

The Value-relevance of Equity Accounted Carrying Amounts and Disclosed Fair Values of Listed Associates

Wessel M. Badenhorst ^{a*}, Leon M. Brümmer ^b, Johannes H.vH. de Wet ^b

^a *Department of Accounting, University of Pretoria*

^b *Department of Financial Management, University of Pretoria*

Summary at a glance: This paper examines the value-relevance of equity accounted carrying amounts and disclosed fair values of investments in listed associates. It finds that investors determine an intrinsic value for investment in listed associates and that the alternative measurement bases are incrementally value-relevant as a result.

Abstract: Equity accounting is a controversial accounting treatment. Although fair value measurement represents a potential alternative measurement base, information content may be lost under a pure fair value measurement approach. This study investigates the value-relevance of equity accounted carrying amounts and disclosed fair values of listed associates, using a sample of the largest firms listed in South Africa, Australia and the United Kingdom. The main finding is that the alternative measurement bases are incrementally value-relevant during the sample period of 31 December 2005 to 31 December 2011, implying that equity investors do not blindly accept either measurement base. Rather, investors include their own assessment of the intrinsic value of an entity's listed associates in their valuations.

Keywords: Equity accounting; fair value; measurement; investments in associates

JEL: M41

This paper has been accepted for publication in the Australian Accounting Review, 2015, forthcoming.

* Corresponding author: Wessel Badenhorst. Department of Accounting, Faculty of Economic and Management Sciences, University of Pretoria, Pretoria, 0002, Republic of South Africa; Tel: +27 12 420 3421; Fax: +27 12 362 5142; wessel.badenhorst@up.ac.za

Wessel Badenhorst is Senior Lecturer in Accounting, Leon Brümmer is Extraordinary Professor in Financial Management and Johannes de Wet is Associate Professor in Financial Management at the University of Pretoria.

The Value-relevance of Equity Accounted Carrying Amounts and Disclosed Fair Values of Listed Associates

Abstract: Equity accounting is a controversial accounting treatment. Although fair value measurement represents a potential alternative measurement base, information content may be lost under a pure fair value measurement approach. This study investigates the value-relevance of equity accounted carrying amounts and disclosed fair values of listed associates, using a sample of the largest firms listed in South Africa, Australia and the United Kingdom. The main finding is that the alternative measurement bases are incrementally value-relevant during the sample period of 31 December 2005 to 31 December 2011, implying that equity investors do not blindly accept either measurement base. Rather, investors include their own assessment of the intrinsic value of an entity's listed associates in their valuations.

Keywords: Equity accounting; fair value; measurement; investments in associates

1. Introduction

The accounting requirement to equity account investments in associates is controversial. Indeed some researchers argue that it has no theoretical economical or decision-making basis and should be scrapped in favour of measurement at fair value (Nobes, 2002:41). However, relying solely on fair value measurements would eliminate the information content of equity accounted carrying amounts. The objective of this paper is therefore to investigate whether the information content of disclosed fair values of listed associates subsume the information content of their equity accounted carrying amounts (i.e. whether measurement at fair value alone can replace the current accounting requirements).

This is no foregone conclusion as prior research has found not only equity accounted carrying amounts of associates and joint ventures to be value-relevant (Soonawalla, 2006), but also the difference between disclosed fair values of listed associates and their equity accounted carrying amounts (Graham, Lefanowicz & Petroni, 2003). By contrast, Barth and Clinch (1998) use a similar sample period and find that disclosed fair values of associates are not value-relevant in most industries. However, differences in sample selection methods, research models and the accounting requirements of different sample countries mean that the findings of the latter two studies cannot be compared directly. Prior research is therefore inconclusive about the value-relevance of disclosed fair values of investments in associates. Importantly, prior research also does not offer evidence on whether market participants view the disclosed fair values of investments in associates as an alternative or incremental measurement base.

It is important to note that neither of the alternative accounting measurement bases necessarily represents the value of the investments associates to equity market participants. Financial statements do not represent a valuation of an entity, but merely provide information that equity investors and other users utilise to value an entity (Conceptual Framework,

2010:OB7). Indeed, professional investors and academics have historically encouraged investors to ignore market values and determine the “intrinsic value” of an investment (Rutterford, 2004). This may explain the value-relevance of equity accounting carrying amounts in prior research, as they capture accounting information which could be used to determine an intrinsic value. However, the possibility that investors blindly accept fair values (i.e. current market values) remains. Although fair value could be the most accurate representation of intrinsic value, such as when the asset will soon be sold, investors often consider current market prices to be the intrinsic value of an investment. Consider the following comment by Rutterford (2004:141): “Analysts were forced to turn to forecasting cash flows, and to assume high growth rates, to be able to determine values close to market prices.” This comment highlights that market values are sometimes forcibly justified, even by sophisticated investors. It is therefore not possible to dismiss either potential measurement base for investments in associates outright.

Sample firms are selected from the 250 largest firms listed on the main boards of the Johannesburg Stock Exchange (JSE) in South Africa, the Australian Securities Exchange (ASX) in Australia and the London Stock Exchange (LSE) in the United Kingdom, based on market capitalisation determined as at 31 December 2011. Annual results of firms with listed associates for the period 31 December 2005 to 31 December 2011 make up the final sample. Results of this study suggest that equity accounted carrying amounts and disclosed fair values of listed associates are incrementally value-relevant. By implication, equity accounted carrying amounts of listed associates contain information which is not captured by their disclosed fair values. Importantly the research design of this study is focused on minimising the variance in the error term as it is not the size of the error, but unpredictability therein, which hamper accurate valuations. Equity investors therefore appear to utilise both to develop their own intrinsic value of an entity’s investments in associates suggesting that both

measurement bases are required for accurate predictions. Because of the conclusion that neither measurement base is sufficient in and of itself, current accounting requirements are supported by the findings of this study.

This study contributes to the literature surrounding the use of fair values in financial reporting by considering the value-relevance of disclosed fair values of listed associates and their equity accounted carrying amounts. The importance of the contribution is that investigations focus not only on the value-relevance of the alternative measurement bases, but also on whether the information content of disclosed fair values are sufficient to replace equity accounted carrying amounts. Therefore the study also contributes to the disclosure versus recognition debate. It sheds light on whether or not an amount, merely disclosed (i.e. fair values), may come to replace its recognised counterpart (i.e. equity accounted carrying amounts).

This paper will be of interest to those involved in the fair value accounting debate, as it shows that fair values do not necessarily contain all information that investors use to value investments. Those involved in the disclosure versus recognition debate will also be interested in the findings of this paper, as they show that disclosed information is incorporated into the valuations of equity investors.

The rest of this paper is set out as follows: section two sets out a brief overview of current accounting requirements for investments in associates, while section three discusses the findings of prior research and develops the hypothesis. Sections four and five detail the research methodology, sample methodology and final sample numbers. This is followed by a discussion of detailed findings, the results of robustness tests and a summary and conclusion of the paper.

2. Current accounting requirements for investments in associates

The accounting requirements for associates under International Financial Reporting Standards (IFRS) during the sample period are detailed in IAS 28, *Investments in associates*, effective January 2005 (hereafter: IAS 28). In terms of IAS 28 all entities, with the exception of venture capital organisations, mutual funds, unit trust funds and similar investment entities, are required to apply the equity method (i.e. equity accounting) to their investments in associates¹.

An entity has an investment in an associate in terms of IAS 28 when it has significant influence over the investee (the power to participate in financial and operating decisions). If an entity holds, directly or indirectly through subsidiaries, 20 per cent or more of the voting power of an investee, IAS 28 requires that significant influence be presumed, unless it is clearly not the case. Significant influence over an investee means that the equity method must be applied to this investment.

The equity method starts with the cost of the investment and adjusts it for the investor's share of changes in the equity (i.e. the net assets) of the investee after the acquisition date. Unlike consolidation, equity accounting results in a single line item on the statement of financial position, namely the investment in associate. Similarly, single line items are reported for the investor's share of the associate's profit or loss and other comprehensive income. To avoid double counting, IAS 28 requires dividends received from an associate to be eliminated against the equity accounted carrying amount so that it reflects the net change in equity of the associate.

Importantly for the purposes of this study, IAS 28 also requires entities to disclose the fair value of investments in associates for which published price quotations are available. This enables the comparison of the equity accounted carrying amount of a listed associate

¹ The version of IAS 28 in place during the sample period has since been superseded by IAS 28, *Investments in associates and joint ventures*, effective January 2013. However, the requirements for the application of the equity method detailed in this section are virtually unchanged in the new version of the standard.

with its disclosed fair value. The next section discusses prior research findings regarding investments in associates.

3. Literature review and hypothesis development

An early paper investigating equity accounting is that of Comiskey and Mulford (1986) who find that entities deliberately avoided acquiring an interest greater than 20 per cent if an investee appeared more likely to report losses. They argue that equity accounting requirements therefore have real economic consequences. However, the accounting measurement requirement for financial assets during the sample years of Comiskey and Mulford (1986) was to carry these investments at cost. With changes to accounting standards, financial assets are now generally required to be carried at fair value. As a result, the incremental cost of applying equity accounting (and likewise the benefits of avoiding its application) has decreased, as losses of associates are likely to be reflected in both equity accounted carrying amounts and fair values.

Indeed Nobes (2002:41) suggests that investments in associates should be measured at fair value, which does not rely on an arbitrary threshold and is a “more honest” valuation approach. This comment by Nobes (2002) reflects a perception by some of the equity method as an alternative valuation method, as opposed to a simplified form of consolidation. Perhaps because the equity method is sometimes viewed as a valuation method, some prior research has found equity accounted results to be value-relevant. Soonawalla (2006) finds, for example, that equity accounted carrying amounts of both associates and joint ventures are value-relevant in Canada and the United Kingdom. Specifically the study shows that disaggregation of investments in associates and joint ventures provides value-relevant information to equity investors. The findings of Soonawalla (2006) were in contrast to prior research by Graham, King and Morrill (2003) who found that proportionate consolidation of

joint ventures forecast accounting return on equity to a greater degree than equity accounted results of joint ventures do.

Interestingly, Richardson, Roubi and Soonawalla (2012) subsequently find that when Canada decided to remove the equity method option for investments in joint ventures in 1995, the firms forced to switch over to proportionate consolidation suffered a decline in value-relevance in certain balance sheet amounts (such as total assets). This would suggest that equity accounted results have greater decision-usefulness than proportionally consolidated results. Although some of these findings relate to joint ventures, they do highlight that great uncertainty remains around the appropriateness of the equity method as an accounting treatment for significant investments.

For this reason some prior researchers have considered the use of fair values as an alternative measurement base for investments in associates. Fair value measurements are grounded in finance theory, whereby the value of any asset is the present value of its expected future cash flows (Ilmanen, 2011:66). Equity accounted carrying amounts focus on the net asset value of the associate and historical information. By contrast, fair values implicitly incorporate expectations around future cash flows relating to the investment in the associate. As the disclosed fair values of listed associates are based on market prices, market expectations about the future cash flows of the associate are carried forward to the financial report of the investor. In essence, it is these expectations which researchers have predicted to be value-relevant.

An early study that investigates fair values of investments in associates is that of Barth and Clinch (1998). They find that the disclosed fair values of investments in associates were not value-relevant, other than for mining firms, for a sample of Australian firms from 1991 to 1995. Barth and Clinch (1998) also find that the recognised carrying amounts of investments in associates were only value-relevant for mining and financial firms. However, as equity

accounted carrying amounts were only utilised in Australian financial statements from 1998 onwards (Nobes, 2002:26), the Barth and Clinch (1998) study compares fair value measurements with the cost of these investments (and not equity accounted carrying amounts). In this respect it is important that Barth and Clinch (1998) utilise total fair values of investments in associates in their model specifications. Therefore, inferences around the value-relevance of fair values remain applicable. However, it is uncertain whether the value-relevance of disclosed fair values found by Barth and Clinch (1998) has been captured by equity accounted carrying amounts.

A study that gives some insight into this, is that of Graham, Lefanowicz and Petroni (2003) who find that the difference between disclosed fair values and equity accounted carrying amounts of listed associates is value-relevant for a sample of listed United States firms reporting from 1993 to 1997. Similarly the study finds that the equity accounted carrying amounts of associates are value-relevant. Importantly, Graham, Lefanowicz and Petroni (2003) only exclude financial services firms from their sample, implying potentially wider value-relevance than indicated by the Barth and Clinch (1998) study. However, differences in sampling methods, sample periods, model specifications and accounting requirements result in the findings of the two papers not being directly comparable. This leads to some unanswered questions, discussed in further detail below.

Apart from the obvious differences, namely that the studies were performed in different countries with sample periods that do not directly overlap, the Graham, Lefanowicz and Petroni (2003) paper is focused on investigating investments in associates. To this end, their sample only includes firms where investments in listed associates comprise more than one per cent of total assets. As Barth and Clinch (1998) investigate several fair value disclosures, their sample is significantly larger and not targeted to investments in associates. Furthermore, Graham, Lefanowicz and Petroni (2003) investigate the value-relevance of the difference

between disclosed fair values and the equity accounted carrying amounts of investments in associates. As the fair value measurement most likely subsumes at least some information included in the equity accounted carrying amount, this would provide a possible explanation why both were found to be value-relevant. By contrast, although Barth and Clinch (1998) consider total fair value measurements and carrying amounts, such a specification only provides insight into the incremental explanatory power of fair value measurements under circumstances when different accounting requirements applied. Therefore prior research does not provide insight into whether or not fair value measurements may *replace* equity accounted carrying amounts. Instead findings are limited to the effect of differences between the two measurement alternatives and merely offer limited evidence that fair values of listed associates could be value-relevant and therefore a decision-useful disclosure.

The two papers discussed above do suggest, however, that the value-relevance of accounting measurements could change as a result of changes in accounting requirements. In this respect, the harmonisation of accounting requirements across countries due to the growing acceptance of IFRS (Barlev & Haddad, 2007) could affect the value-relevance of accounting measurements. Changes in accounting requirements are not the only factor which could have affected of investments in associates since prior research was performed. Collins, Maydew and Weiss (1997) find that book values are playing an ever greater role in equity valuation, while that of earnings is declining. This suggests that, in contrast to the findings of Barth and Clinch (1998), the fair values of investments in associates should be value-relevant across more industries. Graham, Lefanowicz and Petroni (2003) appear to confirm this, as they only exclude financial firms from their sample, but do not provide insight into whether or not fair values of associates provide alternative, rather than incremental, information to equity investors. The hypothesis of this study is therefore (in null form): the disclosed fair

values of listed associates do not subsume the equity accounted carrying amounts of these associates.

4. Research methodology

The model used in this study is similar to those generally used in value-relevance studies (cf. Barth, 2000), namely a simplified Ohlson (1995) model. This model relates the market value of equity to the book value of equity and net income of the firm and is utilised by prior value-relevance studies investigating various aspects around equity accounted investments (Graham, Lefonawicz & Petroni, 2003; O’Hanlon & Taylor, 2007). However, the hypothesis of this study considers whether or not disclosed fair values of listed associates subsume their equity accounted carrying amounts. Therefore the appropriateness of alternative measurement bases are considered in this hypothesis and the approach is similar to Barth (1991), where the significance of differences in measurement error is the important factor. The following regression is utilised for this purpose:

$$MV_{E_{i,t+3}} = \alpha_0 + \alpha_1 \Sigma Year_{i,t} + \alpha_2 \Sigma CTRY_{i,t} + \beta_1 BV_{Excl_{i,t}} + \beta_2 NI_{i,t} + \beta_3 Neg_{i,t} + \beta_4 ASC_{i,t} + \varepsilon$$

Where:

- MV_E represents the market value of equity three months after reporting date;
- $Year$ represents an indicator variable, set to one if an observation falls into a given sample year and zero otherwise;
- $CTRY$ represents an indicator variable, set to one if an observation falls into a given sample country and zero otherwise;
- BV_{Excl} represents the book value of equity, excluding the equity accounted carrying amount of listed associates, at the reporting date;
- NI represents net income from continuing operations attributable to ordinary shareholders of the reporting entity for the reporting period;

Neg is an indicator variable, set to one if net income from continuing operations attributable to ordinary shareholders is negative and zero otherwise; and *ASC* represents different specifications of the investment in associate at the reporting date. In the first specification, *ASC* represents the equity accounted carrying amount of the listed associate and in the second specification its disclosed fair value. In the third specification, the equity accounted carrying amount of the listed associate and its disclosed fair value are included simultaneously. This requires the inclusion of two variables relating to the associate, namely *ASC_{CA}* for the equity accounted carrying amount of the listed associate and *ASC_{FV}* for its disclosed fair value.

Time is indicated by the subscript *t* and unique firms by the subscript *i*. Following Barth and Clinch (1998), amongst others, all variables, except Year, CTRY and *Neg*, are scaled by number of shares outstanding. Number of shares outstanding has been selected for scaling purposes as Barth and Clinch (2009) show that scaling by number of shares outstanding most reliably compensates for incorrect inferences as a result of scale effects, outperforming scalars such as market capitalisation.

The model is a pooled regression, which includes year and country intercepts to allow for fixed-year and fixed-country effects. The regression is run three times with the different specifications of *ASC* as detailed above. The variable of interest from the model is the error term (ϵ). A significant decrease in ϵ between the model with *ASC* specified as the equity carrying amount of the associate and the model with *ASC* specified as its disclosed fair value, would indicate an increase in both relevance and faithful representation of the economic reality.

However, in order to test the hypothesis and truly determine if fair value represents an alternative (as opposed to an incremental) measurement base, a comparison between the variance in ε of the earlier models and the variance in ε of the model which includes both ASC_{CA} and ASC_{FV} is necessary. A smaller variance in ε in the latter specification would indicate that investors utilise both the equity accounted carrying amount of the associate as well as its disclosed fair value in determining market values for the reporting (i.e. the investing) firm. By implication this reflects the possibility that the equity accounted carrying amount of the associate and its disclosed fair value both serve as inputs in the valuation model of equity investors and not as its result. By contrast an increase in the variance of ε (or a lack of significant change therein) would indicate that the earlier model already includes all material information that equity investors consider when valuing a firm's investment in its listed associate. Because recent evidence suggests that comparison of R^2 s is generally inappropriate (Gu, 2007) the comparison of R^2 s is not considered.

Consistent with prior research findings, the coefficients on BV_{Excl} and NI are predicted to be significantly positive. Because BV_{Excl} excludes the equity accounted carrying amounts of listed associates and prior research finds that book values of associates are positively associated with market value of equity (Soonawalla, 2006), it is predicted that the coefficient on ASC should be positive for the first specification. Because possible inferences from prior research are limited, no predictions are made for the coefficient of ASC in the second and third specifications.

The next section discusses the sample for this study.

5. Sample selection methodology and final sample numbers

Sample firms initially consist of the 250 largest firms listed on the main boards of the Johannesburg Stock Exchange (JSE) in South Africa, the Australian Securities Exchange (ASX) in Australia and the London Stock Exchange (LSE) in the United Kingdom, based on

market capitalisation determined as at 31 December 2011. The sample countries have been selected as they all adopted IFRS as their accounting standards for listed firms in 2005 and have a shared colonial history, which should mitigate some cross-country differences in the application of accounting standards. Remaining cross-country differences are controlled for by the use of indicator variables as discussed in section four. Selecting these sample countries ensures the maximum available sample, as the IFRS adoption date of these countries matches that of the version of IAS 28 utilised in this study, which only became effective for financial years starting on or after 1 January 2005.

Only the largest firms of the various exchanges have been selected for this study, as listed associates tend to be large firms themselves and therefore not within the investment scope of smaller firms. Indeed, in the final sample, more than 90 per cent of sample firms are within the top 150 firms listed on the relevant exchange, as the final sample only includes annual results of firms with investments in listed associates within the sample period of 31 December 2005 to 31 December 2011. Sample firms include loss firms and firms from all industries. However, results are assessed for robustness when certain industries and loss firms are excluded from the sample.

Price data and financial statement data are obtained from Datastream and converted to South African Rands (ZAR) for analysis. Financial statement data is used as per the published financial statements and no attempt is made to compensate for differences in the application of accounting requirements between the different sample countries. Disclosed fair values not available on the database are hand-collected from published financial statements where possible. In isolated cases, sample firms do not disclose the required fair values or do

not distinguish between listed and unlisted associates. For these firms, the fair value of the investment in associate is determined from publically available information².

The final sample numbers are affected by a number of factors. Firstly, some firm-years are lost as sample firms are required to be listed for the whole of each year. In addition, a large number of firms provide inadequate disclosure about their investments in associates in their financial statements and are therefore excluded from the final sample, where this information could not be rectified with reference to other publically available information. An example of such inadequate disclosure is firms who do not distinguish the carrying amounts of associates and joint ventures. These restrictions result in a final sample of 253 firm-years. A reconciliation of sample firm-years is provided in Table 1.

[INSERT TABLE 1 ABOUT HERE]

6. Descriptive statistics and univariate results

Descriptive statistics for sample firm-years are detailed in Table 2. Sample firm-years where the equity accounted carrying amounts and disclosed fair values of listed associates are equal are excluded from sample firm-years for the descriptive statistics and most of the subsequent analyses, as such a situation renders the two alternative measurement bases indistinguishable. Amounts are converted to South African Rand (ZAR) for comparative purposes. Table 2 shows that sample firms are generally large, with a mean market value of ZAR 147 186 million, although the data is skewed, as the median market value is ZAR 39 678 million. A similar situation applies to the book value of equity (excluding the equity accounted carrying amounts of listed associates for the purposes of this study) which has a mean of ZAR 63 736

² As sample firms do not always disclose the exact percentage that they hold in associates, it is not possible to independently recalculate all disclosed fair values. This is further complicated by the fact that shareholdings cannot be verified with reference to associates' financial statements when reporting dates are not the same. For this reason, disclosed fair values are relied upon as far as possible, as the financial statements of all sample firms were audited.

million and a median of ZAR 22 074 million. Of the 253 sample firm-years, 32 represent a firm-year with a net loss from continuing operations. As a result, the net income from continuing operations ranges from a net loss ZAR 8 065 million to net income of ZAR 135 561 million.

[INSERT TABLE 2 ABOUT HERE]

Of greater interest is the mean equity accounted carrying amounts for listed associates of ZAR 6 103 million (median of ZAR 816 million), which differs by more than 200% (20%) from the mean (median) disclosed fair values of these associates of ZAR 13 356 million (ZAR 1 017 million). Without further analysis, the equity accounted carrying amounts and disclosed fair values of listed associates do not appear to be significant in absolute terms for all sample firm-years, as the minimum for both these variables is comparatively close to zero.

A large part of the skew in the initial data, especially on the book value of equity, can be ascribed to the inclusion of financial services firms in the sample. Untabulated results show that removing 58 sample firm-years relating to firms operating in the financial services industry significantly reduces the difference between the mean (ZAR 38 004 million) and median (ZAR 21 403 million) of this variable. However, the impact on the equity accounted carrying amounts and disclosed fair values of listed associates is smaller. Mean (median) equity accounted carrying amounts of listed associates of ZAR 3 676 million (ZAR 748) still reflect differences to disclosed fair values of more than 200% (20%) from the mean (median) disclosed fair values of these associates of ZAR 8 814 (ZAR 932), which differences are similar to those of the total sample.

Elements identified in the descriptive statistics with potential consequences for analyses are addressed in several ways. Skew is dealt with by deleting observations with residuals

more than 2.5 standard deviations above or below the mean, scaling variables by the number of shares outstanding and using autoregression with maximum likelihood estimation. The impact of financial services firms on the skew of different variables is addressed during robustness tests, which exclude these firms. Similarly, the potential impact on results of including sample firm-years with a net loss from continuing operations is assessed with reference to a robustness test which excludes these sample firm-years.

In the sections which follow, the detailed findings from analysing the sample firm-years are discussed. The next section discusses univariate investigations, followed by multivariate analyses and robustness tests thereafter.

7. Univariate investigations

The results of univariate investigations are tabulated in Table 3 with Pearson (Spearman) correlations above (below) the diagonal. Significant univariate correlation between the dependent variable and all independent variables at the one per cent level (using two-tailed significance) is evident from Table 4. Importantly, the equity accounted carrying amounts and the disclosed fair values of listed associates are also significantly correlated at the one per cent level (using two-tailed significance) with a Pearson (Spearman) correlation of 0.573 (0.946). This suggests that the fair value of a listed associate depends on its equity accounted carrying amount to a large extent, which carrying amount essentially represents its net asset value (book value of equity). As a result, the univariate results imply that there is significant duplication between the equity accounted carrying amounts and fair values of listed associates. However, these results are merely suggestive and the conclusions for the hypothesis are based on the results of the multivariate analyses discussed in the section which follows.

[INSERT TABLE 3 ABOUT HERE]

8. Detailed multivariate regression findings

The sample firm-years represent a time series and preliminary Durbin-Watson statistics reveal that significant serial correlation (autocorrelation) is present. Therefore, the reported multivariate regression findings for listed associates are autoregression results from maximum likelihood estimation³. The results of the main multivariate regression findings are detailed in Table 4, where the only difference between the various models relates to the specification of the independent variable *ASC*. In Model 1, *ASC* represents the equity accounted carrying amounts of listed associates; in Model 2, *ASC* represents the disclosed fair values of listed associates and in Model 3, both the equity accounted carrying amounts as well as the disclosed fair values of listed associates are included. As Table 4 shows, book value of equity and net income from continuing operations are significant in all specifications at the one per cent level ($p < 0.001$) and positive as predicted. The indicator variable for firm-years where a loss was suffered (*Neg*) is also significant in all of the specifications at the one per cent level ($p < 0.001$), confirming that investors price loss-firms differently from other firms.

[INSERT TABLE 4 ABOUT HERE]

Turning to the variables of interest, the equity accounted carrying amounts of listed associates are negatively associated with market value of equity in Model 1 (prior research findings predict that it should be positive) but insignificant ($p = 0.241$). However, the equity accounted carrying amounts of listed associates are negative (-1.661) and significant at the one per cent level ($p < 0.001$), once the disclosed fair values of listed associates are also

³ Autoregression with maximum likelihood estimation corrects for serial correlation and, as an added advantage, tends to be less sensitive to the impact of outliers, skewness and heteroskedasticity than ordinary least squares as it is a nonparametric estimation method.

included in the model (Model 3). In contrast, the disclosed fair values of listed associates are positive and significantly associated with market value of equity at the one per cent level in all specifications where they are included ($p < 0.001$). The fact that the coefficients of both the equity accounted carrying amounts and disclosed fair values of listed associates are significant implies that both are value-relevant.

Because the equity accounted carrying amounts of listed associates have the opposite sign to that of their disclosed fair values, there is a preliminary suggestion that equity investors remove equity accounted carrying amounts and replace them with disclosed fair values for valuation purposes. Alternatively, investors could be using information captured by equity accounted carrying amounts to determine an intrinsic value for the investments in listed associates. The negative sign would imply that these intrinsic values were lower than market values during the sample period.

Therefore, in order to determine whether the alternative measurement bases have incremental information content, this study relies on investigating the variance (dispersion) in the error terms (ϵ) of the different models. Gu (2007) shows that it is the dispersion of the error terms which determine the superiority of one model specification over another and not differences in R^2 s.

The first test utilised is the Vuong-test which is appropriate for the comparison of non-nested models (Vuong, 1989). In this study the Vuong-test is based on the unstandardized residuals from the structural portion of the maximum likelihood regression. The Vuong-test focuses on the variance in the error terms (Gu, 2007) and is often utilised in value-relevance research when alternative accounting items are considered (Dechow, 1994; Ashbough & Olsson, 2002; Pouraghajan *et al.*, 2012). Note that the Vuong-test is directional. If the test statistic is significantly positive, the first model is superior to the second model and,

conversely, if the test statistic is significantly negative, the second model is superior to the first model.

[INSERT TABLE 5 ABOUT HERE]

In addition to the Vuong-test the Dispersion-test is performed. This test simply compares the variance of the residuals of differing models using a paired sample ANOVA. Although the simplistic nature of this test, unlike the Vuong-test, does not compensate for the mechanical impact on the error term of increasing the number of independent variables, it should be noted that the three models differ by one independent variable at most. As a result, the results of the Dispersion-test tend to be qualitatively similar to those of the Vuong-test in this study⁴. Therefore, in the interest of brevity, the subsequent discussions focus on the results of the Vuong-test. Importantly, however, both of these tests are appropriate for the comparison of model specifications as they ignore the impact of dispersion in the independent variables, which is the reason that R^2 s should not be compared across models (Gu, 2007). The results of the comparisons of the different models are tabulated in Table 5.

Although the variance in the error term decreases between each successive model, Panel A of Table 5 shows that the variance does not decrease significantly ($p = 0.210$) when specifying *ASC* to be the disclosed fair value of the listed associate (Model 2), rather than the carrying amount thereof (Model 1). Importantly, the variance in the error term does show a decrease significant at the ten per cent level ($p = 0.096$) when both the equity accounted carrying amounts of listed associates and their disclosed fair values are included in the model (Model 3), as opposed to the disclosed fair values alone (Model 2). In addition Panel B of Table 6 shows that the decrease in variance of the error term is significant at the five per cent

⁴ The Dispersion-test, due to its simplistic nature, is easy to understand and has therefore been reported, but it should be noted that this test could be inappropriate where competing models differ by a greater number of independent variables.

level ($p = 0.022$) when disclosed fair values are added to a model (Model 3) where only equity accounted carrying amounts of listed associates had previously been included (Model 1).

Taken together, these findings imply that equity accounted carrying amounts and disclosed fair values of listed associates are incrementally value-relevant. This means that investors do not blindly accept disclosed fair values or equity accounted carrying amounts of listed associates. Rather, investors utilise disclosed fair values as well as equity accounted carrying amounts (or information captured thereby) to develop their own assessment of the intrinsic value of an entity's investments in listed associates. As a result, equity accounted carrying amounts of listed associates are not subsumed by disclosed fair values and it is concluded that each of the alternative measurement bases offer incremental information content.

When potential multi-collinearity is considered, reported VIF-scores are all far below ten. A graphical analysis of the residuals reflects that residuals are not heteroskedastic (confirmed by Q and LM test-statistics) and do not exhibit significant skew, being approximately normally distributed. The maximum likelihood regression effectively corrects for serial correlation with all Durbin-Watson test statistics close to two and above the upper critical value. However, as an additional robustness test to assess the impact of serial correlation and heteroskedasticity (and to consider the impact of cross-sectional correlation) the regression is also run utilising (i) GARCH maximum likelihood estimation, (ii) ordinary least squares estimation with robust standard errors clustered by firm only and (iii) ordinary least squares estimation with robust standard errors clustered by firm and year. Untabulated results of all methods are qualitatively unchanged from those reported above. Results suggest that influential observations have been effectively eliminated by the deletion of outlying

observations with studentised residuals greater than 2.5, as Cook's distance for all observations are far below one.

In the section which follows, the main findings are assessed for robustness, by considering alternative sample selection methodologies and model specifications.

9. Results of robustness tests

In this section the results of various robustness tests are detailed. The robustness tests are grouped into subsections according to the elements which they address to facilitate the discussion process.

9.1. Using market value of equity at reporting date

The main multivariate regression results utilise market value of equity three months after reporting date as the dependent variable, as this allows for the dissemination of financial reporting information to equity markets. However, the regression is also run using the market value of equity at reporting date as the dependent variable while the independent variables continue to be specified as at reporting date. Untabulated results show that, in this specification, the equity accounted carrying amounts of listed associates remain negative in Model 1, but is now significant at the one per cent level ($p = 0.009$). Results for all of the other variables and models remain qualitatively unchanged. When the variance in error terms between models are compared, Model 2 remains an insignificant improvement on Model 1 ($p = 0.473$). The variance in the error term of Model 3 remains a significant improvement on Model 2, but now at the five per cent level ($p = 0.034$). Likewise, Model 3 remains a significant improvement on Model 1, albeit at the ten per cent level ($p = 0.057$).

In summary, specifying the dependent variable to be the market value of equity at reporting date, rather than three months thereafter, does not impact on inferences. Although some minor differences are noted, the main inference that the equity accounted carrying

amounts and the disclosed fair values of listed associates are incrementally value-relevant remains.

9.2. Excluding loss firm-years and certain industries

The main multivariate model compensates for the fact that firms with a loss from continuing operations are priced differently from other firms through the use of an indicator variable and includes firm-years in the financial services, mining and utility industries. As these factors may have a significant impact on inferences, the regression is also run excluding these firm-years. Financial firms are excluded as the descriptive statistics show that they induce skew into the data. An analysis excluding mining firms appears warranted as Barth and Clinch (1998) find that fair values of investments in associates are only value-relevant in this industry. Utility firms are excluded for this robustness test due to their heavy regulatory burden. Untabulated results are qualitatively unchanged from those of the main regression for each of the models when these adjustments are made.

When the variance in error terms (ϵ) of the various specifications is compared, inferences are generally unchanged from those of the main regression. The first difference is a slight loss of significance when Models 2 and 3 are compared for the Dispersion-test ($p = 0.106$), although the results for the Vuong-test are still significant at the ten per cent level ($p = 0.056$). The second difference is that the decrease in the variance of the error term is now significant at the one per cent level for the Vuong-test when Models 1 and 3 are compared ($p = 0.008$), although the significance for the Dispersion-test remains at the five per cent level ($p = 0.049$). As a result, findings are consistent with those reported earlier, namely that the alternative measurement bases contain incremental information content.

9.3. Including firm-years where equity accounted carrying amounts and disclosed fair values are equal

Firm-years where the equity accounted carrying amounts and disclosed fair values are equal have been excluded from the sample for the main regression, as the two alternative measurement bases are indistinguishable for these firm-years. Note that these investments in associates are not measured at fair value. The main reasons that the disclosed fair values happen to be equal to the equity accounted carrying amounts are acquisitions of listed associates close to reporting date (investments in associates are initially recognised at fair value) and impairment losses on equity accounted associates (the recoverable amount of an associate is the higher of fair value less costs of disposal and its value in use). The robustness test in this subsection investigates the impact on inferences resulting from the inclusion of these firm-years in the sample. There are 15 sample firm-years where equity accounted carrying amounts and disclosed fair values are equal, and the resultant number of firm-years in the sample increases to 259 (from 245 in the main regression) once observations with residuals more than 2.5 standard deviations above or below the mean have been deleted.

Untabulated results reveal that regression results for all of the models are qualitatively unchanged from those of the main regressions in all respects. When the variances in the error terms (ϵ) of the various models are considered, the decrease in variance in the error term between Models 2 and 3 is now only mildly significant ($p = 0.110$). However, the decrease in the variance of the error term between Models 1 and 3 is qualitatively unchanged and remains significant at the five per cent level ($p = 0.019$). Likewise, the decrease in the variance of the error term achieved by including the disclosed fair value of listed associates (Model 2) rather than their equity accounted carrying amounts (Model 1) remains insignificant ($p = 0.181$). Consequently the inferences are consistent with those of the main investigations, namely that

investors utilise both equity accounted carrying amounts as well as the disclosed fair values of listed associates when they value the reporting firm's investments in listed associates.

9.4. Comparisons to prior research findings

Generally the findings of this study are consistent with those of prior research. For example, the coefficients of the book value of equity and net income from continuing operations were significant in the directions predicted by prior research. A significant exception is the equity accounted carrying amounts of listed associates. In contrast to prior research, which finds this to be positively associated with market value of equity, in this study the coefficient has been negative in the main regression and all of the robustness tests. Although previous robustness tests have indicated that the negative coefficient is not due to the inclusion of firms with a loss from continuing operations or the inclusion of financial services, mining or utility firms, two other possible explanations for the difference with prior research are considered in this subsection.

As the paper of Graham, Lefanowicz and Petroni (2003) is related to this study, differences in the sampling methods between the two studies are considered. Graham, Lefanowicz and Petroni (2003) limit their sample firm-years to those where the equity accounted carrying amounts of listed associates are more likely to be significant, by selecting only those firm-years where equity accounted carrying amounts represent at least one per cent of total assets. Therefore, to facilitate comparison with prior research, the model is regressed utilising similar sample requirements. As Graham, Lefanowicz and Petroni (2003) also exclude financial services firms from their sample, the same requirement is applied to the robustness test⁵.

⁵ Graham, Lefanowicz and Petroni (2003) do not specify whether they exclude loss firm-years from their sample. However, as previous robustness tests have shown that the negative coefficient for the equity accounted carrying amounts is not due to the presence of loss firm-years, they are retained for the purposes of the current regression.

Untabulated regression results are qualitatively similar to those reported earlier and the coefficient for the equity accounted carrying amounts of listed associates remains negative. The only noteworthy difference with the main regression results is that this negative coefficient is now also significant in Model 1 at the one per cent level ($p < 0.001$). Comparisons of the variance in error terms (ϵ) of the various models also yield results generally consistent with those of the main regression findings. Firstly, the decrease in the variance in error terms between Model 1 and 2 remains insignificant ($p = 0.810$). Secondly Model 3 remains a significant improvement on Model 2, although now at the one per cent level ($p = 0.003$), as well as a significant improvement on Model 1, although now at the ten per cent level ($p = 0.055$). Consequently both the equity accounted carrying amounts and the disclosed fair values of listed associates remain incrementally value-relevant in this robustness test.

As a final robustness test, in order to determine whether or not the negative coefficient for the equity accounted carrying amounts of listed associates is due to model specification, the main model is regressed using the model specification of Graham, Lefanowicz and Petroni (2003) as well as their sampling method. This model uses the equity accounted carrying amounts of listed associates and the difference between their disclosed fair values and equity accounted carrying amounts as the independent variables. The results of this robustness test are tabulated in Table 6. Importantly, the equity accounted carrying amounts of listed associates remain negative (-1.806) and significant at the one per cent level ($p < 0.001$). However, consistent with the findings of Graham, Lefanowicz and Petroni (2003), the difference between the disclosed fair values and the equity accounted carryings amounts is positive (0.756) and significant at the one per cent level ($p < 0.001$). Consequently it is concluded that the negative sign on the coefficient for equity accounted carrying amounts of listed associates in this study is not due to model specification.

However, another factor to consider is that the sample period straddles the global financial crisis from 2007-2008. As the equity accounted carrying amounts essentially capture accounting information of the associates, the negative coefficient may therefore reflect investor scepticism during this period. In other words, because the financial crisis shook investors' faith in market valuations, intrinsic values, based on accounting information of associates, were lower than fair values (market values) during this period. However, further research is necessary to determine whether intrinsic values are chronically lower than fair values or whether more normalised economic circumstances eliminates this discount.

[INSERT TABLE 6 ABOUT HERE]

10. Summary and conclusion

This study finds that both measurement bases for listed associates, namely the equity accounted carrying amounts and disclosed fair values, are value-relevant as well as incrementally value-relevant. This means that investors do not use either measurement base directly for valuation purposes. Therefore both disclosed fair values of listed associates, which are based on objective and publically available market values, and equity accounted carrying amounts, which are based on historical accounting information, contain information which investors use to determine an intrinsic value of the reporting firm's investments in associates.

This paper contributes to the existing literature by considering incremental value-relevance, as prior research on disclosed fair values of associates (Barth & Clinch, 1998; Graham, Lefanowicz, & Petroni, 2003) only considered individual value-relevance. In addition, prior research results were conducted in countries and during time periods when accounting requirements were not uniform and findings were therefore not generalisable to

current circumstances. Findings of this study also support current accounting standards, which require equity accounting of listed associates with disclosure of their fair values.

This study contributes to the literature surrounding the use of fair values in financial reporting by considering the value-relevance of disclosed fair values of listed associates and their equity accounted carrying amounts. The importance of the contribution is that investigations focus not only on the value-relevance of the alternative measurement bases, but also on whether the information content of disclosed fair values are sufficient to replace equity accounted carrying amounts. Therefore the study also contributes to the disclosure versus recognition debate. It sheds light on whether or not an amount, merely disclosed (i.e. fair values), may come to replace its recognised counterpart (i.e. equity accounted carrying amounts).

This paper will be of interest to those involved in the fair value accounting debate, as it shows that fair values do not necessarily contain all information that investors use to value investments. Those involved in the disclosure versus recognition debate will also be interested in the findings of this paper, as they show that disclosed information is incorporated into the valuations of equity investors.

However, the results of this paper use a sample selected from the 250 largest firms listed in South Africa, Australia and the United Kingdom. Conclusions can therefore only be generalised to larger firms with listed associates reporting under International Financial Reporting Standards (IFRS). Future researchers may therefore wish to investigate whether the results apply equally to investments in other equity accounted investees for which some firms voluntarily disclose fair values. In addition, future research could investigate whether results in this study are applicable to the valuation of smaller firms.

References

- Ashbough, H. & Olsson, P., 2002. An exploratory study of the valuation properties of cross-listed firms' IAS and US GAAP earnings and book values. *Accounting Review*, 77(1): 107-126.
- Barlev, B. & Haddad, J.R., 2007. Harmonisation, comparability and fair value accounting. *Journal of Accounting, Auditing and Finance*, 22(3): 493-509.
- Barth, M.E., 1991. Relative measurement errors among alternative pension asset and liability measures. *Accounting Review*, 66(3):433-463.
- Barth, M.E., 2000. Valuation-based accounting research: implications for financial reporting and opportunities for future research. *Accounting and Finance*, 40: 7-31.
- Barth, M.E., Clement, M.B., Foster, G. & Kaznik, R., 1998. Brand values and capital market valuation. *Review of Accounting Studies*, 3: 41-68.
- Barth, M.E. & Clinch, G., 1998. Revalued financial, tangible and intangible assets: associations with share prices and non-market-based value estimates. *Journal of Accounting Research*, 36: 199-233.
- Barth, M.E. & Clinch, G., 2009. Scale effects in capital markets-based accounting research. *Journal of Business Finance and Accounting*, 36(3) & (4): 253-288.
- Collins, D.W., Maydew, E.L. & Weiss, I.S., 1997. Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics*, 24: 39-67.
- Comiskey, E.E. & Mulford, C.W., 1986. Investment decisions and the equity accounting standard. *Accounting Review*, 61(3): 519-525.
- Dechow, Patricia M., 1994. Accounting earnings and cash flows as measures of firm performance: the role of accounting accruals. *Journal of Accounting and Economics*, 18:3-42.
- Graham, R.C., King, R.D. & Morrill, C.K.J., 2003. Decision usefulness of alternative joint venture reporting methods. *Accounting Horizons*, 17(3): 123-137.
- Graham, R.C., Lefanowicz, C.E. & Petroni, K.R., 2003. The value-relevance of equity method fair value disclosures. *Journal of Business Finance and Accounting*, 30(7) & (8): 1065-1088.
- Gu, Z., 2007. Across-sample incomparability of R²s and additional evidence on value-relevance changes over time. *Journal of Business Finance and Accounting*, 34(7) & (8): 1073-1098.

- Ilmanen, A., 2011. *Expected returns: An investor's guide to harvesting market rewards*. Chichester. John Wiley & Sons Ltd.
- International Accounting Standards Board, 2003. *Investments in associates*. December, London. IFRS Foundation.
- International Accounting Standards Board, 2010. *Conceptual framework for financial reporting*. September. London. IFRS Foundation.
- International Accounting Standards Board, 2011. *Investments in associates and joint ventures*. May. London. IFRS Foundation.
- Nobes, C., 2002. An analysis of the international development of the equity method. *Abacus*, 38(1): 16-45.
- O'Hanlon, J. & Taylor, P., 2007. The value-relevance of disclosures of liabilities of equity accounted investees: UK evidence. *Accounting and Business Research*, 37(4): 267-284.
- Ohlson, J., 1995. Earnings, book values and dividends in security valuation. *Contemporary Accounting Research* (Spring): 661-687.
- Pouraghajan, A., Emamgholipour, M., Niazi, F. & Samakosh, A., 2012. Information content of earnings and operating cash flows: evidence from the Tehran stock exchange. *International Journal of Economics and Finance*, 4(7): 41-51.
- Richardson, A.W., Roubi, R.R. & Soonawalla, K., 2012. Decline in financial reporting for joint ventures? Canadian evidence on removal of financial reporting choice. *European Accounting Review*, 21(2): 373-393.
- Rutterford, J., 2004. From dividend yield to discounted cash flow: a history of UK and US equity valuation techniques. *Accounting, Business & Financial History*, 14(2): 115-149.
- Soonawalla, K., 2006. Accounting for joint ventures and associates in Canada, UK, and US: do US rules hide information? *Journal of Business Finance and Accounting*, 33(3) & (4): 395-417.
- Vuong, Q.H., 1989. Likelihood ratio tests for model selection and non-nested hypotheses. *Econometrica*, 57(2): 307-333.

Table 1: Reconciliation of sample firm-years

	South Africa	Australia	United Kingdom	Total
Number of firm-years listed for full year	1 328	1 472	1 354	4 154
No investment in associate	(650)	(800)	(881)	(2 331)
No investment in a listed associate	(384)	(194)	(167)	(745)
Incomplete disclosure in the financial statements	(154)	(362)	(206)	(722)
Investments in associates carried at fair value	(15)	(2)	(10)	(27)
Financial statements not available	-	(30)	(6)	(36)
Other	(35)	(5)	-	(40)
Sample firm-years for the study	<u>90</u>	<u>79</u>	<u>84</u>	<u>253</u>

Table 2: Descriptive statistics

	N	Mean ZAR million	Median ZAR million	Standard Deviation ZAR million	Minimum ZAR million	Maximum ZAR million
MV _E	253	147 186	39 678	265 346	288	1 590 911
BV _{Excl}	253	63 736	22 074	155 245	-31 585	1 141 598
NI	253	9 662	2 730	19 389	-8 065	135 561
ASC _{CA}	253	6 103	816	17 012	0	135 918
ASC _{FV}	253	13 356	1 017	38 079	3	267 401
MV _E	Market value of equity, three months after reporting date					
BV _{Excl}	Book value of equity, excluding the equity accounted carrying amounts of listed associates					
NI	Net income from continuing operations, attributable to ordinary shareholders of the parent					
ASC _{CA}	Equity accounted carrying amounts of the listed associates					
ASC _{FV}	Disclosed fair values of the listed associates					

Table 3: Univariate correlations

	MV_E	BV_{Excl}	NI	ASC_{CA}	ASC_{FV}
MV _E		***0.663 (<0.001)	***0.736 (<0.001)	**0.156 (0.013)	***0.281 (<0.001)
BV _{Excl}	***0.823 (<0.001)		***0.643 (<0.001)	**0.134 (0.033)	**0.140 (0.026)
NI	***0.779 (<0.001)	***0.686 (<0.001)		***0.344 (<0.001)	***0.279 (<0.001)
ASC _{CA}	***0.491 (<0.001)	***0.433 (<0.001)	***0.483 (<0.001)		***0.573 (<0.001)
ASC _{FV}	***0.556 (<0.001)	***0.445 (<0.001)	***0.573 (<0.001)	***0.946 (<0.001)	
N	253				
MV _E	Market value of equity, three months after reporting date				
BV _{Excl}	Book value of equity, excluding the equity accounted carrying amounts of listed associates				
NI	Net income from continuing operations, attributable to ordinary shareholders of the parent				
ASC _{CA}	Equity accounted carrying amounts of the listed associates				
ASC _{FV}	Disclosed fair values of the listed associates				
	** Significant at the 5% level		*** Significant at the 1% level		
	(p-values for 2-tailed significance are indicated within the brackets)				

Table 4: Regression findings

$MV_E = \alpha_0 + \alpha_1 \Sigma Year + \alpha_2 \Sigma CTRY + \beta_1 BV_{Excl} + \beta_2 NI + \beta_3 Neg + \beta_4 ASC + \varepsilon$				
	Predicted Sign	Model 1	Model 2	Model 3
BV _{Excl}	+	***0.717 (<0.001)	***0.781 (<0.001)	***0.696 (<0.001)
NI	+	***10.273 (<0.001)	***8.600 (<0.001)	***9.719 (<0.001)
Neg	+ / -	***44.431 (<0.001)	***40.116 (<0.001)	***42.408 (<0.001)
ASC _{CA}	+ / -	-0.369 (0.241)		***-1.661 (<0.001)
ASC _{FV}	+ / -		***0.613 (<0.001)	***0.895 (<0.001)
N		245	245	245
Structural R ²		74.1%	77.5%	79.9%
MV _E	Market value of equity, three months after reporting date			
BV _{Excl}	Book value of equity, excluding the equity accounted carrying amounts of listed associates			
NI	Net income from continuing operations, attributable to ordinary shareholders of the parent			
ASC _{CA}	Equity accounted carrying amounts of the listed associates			
ASC _{FV}	Disclosed fair values of the listed associates			
Neg	Indicator variable set to one if a firm-year reflects a loss from continuing operations and zero otherwise			
	* Significant at the 10% level	** Significant at the 5% level	*** Significant at the 1% level	
	(Autoregression maximum likelihood p-values for 2-tailed significance are indicated within the brackets)			

Table 5: Comparison of the regression findings

$MV_E = \alpha_0 + \alpha_1 \Sigma Year + \alpha_2 \Sigma CTRY + \beta_1 BV_{Excl} + \beta_2 NI + \beta_3 Neg + \beta_4 ASC + \varepsilon$				
<i>Panel A: Comparison of successive models</i>				
	N	Mean sum of squares of residual	Dispersion-test (t-statistic)	Vuong-test (t-statistic)
Model 1	245	2 106		
Model 2	245	1 825	-1.237 (0.217)	-1.258 (0.210)
Model 3	245	1 633	*-1.650 (0.100)	*-1.673 (0.096)
<i>Panel B: Comparison of model 1 and 3</i>				
	N	Mean sum of squares of residual	Dispersion-test (t-statistic)	Vuong-test (t-statistic)
Model 1	245	2 106		
Model 3	245	1 633	**-2.226 (0.027)	**-2.305 (0.022)
Model 1	ASC represents the equity accounted carrying amounts of the listed associates			
Model 2	ASC represents the disclosed fair values of the listed associates			
Model 3	ASC represents two variables, namely the disclosed fair values and equity accounted carrying amounts of listed associates			
<i>The Dispersion-test assesses the significance of changes in the variance of the error term (ε) using unstandardized residuals from each model in a paired sample ANOVA.</i>				
<i>The Vuong-test (Vuong, 1989) is directional. Positive test statistics indicate that the first model is superior to the second model, while negative test statistics indicate that the second model is superior to the first model.</i>				
* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level (p-values for 2-tailed significance are indicated within the brackets)				

Table 6: Regression findings using the model specification of prior research

$MV_E = \alpha_0 + \alpha_1 \Sigma Year + \alpha_2 \Sigma CTRY + \beta_1 BV_{Excl} + \beta_2 NI + \beta_3 Neg + \beta_4 CA + \beta_5 Diff + \varepsilon$		
	Predicted sign	
BV _{Excl}	+	***1.104 (<0.001)
NI	+	***11.435 (<0.001)
Neg	+ / -	***44.029 (0.001)
CA	+ / -	***-1.806 (<0.001)
Diff	+ / -	***0.756 (<0.001)
N		114
Structural R ²		87.6%
MV _E	Market value of equity, three months after reporting date	
BV _{Excl}	Book value of equity, excluding the equity accounted carrying amounts of listed associates	
NI	Net income from continuing operations, attributable to ordinary shareholders of the parent	
CA	Equity accounted carrying amounts of listed associates	
Diff	Difference between disclosed fair values of listed associates and equity accounted carrying amounts	
	** Significant at the 5% level	*** Significant at the 1% level
	(Autoregression maximum likelihood p-values for 2-tailed significance are indicated within the brackets)	