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The recognition of identifiable intangible assets in business combinations and acquisition premiums pre and post IFRS adoption

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Abstract

This paper evaluates the relation between amounts recognised as identifiable intangible assets in business combinations and acquisition premiums, in periods before and after transition to IFRS. In the pre-IFRS period there is evidence of firms recognising identifiable intangible assets in business combinations where high acquisition premiums are paid. This is consistent with opportunism in the recognition of identifiable intangible assets, and high acquisition premiums being an economic consequence of the relative latitude in accounting for identifiable intangible assets. This association of identifiable intangible assets with acquisition premiums ceased with transition to IFRS, notwithstanding the latitude that continues to be provided in accounting regulations for the recognition of identifiable intangible assets. However, the incentives for opportunism remain and an issue requiring address is whether alternative sources of accounting flexibility in relation to business combinations exist, such as goodwill which is no longer subject to mandatory amortisation.

Key words : Business Combinations, Identifiable intangible assets, Goodwill

JEL Classification : M41, G34

1 Introduction

This paper evaluates the association of identifiable intangible assets (IIA's) acquired and recognised in business combinations with acquisition premiums, and considers whether this relationship changed on transition to International Financial Reporting Standards (IFRS) in 2005.¹ There is evidence that firms in Australia historically recognised IIA's rather than goodwill in business combinations because this ameliorated the impact of the mandatory amortisation of goodwill on firm performance reported in subsequent periods (e.g. Wines and Ferguson, 1993). As a consequence, the recognition of IIA's in business combinations is commonly labelled 'opportunistic'. Consistent with this 'opportunistic' label, Su and Wells (2015) are unable to find evidence that amounts recognised as IIA's in business combinations are associated with future performance.² This gives rise to the concern that an economic consequence of the relative latitude afforded to accounting for IIA's is high acquisition premiums, which given the absence of a relation with future performance may indicate overpayment. Hence, the first objective of this paper is to evaluate whether there is evidence of an association between the recognition of IIA's and acquisition premiums. With transition to IFRS in 2005, the requirement for mandatory amortisation of goodwill was removed and the opportunistic incentives to recognise IIA's rather than goodwill diminished. Accordingly, the second objective of this paper is to evaluate if the association between IIA's and acquisition premiums persists in periods after transition to IFRS.

The first motivation for this paper is to determine if regulatory arbitrage in relation to accounting choices for business combinations contributes to high acquisition premiums, and

¹ Acquisition premiums represent the excess of the acquisition price over the pre-acquisition market price, and can be considered the premium for obtaining control of the business. This may entail overpayment. IIA's represent an allocation of acquisition price to the assets acquired and reflects the fair value of all assets acquired (recognised and previously unrecognised).

² This would suggest that the value relevance of identifiable intangible assets is primarily attributable to historic and possibly revalued identifiable intangible assets, although this has not been specifically addressed in the literature and is beyond the scope of this paper.

potentially overpayment by acquiring firms. There is empirical evidence of firms overpaying in acquisitions for a range of reasons, including management hubris (Roll, 1986), management empire building (Jensen, 1986) and management needing to find new opportunities for growth after exhausting those available internally (McCardle and Viswanathan, 1994). Furthermore, there is evidence of firms ameliorating the impacts of business combinations on financial statements through accounting policy choices (Wines and Ferguson, 1993; Ayers *et al.*, 2000). However, an issue requiring address is whether this contributes to high acquisition premiums and has economic consequences. Anecdotal evidence of IIA's being associated with high acquisition premiums in business combinations, and potentially overpayment, is provided by firms such as ABC Learning Ltd (ABC). As a consequence of business combinations over the period 2000 to 2007 ABC recognised IIA's (that were not amortised) of \$2,622m, and goodwill (which was for most this period amortised) of only \$269m. Any of the reasons identified above for overpayment, which would manifest in high acquisition premiums, could be considered relevant. Concerns about the magnitude of acquisition premiums and potential overpayment were recognised and drawn to the attention of the corporate regulator, the Australian Securities and Investments Commission (ASIC), by an anonymous complainant as early as 2006:

It's suggested that the methods of financial reporting being employed here are designed to artificially create apparent shareholder value, when, in fact, that shareholder value associated with the child-care licences (91% of net assets) is based entirely on the future net cash flows of the company, which may or may not be realised. It's also suggested that this may be misleading to potential investors in the company."

'ASIC didn't act on ABC complaint', Kruger, C., The Age, 11 September 2008

Unfortunately, these concerns were well founded and there is little evidence to support the values ascribed to these assets in returns subsequently reported by the firm. Shortly thereafter, ABC experienced financial distress with substantial losses for shareholders and debtholders. However,

while there is anecdotal evidence that the recognition of IIA's is associated with high acquisition premiums, there is no systematic empirical evidence to date. Such an association is suggested by research in the US where there is evidence of firms employing the pooling method to account for corporate acquisitions paying higher acquisition premiums than firms employing the purchase method (e.g. Nathan, 1988; Robinson and Shane, 1990; Aboody *et al.*, 2000; Hopkins *et al.*, 2000; Ayers *et al.*, 2002; Ali and Kravet, 2012). In Australia the pooling method is not permitted, but the recognition of IIA's rather than goodwill has the same effect of shielding the financial statements from the adverse impacts of high acquisition premiums, and a similar relation might be expected.³

The second motivation for this paper is to provide insights into the operation of the regulation now addressing business combinations, and intangible assets. With the adoption of AASB 3 *Business Combinations* and AASB 138 *Intangible Assets*, there is no longer the requirement to amortise goodwill and it is only subject to an annual impairment test. Critically, this diminished the incentive to recognise IIA's rather than goodwill, as the accounting requirements for IIA's are now similar to those for goodwill. While this might suggest indifference concerning the recognition of IIA's or goodwill, it must be noted that ASIC now seems more inclined to advocate a finite life and require amortisation for 'well defined' IIA's.⁴ This would suggest the recognition of IIA's may no longer be characterised as 'opportunistic', and obscuring the consequences of high acquisition premiums. Accordingly, this paper

³ Both AASB 1015 which applied from 1988 until 2005, and AASB 3 which has applied since 2005, prescribe the purchase method in accounting for business combinations.

⁴ ASIC Media Release 18 February 2015, 15-028MR Primary Health Care reduces goodwill.

investigates whether the association between IIA's and acquisition premiums persists after transition to IFRS.⁵

Based on a sample of 393 acquisitions, from the years 1988–2008, this paper evaluates the association between IIA's recognised in business combinations and acquisition premiums paid in periods before and after transition to IFRS. Evidence is provided of a significant positive association between the proportion of the acquisition price allocated to IIA's and acquisition premiums in periods prior to transition to IFRS. This is consistent with firms paying high acquisition premiums and relying on opportunistic accounting practices to obscure the impact on their financial statements. This is also consistent with prior research labelling this accounting practice as opportunistic (e.g. Wines and Ferguson, 1993), and no evidence of an association between IIA's and subsequent firm performance (Su and Wells, 2015). Problematically, given these results which may suggest that the acquisition premiums represent overpayment, there is little evidence of firms subsequently recognising asset impairments. However, this is consistent with evidence on the limited recognition of asset impairments more generally described in Bond *et al.* (2016).

In periods subsequent to transition to IFRS many firms making business acquisitions still recognised IIA's. However, the association between the acquisition premium and the proportion of the acquisition price allocated to IIA's is no longer significant. This suggests that with regulatory changes to accounting for goodwill the use of IIA's to shield the financial statements from the impacts of high acquisition premiums ended.

⁵ This is not to suggest that high acquisition premiums ceased with transition to IFRS, rather that they ceased to manifest in the recognition of IIA's. Alternative strategies for ameliorating the impact of high acquisition premiums may have evolved and this might include the recognition of goodwill. Evaluation of this is beyond the scope of this paper.

This paper makes a number of contributions. First, it extends the literature considering accounting policy choices for business combinations and the resultant economic consequences. In Australia firms have never been able to use the pooling method to mitigate the impact of high acquisition premiums on firm performance reported in subsequent periods, but they have been able to recognise IIA's. These are associated with high acquisition premiums in periods before transition to IFRS, and consistent with US studies on the use of the pooling method this provides evidence of accounting policy choices having economic consequences (e.g. Nathan, 1988; Robinson and Shane, 1990; Aboody *et al.*, 2000; Hopkins *et al.*, 2000; Ayers *et al.*, 2002; Ali and Kravet, 2012). Critically this association ceased after transition to IFRS. Accordingly, the relative latitude in the initial recognition of IIA's in business combinations afforded by AASB 3 and AASB 138 does not appear to be an issue, and there is no evidence it leads to high acquisition premiums. More problematically, where there is evidence of high acquisition premiums there is little evidence of asset impairments in the five years subsequent to the business combination. This may suggest that acquisition price is considered relevant in determining fair value (and hence recoverable amount) and on this basis asset impairment is deemed unnecessary. This might be considered by regulators in guidance for the determination of fair value in regulation such as AASB 136 *Impairment of Assets*.

Second, it extends the literature on the recognition of intangible assets. The extant literature has identified opportunism in the recognition of IIA's rather than goodwill subsequent to the regulatory requirement to amortise goodwill in 1988 (e.g. Wines and Ferguson, 1993). It is likely a consequence of the recognition of IIA's rather than goodwill that James *et al.* (2008) find a weakened association between goodwill and acquisition premiums from 1988. Our results complement these studies by showing an association between IIA's and acquisition premiums in

the post-1988 period. In conjunction, these results suggest that an economic consequence of relative latitude in accounting for IIA's was high acquisition premiums. Evidence in Su and Wells (2015) that there is no association between acquired IIA's and subsequent performance in this period lends support to the conclusion that the high acquisition premiums may represent overpayment. This relationship ceased in 2005, with transition to IFRS, when the incentives to recognise IIA's to ameliorate the impacts of high acquisition premiums on the financial statements were removed. As such this would represent an identifiable benefit arising from the adoption of IFRS. However, this benefit may be diminished if there are alternative sources of accounting flexibility in relation to business combinations. As a cautionary note it must be said that the incentives and circumstances leading to high acquisition premiums and possibly overpayment in business combinations have not changed. In the same manner in which the regulatory change in 1988 created the incentives to recognize IIA's rather than goodwill to ameliorate the impact of high acquisition premiums, so the regulatory change in 2005 reduced the incentive to recognise IIA's. It is beyond the scope of this paper to consider accounting practices associated with high acquisition premiums subsequent to 2005, but this might again include that the recognition of goodwill as amortisation is no longer mandated. This is suggested for future research.

The remainder of this paper is organised as follows. Section 2 briefly describes the salient accounting regulatory requirements, discusses the relevant literature, and develops the hypotheses studied. Section 3 describes the research design and sample selection, and descriptive statistics are provided in Section 4. Section 5 reports the main empirical findings, together with the results of several robustness checks. Section 6 summarises and concludes the paper.

2 Theoretical background and hypothesis

2.1 Regulatory developments in accounting for business combinations

From 1988 until transition to IFRS in 2005 accounting for business combinations was addressed in Australia by AASB 1015 *Accounting for the Acquisition of Assets* and AASB 1013 *Accounting for Goodwill*. Critical aspects of these regulations were the requirements to use the purchase method for business acquisitions, and to amortise goodwill over a period not exceeding 20 years. Under the purchase method the acquisition price is allocated to the assets and liabilities acquired, including any IIA's, and the balance was recognised as goodwill which was subject to amortisation. Some firms responded to this by using the inverse sum of the year's digits method to determine annual amortisation charges, thus mitigating the impact of amortisation on the financial statements in the early years after an acquisition. However, this practice was prohibited by a regulatory change in September 1995 (UIG Abstract 5 *Methods of Amortisation of Goodwill*).

A more common and more effective strategy throughout the entire period was for firms to recognise IIA's rather than goodwill in business combinations (e.g. Wines and Ferguson, 1993; Day and Hartnett 2000). Critically, IIA's were not subject to a specific accounting regulation. While there was a general requirement to depreciate non-current assets in AASB 1021 *Depreciation*, there were a number of strategies that could be adopted to mitigate the effects of this requirement. These included determining an infinite life for the asset, and reducing the depreciable amount by maximising the residual value of the asset. An overview of the accounting practices adopted is provided in Wyatt *et al.*, 2001. Additionally, in the absence of specific regulations addressing IIA's, it was possible for these assets to be revalued in accordance with AASB 1041 *Revaluation of non-current assets*. Accordingly, there were

significant opportunistic benefits for recognising IIA's rather than goodwill in business combinations.

With transition to IFRS in 2005 there was a significant change in the regulations relating to accounting for business combinations, and this is now addressed in AASB 3 *Business Combinations* and AASB 138 *Intangible Assets*. Perhaps the most critical change is the removal of the requirement to amortise goodwill, which is now only subjected to impairment testing. Additionally, the revaluation of IIA's is effectively prohibited by the requirement for this to be supported by asset prices determined in active markets. Hence, there is no longer a material regulatory distinction between goodwill and IIA's and as long as the IIA's are defined as having an infinite life neither are subject to amortisation. Instead they are both subject to annual impairment tests. Accordingly, the opportunity for regulatory arbitrage ended.⁶

2.2 *Prior literature on accounting for business combinations and hypotheses development*

There is a significant literature considering business combinations generally, firm's choices of accounting practices in business combinations, and the potential economic consequences of those choices. There is evidence in the mergers and acquisition literature which suggests that shareholders in target firms capture the majority of the benefits arising from acquisitions (e.g., Jensen and Ruback, 1983; Ayers, Lefanowicz and Robinson, 2000). This may be a consequence of high acquisition premiums and a number of reasons have been advanced in the literature to explain why this might occur. This includes management hubris (Roll, 1986), management empire building (Jensen, 1986) and management needing to find new opportunities

⁶ Critically, with transition to IFRS there was limited change in accounting for identifiable intangible assets. While after transition revaluation was effectively precluded, amortisation remained subject to the same constraints and judgements (i.e., asset lives and amortisable amount).

for growth after exhausting those available internally (McCardle and Viswanathan, 1994). If there are high acquisition premiums in business combinations there are incentives to adopt accounting practices that mask this in the financial statements (Wines and Ferguson, 1993; Ayers *et al.*, 2000). Furthermore, the availability of these accounting practices may have the economic consequence of encouraging high acquisition premiums and potentially overpayment, and this has been subject to investigation in the literature.

In the US attention has been focused on the choice between the purchase and pooling methods to account for business combinations. As far back as Gagnon (1967) it was recognised that firms had an incentive to use the pooling method when the acquisition price of a business exceeded the value of the assets acquired. This shielded the financial statements from the impact of mandatory goodwill amortisation. Furthermore, there is evidence that firms employing the pooling method to account for business acquisitions paid higher takeover premiums than firms employing the purchase method (e.g. Nathan, 1988; Robinson and Shane, 1990; Aboody *et al.*, 2000; Hopkins *et al.*, 2000; Ayers *et al.*, 2002). This led to the conclusion that firms opportunistically selected the pooling method to account for business combinations, and this had the economic consequence of high acquisition premiums.

In Australia firms have never been able to use the pooling method to account for business combinations. However, they have been able to recognise IIA's. This also enabled acquiring firms to shield the financial statements from the impacts of high acquisition premiums. Consistent with expectations there is evidence that subsequent to regulation prescribing the amortisation of goodwill in 1988 firms increasingly recognised IIA's, and this is identified as 'opportunistic' (e.g. Wines and Ferguson, 1993; Day and Hartnett, 2000). The recognition of IIA's rather than goodwill also explains the results in James *et al.* (2008) who find the relation

between acquisition premiums and goodwill weakens after this regulatory change. These results are consistent with those reported in the US with the pooling method, albeit with a different accounting method and in a different context.

However, the question of whether IIA's are associated with high acquisition premiums is unaddressed. There is an extensive literature evaluating whether amounts disclosed as IIA's are value relevant. For example, Godfrey and Koh (2001), Ritter and Wells (2006), and Chalmers *et al.* (2008) all find a significant relation between stock prices and amounts disclosed as IIA's. Furthermore, there is evidence in Ritter and Wells (2006) that the amounts recognised as IIA's are associated with future performance. Critically, these studies do not distinguish acquired IIA's from those that are internally generated. This is significant as Su and Wells (2015) focus on acquired IIA's only, and find no evidence of an association with post acquisition performance. Thus, the results in prior studies are likely attributable to internally generated and/or revalued IIA's and support for this is provided by Barth and Clinch (1998) who focus on the relevance of revaluation increments. Hence, if high acquisition premiums are associated with IIA's and these are not associated with post acquisition performance, this would suggest overpayment.

In combination these results suggest the further evaluation of the association between acquisition premiums and acquired IIA's in the period prior to transition to IFRS when there were incentives to recognise IIA's rather than goodwill. This is reflected in the following hypothesis:

H₁: Acquisition premiums are associated with the recognition of IIA's in the period before transition to IFRS.

With transition to IFRS the incentives to recognise IIA's rather than goodwill ceased. AASB 138 *Intangible Assets* does not prescribe the amortisation of goodwill, and both goodwill and IIA's must instead be subjected to annual impairment tests. There is evidence that when the incentive to recognise IIA's rather than goodwill was created, this weakened the relation between acquisition premiums and goodwill (James *et al.*, 2008). With transition to IFRS this opportunity for regulatory arbitrage was eliminated, and it is expected that the association between IIA's and acquisition premiums will not persist in periods subsequent to transition to IFRS. However, a concern is that while AASB 3 *Business Combinations* and AASB 138 *Intangible Assets* prohibit recognition of internally generated intangible assets, there are few constraints on the recognition of acquired IIA's. The justification for this regulatory distinction is that the value for the acquired intangible assets is determined by an arms-length transaction. Any evidence of high acquisition premiums would suggest that the basis for the regulatory distinction may be overstated. Hence, consideration is given to the following hypothesis:

H₂: Subsequent to IFRS adoption, acquisition premiums are not associated with IIA's.

3 Research design

The model used in this study is in the first instance based upon the approach followed in Ayers *et al.* (2002). Rather than focusing on the association of acquisition premiums with the choice of accounting methods (purchase vs pooling), attention here is focused on the recognition of IIA's. An advantage of the current context is that rather than considering the dichotomous use of accounting methods, IIA's provide a continuous variable capturing the impact of the

accounting choice on the financial statements and this should improve the power of the tests.

This is reflected in the following model:

$$PREM_{it} = \alpha_0 + \alpha_1 IIA_{it} + \sum_{j=2}^{11} \alpha_j Controls_{it} + \varepsilon_{it}$$

This is estimated in the periods before and after transition to IFRS to test Hypotheses 1 and 2 respectively. There are limited observations subsequent to transition to IFRS, so the model is also estimated for the full sample with the inclusion of an indicator variable and an interaction term to determine if the association between acquisition premiums and IIA's changes. This is as follows:

$$PREM_{it} = \beta_0 + \beta_1 IIA_{it} + \beta_2 IIA_{it} * IFRS_{it} + \beta_3 IFRS_{it} + \sum_{j=4}^{13} \beta_j Controls_{it} + \varepsilon_{it}$$

If there is evidence that high acquisition premiums are a consequence of overpayment this should be recognised in subsequent reporting periods and it would be expected to manifest in asset impairments. This suggests the evaluation of the association between IIA's recognised in business combinations and asset impairments. This analysis was discontinued after the initial data collection due to the limited number of firms recognising asset impairments (42 or 10.7% of sample firms) in the five years subsequent to the acquisition. Furthermore, the remoteness of some of the asset impairment to the acquisition makes any link tenuous and any conclusions potentially unsound. This might be taken as suggesting that overpayment did not occur, but there is evidence in Bond *et al.* (2016) that firms may be remiss in the recognition of asset impairments.

With accounting policy choices and studies of this type there are always concerns with endogeneity, and in particular the likelihood the characteristics of the firm, its business model

and economic conditions are associated with dependent and independent variables. To the extent that accounting regulations are not conditioned on these factors and are not firm or time period specific this of less concern, and it is for this reason that we are reluctant to infer causality. This, together with the inability to confirm overpayment through subsequent impairments, are limitations of this study.

3.1 *Acquisition premiums (PREM)*

The focus in this study is on acquisition premiums (*PREM*) paid by acquiring firms in takeovers. As such it is concerned with the extent to which acquisition price exceeds the prevailing market price in the period before the initiation of the acquisition. Consistent with Ayers *et al.* (2002) *PREM* is measured as the ‘takeover price’ less the target firm market value two months before the announcement of the acquisition. This assumes that the market value two months prior to the announcement of the acquisition is not impacted by speculation of the acquisition. If this is insufficient, *PREM* will be understated and this will bias tests against finding a significant association. Recognising the potential impact of materiality on the acquisition, acquisition premiums are scaled by the market capitalisation of the acquiring firm two months prior to the announcement of the acquisition.⁷

3.2 *Identifiable intangible assets*

The primary focus of this study is on the recognition of IIA’s. Identifiable intangible assets (*IIA*) represent an allocation of the acquisition price, and this is identical to the manner in

⁷ Critically, where the acquisition premium is small relative to the value of the acquiring firm, the impacts and benefits of the acquisition will be small. Furthermore, the shield provided by recognising identifiable intangible assets will be immaterial and the impact of recognising such assets to obscure overpayment will be reduced.

which acquisition price is allocated to tangible assets (and liabilities). To the extent that a greater proportion of the acquisition price is allocated to the tangible and intangible assets this will reduce the goodwill recognised. This is scaled by the acquisition price as this identifies the relative amount of takeover price allocated to IIA's. The association between acquisition premiums and IIA's is expected to change with transition to IFRS. To distinguish IIA's recognised in the different regulatory regimes, an indicator variable (*IFRS*) is constructed which assumes the value 1 in periods subsequent to transition to IFRS, otherwise 0, and this is interacted with *IIA*.

If there is evidence that the recognition of IIA's are associated with acquisition premiums in the period before transition to IFRS (H_1), this will be captured by the co-efficient on *IIA* (α_1) for the pre-IFRS sample. If this relation ceases after transition to IFRS (H_2), the co-efficient on *IIA* (α_1) will not be significant. Furthermore, in the interaction model the co-efficient on *IIA* (β_1), *IIA*IFRS* (β_2) will be offsetting.

3.3 Controls

A large body of literature exists investigating various factors likely to be associated with acquisition premiums.⁸ A number of these factors are included as control variables and they represent both accounting and other factors potentially associated with takeover premiums.

Financial statements are a crucial source of information for acquisition decisions (e.g. Bushman and Smith 2001; Kothari 2001; Francis *et al.*, 2003; Koller *et al.*, 2005; Bargeron *et al.*, 2008; Raman *et al.*, 2008; Eckbo, 2009). This would include information about the tangible assets and liabilities acquired that may contribute to the 'value added' by the acquisition and be

⁸ For example, Jensen and Ruback, 1983; Jensen, 1988; Morck *et al.*, 1988; Aboody *et al.*, 2000; Ayers *et al.*, 2002.

reflected in the acquisition premium. Hence, *OTHER* is included as a control variable and is measured as the acquisition price allocated to other assets (excluding IIA's) and liabilities. Profitability of the target firm will also likely impact the takeover price and any acquisition premium. Ayers *et al.* (2002) note that target firms with higher earnings are likely to command higher prices, and this may give rise to high acquisition premiums. To control for this, target net income (*TNI*) is included as a control and is measured as target firm earnings in the period prior to the acquisition. To capture the materiality of the acquisition and to be consistent with the treatment of *PREM*, this is also scaled by the market capitalisation of the acquiring firm two months prior to the announcement of the acquisition.

Leverage for the acquiring firm may also be related to acquisition premiums and the recognition of IIA's. Aboody *et al.* (2000) and Ayers *et al.* (2002) argue that the increase in book values under the purchase method (compared with the pooling method) would be beneficial for acquisitions of highly leveraged targets. Similarly, for Australian firms, high leverage could provide an incentive for acquiring firms to allocate more of the acquisition purchase price to non-amortisable IIA's in order to 'strengthen' the post-acquisition balance sheet. If the debt contracts include IIA's in leverage calculations, this represents an alternative 'accounting benefit' which might be more important to highly leveraged firms.⁹ To capture this, and the extent to which leverage increases as a consequence of the acquisition, leverage (*LEV*) is included as a control variable and is measured as the long-term debt of the target firm, scaled by the market capitalisation of the acquiring firm two months prior to the announcement of the acquisition.

⁹ While it is common for debt contracts to exclude intangible assets in the determination of leverage, this may be customised in the debt contract if there are material intangible assets. If this does not occur then this would likely result in this control not being significant.

The level of pre-takeover ownership by the acquiring firms is likely to impact acquisition premiums because this limits the opportunity for a takeover ‘contest’ and increases the bargaining power of the acquiring firm (e.g. Robinson and Shane 1990; Bugeja and Walter 1995; Ayers *et al.*, 2002). Recognising this we include pre-takeover ownership or toehold shareholdings as a control variable. Toehold shareholding (*TOE*) is measured as the pre-takeover percentage shareholding of the acquiring firm. The level of post-takeover ownership by the acquiring firm is also likely to impact acquisition premiums. Bradley *et al.* (1988) suggest that a bidder’s post-takeover ownership or terminal ownership is also associated with acquisition premiums paid because the demand curve for the target shares slopes upward. Hence, both the levels of pre-takeover ownership (*TOE*) and post-takeover ownership (*TER*) are included to control for the effect of bidders’ pre- and post-takeover ownership on the acquisition premium. Ayers *et al.* (2002) also suggest that if there are competing bids it is likely the acquirer will be forced to pay a high acquisition price. To control for this, we include an indicator variable for competing bids (*CBID*), which assumes the value 1 if the acquisition is contested, and 0 otherwise.

There is evidence of a negative association between the relative size of the target and the acquisition premium paid (e.g. Robinson and Shane 1990). Billett and Ryngaert (1997) interpret this finding as indicating either that relatively larger acquirers have more opportunities to take advantage of target assets, or that acquirers may pay high acquisition premiums for relatively small business combinations because of less scrutiny. Gort and Hogarty (1970) argue that the larger the target relative to the acquirer, the greater the risk of serious earnings dilution if the target performs poorly. Accordingly, the relative size of the target firm (*RELSZ*) is included as a

control and is measured as the ratio of target firm market value to the value of the acquiring firm market value two months prior to the takeover.

A relatively low market-to-book ratio for the target firm prior to the acquisition may indicate greater potential for takeover gains, and this may induce a high acquisition premium. It may also be indicative of management inefficiency in the target firm. (e.g. Jensen and Ruback 1983; Jensen 1988; Morck *et al.*, 1988). Consistent with this, Nathan *et al.* (1998) provide evidence of an inverse relation between market to book ratios and the acquisition premiums. Accordingly, the target firm market-to-book ratio (*MTB*) is included and measured two months prior to the takeover.

There is evidence that if incumbent managers oppose the acquisition this results in high acquisition premiums (e.g. Jennings and Mazzeo, 1993). There is also evidence that managers are less likely to oppose takeovers with high acquisition premiums where this has significant impacts on managerial wealth (e.g. Cotter and Zenner, 1994). Hence, acquiring firms may secure managerial cooperation, either by paying high acquisition premiums or by giving managers preferential treatment. Additionally, agency theory predicts that higher levels of managerial ownership can better align the interests of shareholders and managers. To control for this, we include an indicator variable to capture whether managers oppose the takeover (*Defmeas*). This takes the value 1 for takeovers in which the target's incumbent managers can utilise a share or asset lockup to defeat an unfriendly takeover bid, and 0 otherwise.

Finally, acquisition premiums may be impacted by how tightly the shares in the target company are held. There is likely greater liquidity in firms that are utilising their assets poorly (Jensen, 1986). There may also be potentially greater gains to be realised on acquisition for firms that are not utilising their assets efficiently (Lang *et al.*, 1989; Servaes, 1991). Hence we include

target firm liquidity (*LIQ*) as a control, measured as the total of the target firms cash, short-term investments, and accounts receivables, scaled by the target firms market value two months prior to the acquisition.

4 Sample selection and descriptive statistics

Sample firms for this study are Australian firms making business acquisitions over the period 1 January 1988 to 31 December 2008, and are identified from the SDC Platinum database. This database provided details of takeover announcements, effective dates, names of acquiring and target firms, and the percentage of shares held by acquirers prior to and after the takeover. Due to data requirements for the target firm, only acquisitions of publicly listed Australian firms are included. Financial statement information for both the acquiring and target firms is obtained from Morningstar and the Connect 4 databases. Details of the allocation of the acquisition price across asset and liability categories, including IIA's, is hand-collected from the business acquired note associated with the acquirer's immediate post-acquisition Statement of Cash Flows. As these disclosures are only made for successful takeovers where consolidation is subsequently required, this limits the number of sample firms. A further limitation to the selection of sample firms was the availability of five years financial data subsequent to the acquisition to identify the incidence of asset impairments subsequent to the acquisition. Finally, stock market data were obtained from the Australian Graduate School of Management (AGSM) CRIF price relatives database. To control for the effects of outliers the top and bottom 1% of observations were

eliminated, this identified a final sample of 393 observations.¹⁰ Of these observations, 124 recognised acquired identifiable intangibles assets, while 206 recognised goodwill.

An overview of sample firms is provided in Table 1. Panel A provides details of the years in which the acquisitions occurred. This shows that 306 observations occurred prior to transition to IFRS, and 87 subsequent to transition to IFRS. There are relatively few observations before 1995 and the concentration of observations this creates allays concerns that other regulatory changes or factors may impact the results. Panel B shows that the sample spans a wide range of industries. There is a concentration of observations in three sectors (i.e. metal and mining, 27.23%; diversified financials, 16.79%; and commercial services and supplies, 8.14%); however, this is reflective of the market.

[INSERT TABLE 1 ABOUT HERE]

Descriptive statistics for sample observations are provided in Table 2. For the full sample of firms in Panel A, the mean (median) acquisition premium (*PREM*) of 0.239 (0.016) suggests that for some acquisitions there were material acquisition premiums. The mean (median) value of the proportion of takeover price allocated to IIA's (*IIA*) of 0.106 (0.000) indicates that while many firms did not recognise these assets on acquisition, in some instances they were material. For the sub samples of firms in the pre- and post-IFRS periods in Panels B and C respectively, it is notable that mean acquisition premiums in the pre-IFRS period (0.258) are greater than for the post-IFRS period (0.214), but there is little change in the proportion of the acquisition price recognised as IIA's (*IIA*). The impacts of winsorisation are apparent in the minimum and maximum values and it should be noted that is not exclusively in the pre or post IFRS periods.

¹⁰ Elimination of the top and bottom 1% of observations is minimal. However, this was chosen as there is considerable overlap in these observations across the different variables, and this limits the reduction in sample size. However, the issue of outliers likely persists and this was addressed by winsorizing the remaining data at the 5% / 95% level. The sensitivity of the results to this was considered.

[INSERT TABLE 2 ABOUT HERE]

Correlations between the independent variables are presented in Table 3. This shows that there is a positive correlation between acquisition premiums (*PREM*) and the proportion of takeover price recognised as IIA's (*IIA*); however, neither the Pearson Correlation (0.018) nor the Spearman Rank Correlation (0.103) are significant at conventional levels. This is doubtless impacted by the material number of observations where no IIA's are recognised in the business combination. There are also significant correlations between acquisition premiums (*PREM*) and a number of the control variables, which is expected and consistent with the prior literature. However, the correlations are limited and unlikely to pose co-linearity problems in the subsequent analysis.

[INSERT TABLE 3 ABOUT HERE]

5 Empirical results

The results for the tests of the hypotheses are addressed in the first instance in Table 4, which provides the results from estimating Model 1 for the separate subsamples of pre- and post-IFRS observations, and Model 2 for the combined sample. This identifies the associations between acquisition premiums and the test and control variables.

[INSERT TABLE 4 ABOUT HERE]

For the subsample of pre-IFRS observations the co-efficient on recognised IIA's (*IIA*) is significant ($\alpha_1=0.551$, $t=6.040$, $p=0.000$). This is consistent with H_1 and firms recognising IIA's to shield the financial statements of the acquirer from the adverse consequences of high acquisition premiums. As expected, the co-efficient on other assets acquired (*OTHER*) is positive and significant ($\alpha_2=1.116$, $t=49.040$, $p=0.000$) and this suggests that firms with more assets in

place attract high acquisition premiums. Similarly, the co-efficient on target firm net income (*TNI*) is positive and significant ($\alpha_3=0.264$, $t=2.030$, $p=0.044$) which is consistent with the results in Ayers *et al.* (2002). Finally, consistent with Robinson and Shane (1990) and Billett and Ryngaert (1997), the co-efficient on the relative size of the acquisition (*RELSZ*) is negative and significant ($\alpha_8=-0.802$, $t=-16.550$, $p=0.000$).

In the post-IFRS period it is notable that the co-efficient on recognised IIA's (*IIA*) is not significant ($\alpha_1=0.196$, $t=1.310$, $p=0.194$). This provides support for H_2 and firms in the post-IFRS period being less likely to recognise IIA's to shield the financial statements of the acquirer from the adverse consequences of high acquisition premiums. Consistent with the results for the pre-IFRS period, the co-efficients on other assets acquired (*OTHER*) is positive and significant ($\alpha_2=1.168$, $t=22.370$, $p=0.000$), target firm net income (*TNI*) is positive and significant ($\alpha_3=0.408$, $t=1.970$, $p=0.052$), and the relative size of the acquisition (*RELSZ*) is negative and significant ($\alpha_8=-0.822$, $t=-8.030$, $p=0.000$).

A further test of the hypotheses is provided by the estimation of Model 2 for the full sample of firms. This includes an indicator variable for periods subsequent to transition to IFRS, and this is interacted with recognised IIA's. Consistent with the results for the pre-IFRS sample reported above, the co-efficient on recognised IIA's (*IIA*) is significant ($\beta_1=0.498$, $t=5.670$, $p=0.000$). Again, this provides support for H_1 . However, the co-efficient on the interaction between IIA's and IFRS (*IIA*IFRS*) is negative or offsetting and significant ($\beta_3=-0.363$, $t=-2.070$, $p=0.039$). This suggests a significantly weaker association between acquisition premiums and the recognition of IIA's in the post IFRS period, which provides further support for H_2 . Interestingly, the co-efficient on the IFRS variable is positive and significant ($\beta_2=0.167$, $t=3.540$, $p=0.001$) and this indicates that rather than diminishing after transition to IFRS, after controls

acquisition premiums increased. Accordingly, this raises the issue of whether alternative strategies are being adopted to mask the impact of high acquisition premiums on financial statements. Consistent with the results for the separate sub samples, the co-efficients on other assets acquired (*OTHER*) is positive and significant ($\beta_4=1.147$, $t=55.060$, $p=0.000$), target firm net income (*TNI*) is positive and significant ($\beta_3=0.408$, $t=1.970$, $p=0.052$), and the relative size of the acquisition (*RELSZ*) is negative and significant ($\beta_8=-0.822$, $t=-8.030$, $p=0.000$).

Recognising the number of metal and mining (here after mining) firms in the sample, and the potential for intangible assets specific to this sector to impact the results and bias test statistics, the above tests are repeated separately for the observations partitioned on the basis of industry. The results are reported in Table 5. For the pre-IFRS sample reported in Panel A, the co-efficients on recognised IIA's (*IIA*) are significant for both mining firms ($\alpha_1=1.016$, $t=5.200$, $p=0.000$) and non-mining firms ($\alpha_1=0.320$, $t=3.190$, $p=0.002$). The results for the controls are also generally consistent with those reported previously. These results are again supportive of H_1 and there being an association between acquisition premiums and the recognition of IIA's. In Panel B the results of estimating Model 1 in the post-IFRS period are reported. For mining firms, the model is not significant (F-stat=1.650, $p=0.210$) and this is likely a consequence of the limited sample size ($n=23$). For the non-mining firms, the model is statistically significant (F-stat=48.810, $p=0.000$). However, the co-efficient on recognised IIA's (*IIA*) is still not significant ($\alpha_1=0.234$, $t=0.930$, $p=0.355$). This is consistent with the results reported above for the post-IFRS period and again provides support for H_2 and the relation between acquisition premiums and recognised IIA's not persisting in post-IFRS periods. Finally, in Panel C, the results for estimating Model 2 for the full sample are presented. For mining firms, the co-efficient on recognised IIA's (*IIA*) is significant ($\beta_1=1.000$, $t=5.520$, $p=0.000$) as predicted by H_1 , and the co-

efficient on the interaction between recognised IIA's and IFRS ($IIA*IFRS$) is significant ($\beta_3=-0.785$, $t=-2.400$, $p=0.018$) and offsetting as predicted by H_2 . For non-mining firms, the coefficient on recognised IIA's (IIA) is significant ($\beta_1=0.199$, $t=2.160$, $p=0.032$) as predicted by H_1 , but the co-efficient on the interaction between recognised IIA's and IFRS ($IIA*IFRS$) while negative is not significant ($\beta_3=-0.079$, $t=-0.400$, $p=0.690$).

[INSERT TABLE 5 ABOUT HERE]

If the recognition of IIA's is associated with acquisition premiums, and evidence of overpayment, this should manifest in asset impairments in subsequent reporting periods. As noted above, there was little evidence of sample firms recognising asset impairments (42 firms or 10.7% of sample firms), and this is less than suggested by the results in Su and Wells (2015) of there being little association between IIA's and post-acquisition firm performance. However, this result is suggested by Bond *et al.* (2015) who provide evidence of firms often not recognising asset impairments even when indicators of impairment are exhibited.

5.1 Robustness of results

During the course of this paper a number of issues were identified as requiring further investigation. Some issues relate to the sample firms included and their possible impact on results, while others relate to research design. The sensitivity of results to these issues was considered and is addressed below.

It is recognised that some acquisitions spanned the transition to IFRS period and this may have impacted the relation between acquisition premiums and recognised IIA's. Accordingly, sample firms where the acquisition spanned the transition period were deleted (57 firms) and the tests repeated. This did not materially impact the results.

Some firms are included in the sample more than once as they undertook more than one acquisition in the sample period. As there were only a limited number of these observations the tests were repeated with firms being limited to being in the sample once only. This did not materially impact the results.

In the main tests the sample was winsorised at the 1% and 99% percentile levels. To determine the sensitivity to the results to outliers, exclusions were increased to the 5% and 95% percentile levels. Consistent with the results in the primary tests the results are generally supportive of the hypothesis. However, it is notable that interaction between recognised IIA's and IFRS ($IIA*IFRS$) is no longer significant. However, this is likely a consequence of reduced sample size for firms in the post-IFRS period and the deletions being focussed on observations recognising IIA's.

Finally, a number of alternative variable definitions and scalars were considered. This included defining IIA as recognised IIA's scaled by the sum of identifiable intangible asset allocations and goodwill. It also included the scaling of variables by the number of an acquirer's common outstanding shares, the acquirer's book value of equity, and the sum of the target's and acquirer's book value of equity. As expected, results (not tabled) were found to be robust.

6 Conclusion

The objective of this paper was to evaluate whether there is a relation between the recognition of IIA's and acquisition premiums, which is suggestive of overpayment. Furthermore, whether this relation changed with transition to IFRS when the incentives recognise IIA's ceased. This is of concern as it identifies accounting practices which have commonly been labelled as opportunistic as also having economic consequences. Evidence is

provided of a positive relation between IIA's recognised in business combinations and acquisition premiums in periods prior to transition to IFRS. Subsequent to transition to IFRS, this relation ceased.

This paper makes a number of contributions to the academic literature. It extends the literature considering accounting policy choices for business combinations and the economic consequences. In the US there is evidence of firms, using the pooling method, paying higher acquisition premiums. In Australia, where firms were unable to use the pooling method, the same outcome was achieved through the recognition of IIA's and evidence is provided that IIA's are being associated with high acquisition premiums in the period prior to transition to IFRS. Hence this paper identifies an economic consequence to the opportunistic choice of accounting policies. Subsequent to transition to IFRS there is no evidence that IIA's are associated with high acquisition premiums, notwithstanding the relative latitude in the initial recognition of IIA's in business combinations afforded by AASB 3 *Business Combinations* and AASB 138 *Intangible Assets*. This is not to say that high acquisition premiums and possibly overpayment doesn't occur subsequent to transition to IFRS. To the extent that the incentives for opportunism remain an issue requiring address is whether there are alternative sources of accounting flexibility in relation to business combinations, such as goodwill which is no longer subject to mandatory amortisation. While we find evidence of high acquisition premiums being associated with the recognition of IIA's we find no evidence that this leads to asset impairments. This is problematic as there is no evidence that they are associated with post acquisition performance (Su and Wells, 2015). Doubtless, firms are relying on the business combination to establish the 'fair value' of the asset for the purpose of determining recoverable amount and asset impairment. This might be

considered by regulators in guidance for how fair value is determined in AASB 136 *Impairment of Assets*.

This paper also complements a number of studies that have considered accounting for IIA's in Australia. There is evidence that subsequent to the issue of AASB 1013 the relation between acquisition premiums and goodwill weakened (James *et al.*, 2008). Our results suggest this occurred because firms were increasingly recognising IIA's instead. There is also evidence that amounts recognised as IIA's generally are value relevant (e.g. Godfrey and Koh, 2001; Ritter and Wells, 2006; Chalmers *et al.*, 2008), and that they are associated with future performance (e.g. Ritter and Wells, 2006). However, a feature of these papers is that they do not distinguish between IIA's that are acquired from those that are internally generated. In contrast, Su and Wells (2015) focus on acquired IIA's only, and they find no association with future performance. Our results suggest that this may be consequence of overpayment for acquired IIA's.

Finally, there are a number of unresolved issues which are beyond the scope to this paper. The incentives which lead firms to select particular accounting policies, in this case the recognition of IIA's, have not been eliminated. The challenge for researchers and regulators is to identify alternative strategies that firms might use to shelter their financial statements from the consequences of high acquisition premiums and potential overpayment in business acquisition. This may be goodwill for which amortisation is no longer mandated, and this is a question for subsequent research. A further issue is how overpayment in acquisitions resolves in subsequent periods.

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Table 1
Distribution of sample by calendar year and acquirer's industry

Panel A: Distribution of sample by calendar year			
Year/Model	Pre-IFRS	Post-IFRS	Full sample
1988	1		1
1989	8		8
1990	7		7
1991	7		7
1992	6		6
1993	14		14
1994	9		9
1995	19		19
1996	28		28
1997	18		18
1998	19		19
1999	26		25
2000	34		34
2001	24		24
2002	16		16
2003	21		21
2004	23		23
2005	26	1	27
2006		34	34
2007		36	37
2008		16	16
Total	306	87	393

Panel B: Distribution of sample by acquirer's Industry			
Industry/Model	Pre-IFRS	Post-IFRS	Full sample
Energy	18	3	21
Chemicals	5	0	5
Construction Materials	5	3	8
Paper and Forest Products	2	0	2
Metals and Mining	84	23	107
Capital Goods	0	0	0
Commercial Services and Supplies	22	10	32
Transportation	8	2	10
Automobiles and Components	0	0	0
Consumer Durables and Apparel	5	0	5
Consumer Services	4	2	6
Media	2	1	3

Retailing	16	3	19
Food and Drug Retailing	23	5	28
Food Beverage and Tobacco	1	0	1
Healthcare Equipment and Services	8	1	9
Pharmaceuticals and Biotechnology	0	0	0
Banks	8	6	14
Diversified Financials	54	12	66
Insurance	2	1	3
Real Estate, excluding Investment Trusts	12	3	15
Real Estate Investment Trusts	0	0	0
Software and Services	4	1	5
Technology Hardware and Equipment	8	0	8
Telecommunications Services	10	8	18
Utilities	0	0	0
not specified	5	3	8
Total	306	87	393

#Industry definitions are taken from the Australian Graduate School of Management's *Centre for Research in Finance* (CRIF) price-relatives database.

Table 2
Descriptive statistics

Panel A: Full sample						
	Mean	Median	SD	Minimum	Maximum	n
<i>PREM_{it}</i>	0.239	0.016	1.064	-0.899	4.564	393
<i>IIA_{it}</i>	0.106	0.000	0.235	0.235	0.885	393
<i>OTHER_{it}</i>	0.500	0.124	0.937	-0.035	3.985	393
<i>IFRS_{it}</i>	0.224	0.000	0.417	0.417	1.000	393
<i>TNI_{it}</i>	0.091	0.010	0.181	-0.056	0.704	393
<i>LEV_{it}</i>	0.353	0.031	0.716	0.000	2.905	393
<i>TOE_{it}</i>	11.744	0.000	18.373	0.000	59.305	393
<i>TER_{it}</i>	95.362	100.000	11.391	60.050	100.000	393
<i>CBID_{it}</i>	0.076	0.000	0.266	0.000	1.000	393
<i>RELSZ_{it}</i>	0.466	0.287	0.485	0.015	1.869	393
<i>MKTBK_{it}</i>	2.168	1.288	3.413	-4.151	11.833	393
<i>DEFMEAS_{it}</i>	0.079	0.000	0.270	0.000	1.000	393
<i>LIQ_{it}</i>	0.590	0.262	0.831	0.018	3.361	393

Panel B: Pre-IFRS period						
	Mean	Median	SD	Minimum	Maximum	n
<i>PREM_{it}</i>	0.258	0.010	1.227	-0.899	4.564	306
<i>IIA_{it}</i>	0.106	0.000	0.232	0.232	0.885	306
<i>OTHER_{it}</i>	0.537	0.140	0.977	-0.035	3.985	306
<i>TNI_{it}</i>	0.088	0.012	0.173	-0.056	0.704	306
<i>LEV_{it}</i>	0.399	0.040	0.768	0.000	2.905	306
<i>TOE_{it}</i>	12.617	0.000	18.827	0.000	59.305	306
<i>TER_{it}</i>	95.606	100.000	11.147	60.050	100.000	306
<i>CBID_{it}</i>	0.075	0.000	0.264	0.000	1.000	306
<i>RELSZ_{it}</i>	0.466	0.274	0.487	0.015	1.869	306
<i>MKTBK_{it}</i>	1.913	1.190	2.935	-4.151	11.833	306
<i>DEFMEAS_{it}</i>	0.088	0.000	0.284	0.000	1.000	306
<i>LIQ_{it}</i>	0.607	0.258	0.845	0.018	3.361	306

Panel C : Post-IFRS period						
	Mean	Median	SD	Minimum	Maximum	n
$PREM_{it}$	0.214	0.041	0.931	-0.899	4.564	87
IIA_{it}	0.110	0.000	0.247	0.247	0.885	87
$OTHER_{it}$	0.402	0.070	0.810	-0.035	3.985	87
TNI_{it}	0.103	0.007	0.208	-0.056	0.704	87
LEV_{it}	0.193	0.011	0.461	0.000	2.905	87
TOE_{it}	8.672	0.000	16.409	0.000	59.305	87
TER_{it}	94.515	100.000	12.244	60.050	100.000	87
$CBID_{it}$	0.092	0.000	0.291	0.000	1.000	87
$RELSZ_{it}$	0.465	0.315	0.483	0.015	1.869	87
$MKTBK_{it}$	3.126	2.000	4.575	-4.151	11.833	87
$DEFMEAS_{it}$	0.046	0.000	0.211	0.000	1.000	87
LIQ_{it}	0.522	0.262	0.781	0.018	3.361	87

- $PREM_{it}$: Takeover price less the target's market value scaled by the acquiring firm's market value 2 months prior to the acquisition.
- IIA_{it} : Identifiable intangible assets recognised in the business combination scales by takeover price.
- $OTHER_{it}$: Amount of takeover price allocated to assets (other than IIA and goodwill) and liabilities, deflated by the acquiring firm's market value 2 months prior to the acquisition.
- $IFRS_{it}$: Indicator variable assuming the value 1 if the takeover in the post-IFRS period, 0 otherwise.
- TNI_{it} : Target firm earnings in the year prior to the acquisition scaled deflated by the acquiring firm's market value 2 months prior to the acquisition.
- LEV_{it} : Ratio of the target's firms long-term debt to the target's market value 2 months prior to the acquisition.
- TOE_{it} : Acquirer's pre-takeover ownership percentage in the target firm.
- TER_{it} : Acquirer's post-takeover ownership percentage in the target firm.
- $CBID_{it}$: Indicator variable assuming the value 1 if there was a competing bidder for the target, 0 otherwise.
- $RELSZ_{it}$: Ratio of the target firms market value to the acquiring firms market value, both 2 months prior to the acquisition.
- $MKTBK_{it}$: Ratio of the target firms market value 2 months prior to the acquisition to the target firms book value of equity.
- $DEFMEAS_{it}$: Indicator variable assuming the value 1 if the target has defensive measures in place, 0 otherwise.
- LIQ_{it} : Ratio of the target firms cash, short-term investments, and accounts receivable to the target firms market value 2 months prior to the acquisition.

Table 3
Correction Matrix

	A	B	C	D	E	F	G	H	I	J	K	L	M
A. PREM _{it}	1	0.018	0.777	-0.03	0.1	0.138	-0.027	-0.014	-0.036	0.024	-0.148	-0.005	0.21
B. IIA _{it}	0.103	1	-0.139	-0.009	-0.017	-0.006	-0.025	-0.028	-0.05	-0.048	-0.008	0	0.011
C. OTHER _{it}	0.451	-0.22	1	-0.071	0.214	0.14	-0.03	0.005	-0.059	0.362	-0.127	-0.071	0.129
D. IFRS _{it}	0.08	-0.038	-0.076	1	0.023	-0.122	-0.092	-0.039	0.027	-0.012	0.143	-0.068	-0.047
E. TNI _{it}	-0.01	-0.062	0.108	-0.032	1	0.172	-0.036	-0.011	-0.052	0.379	-0.036	-0.079	0.029
F. LEV _{it}	-0.004	0.018	0.01	-0.105	0.313	1	0.049	-0.079	0.025	-0.031	-0.178	0.005	0.227
G. TOE _{it}	0.012	0.009	-0.013	-0.103	0.004	0.048	1	-0.144	0.039	0.02	-0.068	0.078	0.008
H. TER _{it}	-0.009	0.005	0.004	-0.038	-0.035	-0.061	-0.244	1	-0.029	0.03	0.084	0.019	-0.142
I. CBID _{it}	-0.057	-0.061	-0.08	0.027	-0.036	0.086	0.050	-0.03	1	-0.104	-0.034	0.121	-0.028
J. RELSZ _{it}	-0.132	-0.09	0.466	-0.018	0.186	-0.071	0.042	0.04	-0.113	1	0.038	-0.113	-0.107
K. MKTBK _{it}	-0.165	0.023	-0.126	0.129	-0.101	-0.199	-0.094	0.142	0.026	0.043	1	0.007	-0.179
L. DEFMEAS _{it}	-0.032	0.047	-0.091	-0.068	-0.049	0.059	0.029	0.005	0.121	-0.115	0.04	1	0.001
M. LIQ _{it}	0.187	0.041	0.049	-0.016	-0.028	-0.021	-0.011	-0.111	-0.05	-0.144	-0.272	-0.011	1

Pearson correlations above diagonal and Spearman Rank correlations below diagonal.

All correlations significant at the 1% level are bold.

All variables as previously defined.

Table 4
The association between acquisition premiums and recognized identifiable intangible assets, pre-IFRS, post-IFRS and for the full sample

	$PREM_{pre-IFRS}$ (n=306)		$PREM_{post-IFRS}$ (n=87)		$PREM_{full\ period}$ (n=393)				
	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value
Constant	-0.199	-1.040	0.299	0.092	0.280	0.781	-0.171	-1.070	0.284
IIA_{it}	0.551	6.040	0.000 ***	0.196	1.310	0.194	0.498	5.670	0.000 ***
$IFRS_{it}$							0.167	3.540	0.001 ***
$IIA_{it}IFRS_{it}$							-0.363	-2.070	0.039 **
$OTHER_{it}$	1.166	49.040	0.000 ***	1.168	22.370	0.000 ***	1.147	55.060	0.000 ***
TNI_{it}	0.264	2.030	0.044 **	0.408	1.970	0.052 **	0.293	2.760	0.006 ***
LEV_{it}	-0.010	-0.360	0.721	-0.067	-0.830	0.410	-0.015	-0.580	0.565
TOE_{it}	0.001	0.930	0.354	0.000	0.110	0.916	0.001	1.060	0.292
TER_{it}	0.000	0.250	0.803	0.000	-0.030	0.980	0.001	0.340	0.735
$CBID_{it}$	0.059	0.730	0.468	-0.167	-1.300	0.196	-0.075	-1.120	0.266
$RELSZ_{it}$	-0.802	-16.550	0.000 ***	-0.822	-8.030	0.000 ***	-0.793	-18.860	0.000 ***
$MKTBK_{it}$	0.015	2.000	0.047 **	0.001	0.090	0.931	0.007	1.270	0.206
$DEFMES_{it}$	-0.003	-0.050	0.963	-0.175	-1.010	0.316	-0.001	-0.010	0.990
LIQ_{it}	0.059	2.270	0.024 **	0.021	0.420	0.675	0.052	2.340	0.020 **
Adjusted R ²	0.898			0.877			0.894		
F-stat	244.350		0.000 ***	56.770		0.000 ***	255.270		0.000 ***

Where:

$$PREM_{it} = \alpha_0 + \alpha_1 IIA_{it} + \sum_{j=2}^{11} \alpha_j Controls_{it} + \varepsilon_{it}$$

$$PREM_{it} = \beta_0 + \beta_1 IIA_{it} + \beta_2 IIA_{it} * IFRS_{it} + \beta_3 IFRS_{it} + \sum_{j=4}^{13} \beta_j Controls_{it} + \varepsilon_{it}$$

All variables as previously defined

- *** : Denotes significance at the 1% level
- ** : Denotes significance at the 5% level
- * : Denotes significance at the 10% level

Table 5
The association between acquisition premiums and recognized identifiable intangible assets for mining firms and others firms separately

	$PREM_{mining\ firms}$ (n=84)			$PREM_{allothers}$ (n=222)		
	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value
Constant	-0.827	-2.010	0.048 **	0.042	0.200	0.842
IIA_{it}	1.016	5.200	0.000 ***	0.320	3.190	0.002 ***
$OTHER_{it}$	1.190	22.810	0.000 ***	1.157	44.570	0.000 ***
TNI_{it}	0.521	1.810	0.074 *	0.135	0.960	0.337
LEV_{it}	-0.054	-0.860	0.393	0.016	0.520	0.603
TOE_{it}	0.002	0.650	0.517	0.001	0.780	0.439
TER_{it}	0.006	1.350	0.181	-0.001	-0.680	0.498
$CBID_{it}$	0.082	0.360	0.719	0.037	0.460	0.646
$RELSZ_{it}$	-0.743	-6.990	0.000 ***	-0.834	-15.860	0.000 ***
$MKTBK_{it}$	0.005	0.320	0.753	0.019	2.450	0.015 **
$DEFMES_{it}$	0.072	0.450	0.652	-0.022	-0.260	0.793
LIQ_{it}	0.094	1.210	0.230	0.036	1.390	0.167
Adjusted R ²	0.886			0.908		
F-stat	59.340		0.000 ***	200.120		0.000 ***

	<i>PREM</i> _{mining firms} (n=23)			<i>PREM</i> _{all others} (n=64)		
	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value
Constant	0.696	0.330	0.744	-0.030	-0.070	0.942
<i>IIA</i> _{it}	-0.010	-0.040	0.970	0.234	0.930	0.355
<i>OTHER</i> _{it}	0.077	0.290	0.780	1.198	20.240	***
<i>TNI</i> _{it}	-0.675	-1.100	0.295	0.442	1.810	*
<i>LEV</i> _{it}	-0.382	-0.840	0.420	-0.039	-0.420	0.676
<i>TOE</i> _{it}	0.003	0.640	0.538	0.001	0.220	0.830
<i>TER</i> _{it}	-0.001	-0.080	0.941	0.001	0.250	0.800
<i>CBID</i> _{it}	-0.667	-1.740	0.110	-0.191	-1.280	0.205
<i>RELSZ</i> _{it}	-0.153	-0.570	0.581	-0.797	-6.510	***
<i>MKTBK</i> _{it}	-0.037	-2.330	0.040	0.006	0.550	0.587
<i>DEFMES</i> _{it}	0.012	0.040	0.970	-0.298	-1.110	0.273
<i>LIQ</i> _{it}	-0.420	-1.400	0.189	0.007	0.130	0.893
Adjusted R ²	0.845			0.892		
F-stat	1.650		0.210	48.810		***

	<i>PREM_{miningfirms}</i> (109)			<i>PREM_{all others}</i> (n=284)		
	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value
Constant	-0.576	-1.680	0.096 *	-0.214	-1.280	0.201
<i>IIA_{it}</i>	1.000	5.520	0.000 ***	0.199	2.160	0.032 **
<i>IFRS_{it}</i>	0.181	1.620	0.108	0.174	3.750	0.000 ***
<i>IIA_{it} * IFRS_{it}</i>	-0.785	-2.400	0.018 **	-0.079	-0.400	0.690
<i>OTHER_{it}</i>	1.212	27.670	0.000 ***	1.126	51.660	0.000 ***
<i>TNI_{it}</i>	0.564	2.370	0.020 **	0.157	1.450	0.148
<i>LEV_{it}</i>	-0.072	-1.250	0.216	0.017	0.660	0.508
<i>TOE_{it}</i>	0.003	1.180	0.240	0.000	-0.030	0.975
<i>TER_{it}</i>	0.003	0.910	0.364	0.002	1.100	0.272
<i>CBID_{it}</i>	0.089	0.430	0.671	-0.119	-1.900	0.058 *
<i>RELSZ_{it}</i>	-0.784	-9.080	0.000 ***	-0.851	-18.900	0.000 ***
<i>MKTBK_{it}</i>	0.001	0.080	0.935	0.009	1.700	0.091 *
<i>DEFMES_{it}</i>	0.043	0.320	0.747	-0.003	-0.030	0.973
<i>LIQ_{it}</i>	0.082	1.170	0.246	0.039	1.850	0.065 *
Adjusted R ²	0.894			0.912		
F-stat	70.100		0.000 ***	225.490		0.000 ***

Where:

$$PREM_{it} = \alpha_0 + \alpha_1 IIA_{it} + \sum_{j=2}^{11} \alpha_j Controls_{it} + \varepsilon_{it}$$

$$PREM_{it} = \beta_0 + \beta_1 IIA_{it} + \beta_2 IIA_{it} * IFRS_{it} + \beta_3 IFRS_{it} + \sum_{j=4}^{13} \beta_j Controls_{it} + \varepsilon_{it}$$

All variables as previously defined

- *** : Denotes significance at the 1% level
- ** : Denotes significance at the 5% level
- * : Denotes significance at the 10% level

The likelihood of extreme observations contained in the selected data sets was addressed by winsorising variables at both the 1st and 99th percentiles as well as the 5th and 95th percentiles. Another concern of this chapter was the possibility of regression results being biased by outliers. Therefore, tests were re-performed with the three selected data sets above where observations with regression residuals more than 2 (Appendix 2.D ~ 2.F)¹¹ and 3 (Appendix 2.G ~ 2.I) standard deviations from zero are excluded.

¹¹ Each Appendix provides the details of full results for these sub-samples in the separate tables.