.200	0.028			

[10] We have found that the coefficient of OVER on InAM (income-increasing accruals earnings management) turns negative (after Over1), when there is a high level of accruals earnings management constraints. This result is different from Badertscher's (2011) study for the following two reasons: firstly, InAM is a dummy variable; secondly, there are significant variations between Australia and the US in relation to market competition, firm characteristics, economic structure, governance environment, and major industries. For example, Australia follows a principle-based balance sheet-oriented conceptual framework in accounting judgement, a common law legal system, a high level of shareholder protection, and low conformity between taxation reporting and financial accounting; in addition, there are some differences with the US in terms of regulatory and reporting environments (Chalmers et al., 2008, 2011; Lont et al., 2010).

$lnAM_{j,t}$				-0.422	-1.240	0.216
$Leverage_{j,t}$	1.037	1.060	0.287	1.012	0.970	0.332
$SalesG_{j,t}$	-0.586	-0.760	0.450	0.160	0.190	0.850
$MtoB_{j,t}$	0.005	0.020	0.984	-0.783***	-3.070	0.002
$Mktcap_{j,t}$	0.020	0.150	0.881	0.445***	2.910	0.004
$ROE_{j,t}$	-0.610	-0.310	0.754	-0.409	-0.200	0.844
$Capital_{j,t}$	-0.477	-1.280	0.201	1.194***	2.880	0.004
$IND_{j,t}$	-1.156	-1.200	0.230	0.798	0.780	0.435
_cons.	-5.980	-1.380	0.166	-1.390	0.730	0.467
Year effects	YES			YES		
Industry effects	YES			YES		
Number of obs	232			232		
Pseudo R^2	47.00%			24.50%		

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Note: $Over_{1j,t}$ equals 1 if j firm is overvalued one year during the sample years, and 0 otherwise. $Over_{2j,t}$ equals 1 if j firm is overvalued two consecutive years during the sample years, and 0 otherwise. $Over_{3j,t}$ equals 1 if j firm is overvalued three consecutive years during the sample years, and 0 otherwise. $Over_{4j,t}$ equals 1 if j firm is overvalued four consecutive years during the sample years, and 0 otherwise. $Over_{5j,t}$ equals 1 if j firm is overvalued five or more than five consecutive years during the sample years, and 0 otherwise. $Big4_{j,t}$ equals 1 if j firm is audited by Big 4 auditors, and 0 otherwise. $Litigation_{j,t}$ equals 1 if j firm is in pharmaceuticals/biotechnology, software, or services industries, and 0 otherwise. $Meet_{j,t}$ is a dummy variable that equals 1 if j firm's earnings before tax in year t is greater than or equal to earnings before tax in year t-1, and 0 otherwise. $Loss_{j,t}$ is a dummy variable that equals 1 if j firm report statutory earnings in year t, and 0 otherwise. $MtoB_{j,t}$ is the market-to-book equity ratio for firm j in year t. $ROE_{j,t}$ is earnings before tax divided by average equity for firm j in year t. $Leverage_{j,t}$ is measured by short-term and long-term debt divided by total assets for firm j, year t. $SalesG_{j,t}$ is the sales for firm j, year t minus the sales for firm j, year t-1, then divided by the sales for firm j, year t. $MktCap_{j,t}$ is measured as the natural logarithm of the market capitalisation of the firm at the beginning of year t for firm j. $Capital_{j,t}$ is capital intensity measured by the ratio of net book value of property, plant, and equipment to total assets for firm j, year t.

7. Conclusion

This study tests and extends the assumption developed by Jensen's (2005) agency theory of overvalued equity. The purposes of this paper are: first, to examine whether the duration of overvaluation affects managers' choice to use accruals earnings management and aggressive underlying earnings disclosure; second, to investigate the influences of corporate governance on managers' choice of using different earnings management mechanisms to sustain the equity overvaluation; and third, to examine the impacts of the ASIC underlying reporting guidelines on managers' choice of using different earnings management mechanisms to sustain the equity overvaluation. Jensen (2005) predicts that overvaluation leads managers to engage in alternative earnings management techniques to sustain the firm's overvalued equity. This paper provides evidence that is consistent with this reasoning. It finds that overvalued firms engage in accruals earnings management in the early stage. As overvaluation

continues, overvalued firms are more likely to disclose underlying earnings, and to do so in an aggressive manner to maintain the overvaluation. Furthermore, this paper finds that in firms with low corporate governance managers are more likely to use both earnings management techniques to sustain equity overvaluation, while in firms with high corporate governance managers do not apply accruals earnings management, although they still disclose underlying earnings aggressively to sustain equity overvaluation. Lastly, this study shows that firms that do not conform to the ASIC guidelines are more likely to sustain the overvaluation by using both earnings management techniques, while this is not observed in firms that conform to the ASIC guidelines. Additional tests demonstrate that when managers are constrained by using accruals earnings management, they will only engage in aggressive underlying earnings disclosure to sustain the overvaluation.

Two limitations should be considered when interpreting the results. First aggressive underlying earnings disclosure is new in the earnings management literature. Due to the lack of guidance received from the literature, the control variables of underlying earnings may not have comprehensively explained underlying earnings disclosure. This paper focused on the managers' choice to use accruals earnings management or aggressive underlying earnings disclosure. A future research can examine the influence of real activities of earnings management on aggressive underlying earnings disclosure. Second, although we use models of time–industry effects to control for the unobservable confounding variables that differ from time to time, as well as unobservable confounding variables that differ across industries, we could not fully control for all other unobservable variables that influence the explanatory variables.

The results of this paper provide several avenues for future research. First, as the paper only examined the relationship between overvaluation and managers' decisions to use accruals earnings management and underlying earnings disclosure, researchers can extend the effect of the real activities earnings management on overvaluation and managers' choices to use accruals earnings management, real activities earnings management, and underlying earnings disclosure. Second, future research could also examine the factors that cause firms to become overvalued, and the interventions that can mitigate the agency costs of overvalued equity, such as the role of governments, regulators, and interventions that constrain pernicious earnings management.

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Appendix one

Variables definitions and measurements

Variable	Proxy	Measurement
Dependent variables		
$InAM_{j,t}$	Income increasing earnings included in accruals-based earnings management	Dummy variable, positive abnormal accruals are coded as '1' and '0' otherwise
$InEx_{j,t}$	Aggressive underlying earnings	Dummy variable, underlying earnings greater than statutory earnings is coded as '1'and '0' otherwise
Independent variables H1		
$Over_{1j,t}$	Market-based equity is overvalued for one year, during the sample years	Dummy variable, overvalued for one year, equals '1' and '0' otherwise
$Over_{2j,t}$	Market-based equity is overvalued for two consecutive years, during the sample years	Dummy variable, overvalued for two consecutive years, equals '1' and '0' otherwise
$Over_{3j,t}$	Market-based equity is overvalued for three consecutive years, during the sample years	Dummy variable, overvalued for three consecutive years, equals '1' and '0' otherwise
$Over_{4j,t}$	Market-based equity is overvalued for four consecutive years, during the sample years	Dummy variable, overvalued for four consecutive years, equals '1' and '0' otherwise
Independent variable H2		
$IND_{j,t}$	Extent of independent directors on board	Percent of independent directors over total directors of firm j in year t
Control variables – accruals management specific		
$Big4_{j,t}$	Large four audit firms	Dummy variable, 1 if j firm is audited by Big 4 auditors, 0 otherwise
$Litigation_{j,t}$	The risk of security litigation	Dummy variable, 1 if j firm is in pharmaceuticals/biotechnology, software, or services industries, 0 otherwise
Control variables – underlying earnings specific		
$Meet_{j,t}$	Meeting earnings targets	Dummy variable that equals 1 if j firm's earnings before tax in year t is greater than or equal to earnings before tax in year t-1, and 0

		otherwise
$Loss_{j,t}$	Earnings loss situation	Dummy variable that equals 1 if j firm reports statutory earnings in year t, and 0 otherwise
Control variables – general		
$PE_{j,t}$	The growth potential of the firm	Price-to-earnings ratio for j firm in year t
$PB_{j,t}$	The extent of over- or under-valuation of stock price	Price-to-book ratio for j firm in year t
$PBPE_{j,t}$	Average of price-to-earnings ratio and price-to-book ratio	The average of $PE_{j,t}$ and $PB_{j,t}$ for firm j in year t
$Leverage_{j,t}$	Ability to meet financial obligations	Short-term and long-term debt divided by total assets for firm j in year t
$SalesG_{j,t}$	Sales growth	Sales for firm j, year t minus the sales for firm j, year t-1, then divided by the sales for firm j, in year t
$MtoB_{j,t}$	Firm growth	Market-to-book equity ratio for firm j, in year t
$Mktcap_{j,t}$	A market-based firm size	Natural logarithm of the market capitalisation of the firm at the beginning of year t for firm j
$NOA_{j,t}$	The extent of earnings management in previous periods using accruals	Shareholders' equity less cash and cash equivalent plus total debt at the beginning of the year divided by lagged sales for firm j
$ROE_{j,t}$	Profitability of firm	Earnings before tax divided by average equity for firm j in year t
$Capital_{j,t}$	Ability to use assets to generate revenue	Capital intensity measured by the ratio of net book value of property, plant, and equipment to total assets for firm j in year t

Appendix two

Examples of firms that conform to/ do not conform to the underlying earnings disclosure guidelines[11]

Firms that conform to guidelines	Firms that do not conform to guidelines
Rio Tinto Limited	Fortescue Metals Group Ltd
Brambles Limited	Sydney Airport
Boral Limited	Fletcher Building Limited
AWE Limited	Mineral Resources Limited
Beach Energy Limited	Sigma Healthcare Limited
BlueScope Steel Limited	Resolute Mining Limited

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[11] The annual reports were collected from DatAnalysis Premium database.