
J.L. BIRT*
C.M. BILSON**
T. SMITH**
R.E. WHALEY***

OWNERSHIP, COMPETITION, AND FINANCIAL DISCLOSURE

Abstract

Empirical research on firms' (dis)incentives to disclose investigates the effects of a range of variables including information asymmetry, agency costs, political costs, and proprietary costs. Verrecchia (2001) argues that economic-based models of disclosure must establish a link between financial reporting and its economic consequences. In response to Verrecchia (2001) and drawing on the industrial organization and strategic management disciplines we introduce a new variable (measuring insider ownership and industry competition) which links both the internal and external environments of the firm and demonstrate that it adds to our understanding of discretionary financial disclosure decisions. We test the model by examining voluntary segment disclosures in Australian firms. We find that our new variable linking the internal and external environment of the firm, alongside previously tested variables including ownership diffusion, return and size is significant. We conduct a series of robustness tests on our model and find that the significance of the model is robust to the inclusion of variables measuring the change in standard, acquisitions and disposals and cross listing on the US stock exchange.

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*School of Business and Information Management, Australian National University, ** School of Finance and Applied Statistics, Australian National University, and Fuqua School of Business, Duke University. Comments by Mike Bradbury, Robert Faff, Bruce Grundy, John Handley, Paul de Lange, Gordon Richardson, as well as seminar participants at Monash University, the University of Melbourne Finance Seminar Series, UNITEC seminar series, the 2003 AGSM Accounting and Finance Research Camp in Sydney and the 2003 AFAANZ conference in Brisbane are gratefully acknowledged. Petra Fleischer provided valuable assistance in data collection.

OWNERSHIP, COMPETITION, AND FINANCIAL DISCLOSURE

1. Introduction

Verrecchia (2001) categorizes disclosure research into three broad groups—association-based, discretionary-based, and efficiency-based. Association-based research investigates the relation between exogenous disclosure and change in investors' individual actions. Discretionary-based research investigates how firms use their discretion regarding information that does not require mandatory disclosure. Efficiency-based research examines unconditional disclosure choices characterized by endogenous consumers. Discretionary-based research models the firm's incentives or disincentives to disclose as a function of a range of variables including information asymmetry, agency costs, political costs, and proprietary costs.¹ Verrecchia argues that these models of disclosure must establish a link between financial reporting and its economic consequences. While previous studies find significant relations between discretionary disclosures and variables such as size and leverage², no study identifies a variable that enhances existing disclosure models and links financial reporting and its economic consequences.

In response to Verrecchia's call for an economic-based argument for financial reporting we examine the industrial organisation and strategic management literature which suggests a new variable involving the internal and external environment of the firm. Both Tirole's *The Theory of Industrial Organization* (1990) and Schmalensee and Willig's *The Handbook of Industrial Organisation* (1989) discuss the nature and role of competitive strategy which can be applied to the internal organization of the firm, for instance the effect of incentives within the firm on achieving competitive advantages. Porter (1981) adds that a successful firm must match its internal and external environment and further, a firm's performance depends critically on the characteristics of the industry environment in which it operates. In the early 1990s, an entire special issue of the *Strategic Management Journal* (Vol, 12, 1991) examines the relationship between strategic management and economics and indicates areas for future research utilising the linkage between the two disciplines. Further, Saloner (1991) adds that issues, intersecting the internal environment and the external environment are a growth area in economics. The external environment including

factors such as competition, combined with internal factors such as incentive schemes are important inputs to a firm's decision making approach.

This study, will investigate whether a new variable representing the internal and external environments, combined with previously examined variables in the voluntary disclosure literature (see Chow and Wong-Boren, 1987, Street and Gray, 2001, Mitchell et al, 1995) enhances the ability of the model to explain voluntary disclosure. The variable *IOHI* will measure the inside ownership of the firm combined with the level of industry competition of the firm. We focus on voluntary segment disclosures because they have been found to be value relevant in forecasting sales and profits.³ Our empirical analyses focus on firm's segment disclosures for 2001 under the original Australian Accounting Standards Board (AASB) standard and for 2002/2003 under the revised standard. This unique regulatory background featuring a change in segment reporting standard provides us with an additional test of robustness for the model featuring our *IOHI* variable.

Previous disclosure studies have found significant results for variables originating from agency, political cost, information asymmetry and proprietary cost theories. Studies such as Berger and Hann (2002) and Harris (1998), for example, examine the impact of competition on disclosure, and Nagar *et al* (2003) examine the impact of ownership structure on disclosure. We acknowledge these findings and construct a disclosure model incorporating existing variables and our new variable *IOHI*. Our strong results demonstrate that the *IOHI* variable does in fact enhance the ability of the model explaining voluntary disclosure. We conduct a series of robustness tests on our *IOHI* variable and find that the significance of the *IOHI* variable is robust to the inclusion of variables measuring the change in standard, acquisitions and disposals of other firms and cross listing on the US stock exchange.

A greater understanding of the incentives to disclose financial information is timely as jurisdictions worldwide are currently undergoing international harmonization projects with accounting standards which will result in changes to disclosure practices. Australia is moving towards adopting the International Accounting Standard Board's (IASB) International Financial Reporting Standards (IFRS) by 2005, and the Financial Accounting

Standards Board is currently committed to a project with the IASB to harmonize their standards.

The remainder of the paper is organized as follows. Section 2 outlines the institutional setting of AASB 1005 *Segment Reporting*. Section 3 summarizes the main hypotheses regarding discretionary disclosures. Section 4 outlines our model specification, and Section 5 describes the empirical measures and sample selection, and provides descriptive statistics. Section 6 reports the results of our empirical tests. Section 7 contains a discussion of the robustness tests, and Section 8 describes the main conclusions and suggests avenues for future research.

2. Institutional setting

Segment reporting refers to the disclosure of results from operating in markets with different rates of profit, different degrees of risk, and different opportunities for growth. Previous research has shown that segment reporting disclosures are useful for investment decision-making as the disaggregated industry and geographic segment data can provide analysts and other users with additional information to appraise the different markets in which the company operates (Kochanek, 1974, Aitken, Czernkowski and Hooper, 1994). Local and international standards require the disclosure of information regarding business and geographic segments. The Australian Accounting Standards Board (AASB) has released two standards on segment reporting: AASB 1005 *Financial Reporting by Segments* and the revised AASB 1005 *Segment Reporting*. The current U.S. standard is SFAS 131 *Reporting Disaggregated Information about a Business Enterprise*, and the current international standard is IAS 14 *Segment Reporting*.

2.1 Segment Reporting Standards in Australia

Australia's original segment standard AASB 1005 *Financial Reporting by Segments* was released in 1986 and required firms to disclose segment revenue, segment result, and the carrying amount of segment assets for both industry and geographical segments. In August 2000, the AASB issued the revised standard AASB 1005 *Segment Reporting* whereby firms are required to identify their segments in line with their internal organizational structure and internal reporting system. This approach, known as the "management approach"⁴, differs markedly from the original "industry approach". The

revised standard also allows firms to choose whether line of business (LOB) or geographic area (GEO) will be a primary or a secondary segment disclosure.⁵ The required disclosures for primary segments are much more extensive than for secondary segments. The standard stipulates that firms' must disclose segment revenue, segment profit, segment assets, segment liabilities, acquisition of segment assets, depreciation and amortization of segment assets, other non-cash segment expenses, segment share of the net profit/result of associates or other investees and segment carrying amount of investments in the associates. The revised standard also encourages voluntary disclosure of additional information such as segment cash flows and segment non-cash revenues.. For secondary segments, the standard requires disclosure of segment revenues, the carrying amount of assets and the cost of property, plant and equipment, and intangible assets acquired during the period. A segment's profit is not a required disclosure for secondary segments, under the revised AASB 1005.

2.3 *International Harmonization of Segment Standards*

In recent years, there has been a trend towards increasing comparability in global financial reports. The International Accounting Standards Board (IASB) is currently working on the implementation of the International Financial Reporting Standards (IFRS) with the aim to develop uniform, high quality financial reports. By 2005, companies listed in Australia, New Zealand, and any European Union country will fully adopt the IFRS of the IASB. While the U.S. is not adopting IFRS, it is an important partner to the IASB and is working on projects to reduce the differences in FASB and IASB standards. The implementation of IFRS and the harmonization of standards internationally will have repercussions for companies in the preparation and presentation of financial reports.

3. Theoretical framework

Positive accounting theory deals with managements' motives in making accounting choices. Within this framework, disclosure research focuses on the role of capital market incentives in the firm's disclosure decisions. Verrecchia (2001) categorizes disclosure research into three broad groups. First, "association-based" research investigates the relation between exogenous disclosure and the change in investors' individual actions. Second, "discretionary-based" research investigates how

firms use their discretion in revealing information when reporting is not mandated. Third, “efficiency-based” research examines unconditional disclosure choices characterized by endogenous consumers.

Discretionary-based disclosure research considers the incentives and disincentives for disclosing additional financial information in a capital market setting. Incentives include; mitigating the affects of information asymmetry, decreasing potential political costs and monitoring agents and therefore reducing agency costs. A disincentive for disclosing additional financial information would be the potential proprietary costs associated with the disclosure of information. A number of hypotheses have been tested. Table 1 summarizes past research in terms of hypotheses tested and test results.

3.1 Information Asymmetry Hypothesis

Informational asymmetry impedes efficient allocation of resources. It arises when markets do not perfectly aggregate private information, and can lead to higher transaction costs, lower liquidity, and, ultimately, mis-pricing of the firm’s shares. The effects of information asymmetry can be mitigated in a number of ways, including contracting, regulation, and the work of information intermediaries. Accounting disclosures are also a means of disseminating information to less well-informed parties. Several studies have examined the role of information asymmetry proxies and the presence of voluntary disclosures. Botosan (1997), for example, examines analyst following as a proxy for information asymmetry and finds that firms with lower analyst following have a propensity for higher disclosure and consequently experience a reduction in their costs of capital. For firms with higher analyst following, she finds no significant relation. Previous studies have also found size to be associated with the level of information asymmetry. Atiase (1985), Bamber (1987) and Diamond and Verrecchia (1991) find that stock prices incorporate information about larger firms earlier than smaller firms. King, Pownall and Waymire (1990) predict that disclosure will increase with firm size as the incentives for disclosure are greater for larger firms. Studies have also investigated the association between ownership and information asymmetry. Healy, Hutton and Palepu (1999) use the variable institutional ownership and find a link between increased disclosure and higher percentages of

institutional ownership. Jiambalvo, Rajgopal and Venkatachalam (2002) find that in cases where firms' have high percentages of institutional ownership, their current earnings are more likely to reflect future earnings. These findings are further supported by studies which have used the variable diffused ownership (Mitchell et al 1995, Aitken et al 1997) and have concluded that an increasing percentage of significant owners is positively associated with voluntary disclosures.

3.2 Political Costs

Political costs may also explain discretionary disclosure decisions. Belkaoui and Karpik (1989) find that firms employ a number of devices (including discretionary disclosures) to avoid the attention of external parties such as government regulators, suppliers, and unions.⁶ Deegan and Gordon (1996) find that firms that are politically more visible to the market increase disclosures as a means of mitigating potential political costs. One inherent problem with the political cost studies, however, is that it is often difficult to distinguish the political cost hypothesis from other disclosure theories. These studies also use the variable firm size as a proxy to measure for political costs.

3.3 Agency Costs

Agency costs arise when principals and agents have conflicting incentives.⁷ As a means of mitigating divergent interests, principals may use different incentives to monitor their agents. The possibilities include performance-based contracts, bonus share plans, debt covenants, audit committees, as well as increased disclosure. Past investigations document that firm characteristics such as firm size, leverage and fixed assets in place affect voluntary disclosures by influencing the degree of agency and contracting costs experienced by the firm (Bradbury, 1991, Chow and Wong-Boren, 1987). In their review of fourteen accounting choice studies, Holthausen and Leftwich (1983), find support for the variables firm size and leverage.

Several segment disclosure choice studies support the Holthausen and Leftwich findings. Foster (1986) notes that firm size is the most commonly-used control variable

in disclosure studies and in segment disclosure studies it has also been a significant variable (McKinnon and Dalimunthe 1993, Bradbury 1992, Berger and Hann 2002). Studies have also reported a positive association between disclosure and being audited by an international auditing firm. Street and Gray (2001) argues that a “big four or five” auditor encourages firms to be forthcoming in their disclosures as part of the monitoring process associated with reducing agency costs. Prior research has suggested an association between the proportion of fixed assets in place and voluntary disclosure. Firms exhibiting large proportions of fixed assets in place are expected to experience lower agency costs (Bradbury, 1992, Chow and Wong-Boren, 1987) and consequently will have less incentive to voluntarily disclose.

Studies have also examined the relationship between ownership structure and disclosure, examining variables such as directors’ shareholdings and CEO remuneration. Jensen and Meckling (1976) argue that agency costs increase with the proportion of outside capital. Nagar *et al* (2003) investigate the relation between disclosures and the level of CEO share ownership and stock performance remuneration, and find a positive relation between disclosure and CEO ownership. In firm performance studies, insider ownership plays an important, albeit empirically ambiguous, role. Berle and Means (1932), for example, find an inverse correlation between ownership and firm performance. Demsetz (1983), on the other hand, argues there should be no relation between variation in ownership and firm performance because the ownership structure of a firm is a multidimensional variable and should be seen as an endogenous outcome of decisions that reflect the influence of shareholders. A recent study by Leung and Horwitz (2004) investigates voluntary segment reporting in Hong Kong firms and finds that voluntary segment disclosure decreases when the level of insider ownership increases above 25% of the total shares. The agency problem transfers from a conflict between principals and agents to a conflict between the controlling and minority shareholders.

3.4 *Proprietary Costs*

The discretionary disclosure literature also considers theories that explain a firm’s decision not to disclose. Dye (2001) takes the position that, if disclosure is discretionary,

firms will release favorable information and choose not to disclose unfavorable information.⁸ Verrecchia (2001) considers the role of proprietary costs in explaining a firm's decision to withhold the release of additional information. Proprietary costs arise when private information, if released, may harm the firm's competitive position.

Segment information is important to users of financial reports. Firm operations can vary significantly across line of business and geographic segments, and firm segments vary according to the rates of profit, levels of risk, and opportunities for growth. Segment disclosures contain value relevant information that may help investors and analysts predict future profits and revenues. At the same time, segment disclosure information may be useful to external (potentially adversarial) parties such as suppliers, employees, unions and competitors. Consequently, management must exercise discretion by taking into consideration the impact of the release of potentially harmful information to the market before disclosing it.

In determining an appropriate level of disclosure, firms will therefore consider factors such as the competitiveness of the industry in which they operate. The empirical evidence regarding the relation between competition and disclosure is mixed. On one hand, Verrecchia (1983) and Wagenhofer (1990) find that firms in more competitive industries provide less informative disclosures. On the other, some studies find that firms in less competitive industries provide less informative disclosures. Harris (1998) finds that operations in less competitive industries are less likely to be reported as industry segments. This suggests that managers attempt to conceal information that may allow rival firms to capture these profits. Hayes and Lundholm (1996), finds that a firm disaggregates consolidated information into segment information in a highly competitive environment in order to avoid the adverse selection problem.

Firm performance is another determinant in the decision to disclose. The empirical studies on the relation between firm performance and disclosure are mixed. Previous research (Lev and Penman, 1990) suggests that firms tend to be more forthcoming when the firm is experiencing favourable earnings results compared with when the firm is performing poorly (Lang and Lundholm, 1993). However, the competitive costs associated with segment disclosures tend to increase as the profitability

of the reporting entity increases (Prencipe, 2004). Berger and Hann (2002) also find that firms aggregate segment information when there are large variances in segment profits in order to protect abnormal profits.

On balance, the literature appears to support the position that firms with low competition have higher proprietary costs, and, therefore, less incentive to disclose information to their competitors. Firms in less competitive industries have the potential to make abnormal profits and there is more scope for rivals in these industries to use the proprietary information disclosed. However firms in more competitive industries, have greater incentive to disclose information in order to reduce information asymmetries.

3.5 Summary of Disclosure Variables

Previous studies investigating voluntary segment disclosures have focused on a range of variables originating from agency, information asymmetry, political costs and proprietary cost theories. A review of the voluntary disclosure literature reveals that firm size (*LOGTA*), ownership diffusion (*OWNDIFF*), leverage (*LEV*), big 5 auditor (*AUDITOR*), return (*RETURN*) and fixed assets in place (*FAIP*) are commonly tested variables. These variables can thus be expressed in the following model:

$$VD = f(OWNDIFF, RETURN, FAIP, AUDITOR, LEV, LOGTA) \quad (1)$$

4. Model specification

Verrecchia (2001) argues that disclosure research must establish a link between financial reporting and its economic consequences. In response to Verrecchia's call for an economic-based argument for financial reporting, we examine the industrial organisation and strategic management literature. This literature suggests a potentially new variable which involves the internal and external environment of the firm.

Tirole's *The Theory of Industrial Organisation* (1990) and Schmalensee and Willig's *The Handbook of Industrial Organisation* (1989) discuss the nature and role of competitive strategy which can then be applied to the internal organisation of the firm. For example the existence of incentives such as directors' shares and CEO remuneration can impact on the firm's competitive position in the market. Porter (1981) argues that a

successful firm must match its internal competencies and values to its external environment. A firm's performance in the marketplace depends critically on the characteristics of the industry environment in which it competes. Further, industrial organisation can contribute greatly to strategic decision making and exposure to strategic managements also has a positive influence on industrial organisational research.

In the early 1990s, a special issue of the Strategic Management Journal (Vol, 12, 1991) examines the relationship between strategic management and economics and indicates areas for future research utilising the linkage between the two disciplines. Further, Saloner (1991) adds that issues, intersecting the internal environment and the external environment are a growth area in economics. The external environment including factors such as competition, combined with internal factors such as incentive schemes are important inputs to a firm's decision making approach.

Therefore, we propose that a management decision such as whether to voluntarily disclose segment information will depend jointly on the internal and external environments within which the firm operates. We measure the firm's internal environment by the variable insider ownership *IO* which is measured by directors' direct and indirect shareholdings. With high levels of *IO*, managerial and shareholder interests are closely aligned. To examine the external environment of the firm we use a variable *HI* measuring the degree of industry competition faced by the firm which is captured using the Herfindahl index. This is based on the median *HI* calculated using 36 industries based on the top 500 firms on the ASX by the following formula:

$$\text{Industry Herfindahl index } \sum [r_{ij}/R_j]^2 \text{ where;}$$

r_{ij} = Firm i's revenue in industry j, as defined by the 4-digit SIC code

R_j = The total of revenue for all firms in industry j

While other proxies for competition have been used in segment studies including the four firm concentration ratio and the speed of abnormal profit adjustment (Berger and Hann, 2002; Harris, 1998), we choose the Herfindahl index as it is widely used in research and practice including the U.S. Department of Justice who implements the

Herfindahl index in its antitrust activities. Therefore we believe that our internal/external variable *IOHI* when added to the model (1) will enhance the ability of the model to explain voluntary disclosures.

Therefore, we will test the following model featuring our internal/external environment variable *IOHI*:

$$VD = f(IOHI, OWNDIFF, RETURN, FAIP, AUDITOR, LEV, LOGTA)(2)$$

5. Empirical measures, sample selection and descriptive statistics

5.1 Data

To examine firms' segment reporting practices, we use the *Connect 4* database to access financial reports for the Top 500 Australian companies for the three years, 2001-2003. Segment reporting information, if disclosed, is located in the notes of the financial reports. Of the Top 500 reports examined for the year 2001, 263 disclosed segment information. Under the revised standard in 2002 and 2003, 276 and 286 firms respectively disclosed segment information. For our entire sample, we found that 825 firms disclosed segment information. We calculate our measure of competition (i.e. the Herfindahl index) based on the industry groups of the entire sample of Top 500 Australian firms. We categorize the Top 500 Australian firms according to the 36 Global Industry Classification Scheme (GICS) four-digit industry groups.⁹ Table 2 provides a breakdown of our sample and their relevant industries for 2001-2003. In neither year does a single industry dominate in our assignment of the dependent variable.

5.2 Voluntary Segment Disclosure Variables

The dependent variable used in our models is a dichotomous variable *VD* which indicates whether the firm reported other disclosures for 2001 aside from the required revenue, result and segment assets. Firms who reported additional disclosures are coded "1", and all others are coded "0". For 2002/2003, *VD* reflects disclosures that are in addition to the required nine primary items and two secondary items as outlined in section 2.1. Firms making such disclosures are coded "1". All others are coded "0".

5.3 Other Explanatory Variables

The existing literature has tested several explanatory variables which stem from the agency, information asymmetry, political cost and proprietary cost theories. These variables will also be included in our model and are measured as follows:

Firm size is a commonly tested variable in agency, information asymmetry and political cost disclosure studies. In this study, firm size is measured as the natural logarithm of total assets *LOGTA*. Ownership diffusion *OWNDIFF* has been used in studies as a proxy for information asymmetry studies and is defined in this study as the proportion of shares not held by the top 20 shareholders. Leverage *LEV* is a well known and commonly tested variable in agency cost studies and is measured as the book value of debt divided by market value of equity and the book value of debt. In this study we have also included a variable *AUDITOR* representing the “big five 2001” or “big four 2002/2003” audit firm which has been previously included in other agency theory studies. The profitability of the firm has also been a commonly tested explanatory variable in studies investigating proprietary costs. In this study as a proxy for profitability we will use the *RETURN* variable which represents the annual stock return in the years 2001 - 2003. The return is measured as the logarithmic stock return over the year and includes both dividends and price appreciation. Finally, agency studies also suggest the use of the proportion of fixed assets in place *FAIP* to explain cross-sectional variation in voluntary disclosure studies (Bradbury, 1992, Chow and Wong-Boren, 1987). *FAIP* is measured as the book value of fixed assets relative to total assets.

5.4 *Descriptive statistics*

Table 2 also provides statistics for the dependent variable *VD*. In 2001, 40.68 percent (107) of firms provided voluntary disclosures. In 2002, 51.44 percent (142) firms provided voluntary disclosures. In 2003, 67.48% (193) of firms provided voluntary segment disclosures. Voluntary segment disclosures included items such as: additional segment revenue, interest, amortisation of goodwill, depletion, income tax, significant items, segment bad debts, capital expenditure and segment cash flow from operating activities. Table 3 presents the descriptive statistics of the independent variables for the pooled sample. For the sample, the mean insider ownership variable is 17.88 percent. The

mean Herfindahl index based on revenue is 33.47 percent. The mean *IOHI* which is the product of *IO* and *HI* is 6.09 percent. The mean for ownership diffusion is 37.41 percent. 82.30 percent of the firms have big 4/big 5 auditors. The leverage ratio mean is 44.85 percent. The mean for the fixed assets in place variable is 59.86 percent. The mean return is negative 0.04.

5.5 *Correlation matrix*

Table 4 presents pair wise correlations between the variables over the full sample period 2001 to 2003. The strongest correlations are observed for the *LOGTA* variable, which is highly correlated with both *LEV* (52.9%), *FAIP* (30.2%) and with the internal/external environment variable *IOHI* (-21.2%). Apart from *LOGTA*, the *IOHI* variable is relatively weakly correlated with the other variables, the exceptions being the variable *OWNDIFF* (-27.6%). This low correlation mitigates possible concerns about the effects of multicollinearity in the model estimation that follows. One final point to note is the high correlation observed between the interactive variable *IOHI* and its components *IO* and *HI*.

6 **Empirical tests and results**

This section contains analyses directed at testing the hypothesis that voluntary segment disclosures are related to several previously tested variables and also our new variable measuring the internal/external environment.

6.1.1 *IOHI variable probit results*

We first test our *IOHI* variable in isolation to determine whether there is a relationship between voluntary segment disclosures and the *IOHI* variable. We test our *IOHI* variable using a pooled time series cross sectional probit model for the 3 years of data where the voluntary disclosure variable (*VD*) is the dependent variable. The sole regressor is the interactive variable *IOHI*, which is the product of the inside ownership *IO* and Herfindahl index *HI* variables. The results of the probit regression of voluntary disclosure against the interactive *IOHI* variable are found in Table 5 Panel A. These results indicate a strong significant relationship is evident between the variables (t-test = -2.74). Importantly, the negative coefficient on the *IOHI* variable is of the correct sign,

indicating that firms in situations of low competition and with high levels of insider ownership are less likely to disclose voluntary segment items.

6.1.2 *Non-linearities in ownership*

Some investigators (e.g., Morck, Shleifer and Vishny (1988)) find support for a non-linear relation between ownership and corporate performance with different functional forms over the range of ownership.¹⁰ As a test of robustness, therefore, we consider a non-linear specification of the relationship between VD and $IOHI$ that affords continuity and nests the different functional forms previously examined:

$$VD = \beta_0 + \beta_1 IOHI + \beta_2 IOHI^2 + \beta_3 IOHI^3 + \beta_4 D1 + \beta_5 D2 \quad (8)$$

where

$$D1 = \left[HI \times (IO - 0.05)^3 \right] \text{ if } IO > 0.05 \text{ and zero elsewhere,}$$

and

$$D2 = \left[HI \times (IO - 0.25)^3 \right] \text{ if } IO > 0.25 \text{ and zero elsewhere.}$$

Table 5 Panel B illustrates that none of the coefficients on the non-linear terms were significant. Further, the result of the likelihood ratio test failed to support the existence of a non-linear relationship (p-value = 0.09). In addition, it shows no evidence of a change in the functional form over the range of ownership.

6.2 *Probit results*

We employ probit methodology to test the significance of the explanatory variables. Our analysis is for the 3 years of data in a pooled time series, cross sectional probit model. Table 6 reports the results of our two probit regressions. In the first model (1) the voluntary disclosure variable (VD) is the dependent variable and previously commonly tested disclosure variables are the regressors. In model (1) we find evidence of a relationship between voluntary disclosure and each of $OWNDIFF$ ($t=-2.32$), $RETURN$ ($t=-2.61$) and $LOGTA$ ($t=2.79$). These results are as expected based on previous

literature. Firm size (*LOGTA*), is consistent with Bradbury (1992), Aitken et.al (1994), Leuz (1999), McKinnon and Dalimunthe (1993) and Mitchell et.al (1995).

Our second model (2) includes our variable *IOHI* alongside commonly tested disclosure variables as regressors. The results are as we hypothesised and we find that the *IOHI* variable is significant and the predicted sign ($t=-2.97$), indicating that firms with high insider shares and low competition are less likely to voluntarily disclose segment data. For the remaining six explanatory variables we find that the same three of them are significant as in model (1). Specifically, we find that there is a significant relationship between voluntary segment disclosures and each of *OWNDIFF* ($t=-3.05$), *RETURN* ($t=-2.72$) and *LOGTA* ($t=2.13$). Again, these results are consistent with the previous literature. We feel that the significant result for our *IOHI* variable is a contribution to the existing literature and our results for the *OWNDIFF*, *RETURN* and *LOGTA* variables provide further justification for these variables as determinants of voluntary disclosure.

6.2.1 Likelihood ratio tests

We then perform a likelihood ratio test of the models. The likelihood ratio tests the null hypothesis that the coefficient on the *IOHI* variable is zero. Therefore we construct a likelihood ratio statistic:

$$LR = -2(\ln L_R - \ln L_U), \quad (3)$$

Where L_U is equation (2) featuring the *IOHI* variable plus the other explanatory variables identified in the prior literature as being able to explain voluntary disclosure and L_R is equation (1) based only on the explanatory variables.

Table 6 reports the results of the likelihood ratio test. Our null hypothesis, that the *IOHI* variable fails to add to the explanatory power of the existing variables, is soundly rejected ($p\text{-value} = 0.00$). This provides evidence that the addition of our *IOHI* variable which captures both the internal and external environments of the firm does enhance the ability of the model and is therefore useful in explaining the existence of voluntary segment disclosures.

7. Robustness tests

We conduct a series of robustness tests on our *IOHI* variable and find that the significance of the *IOHI* variable is robust to the inclusion of variables measuring the change in standard, acquisitions and disposals of other firms and cross listing on the US stock exchange.

7.1 *Change in standard*

The revised segment reporting standard AASB 1005 *Segment Reporting* has significantly affected segment reporting practices of Australian firms. Therefore, as an additional test of robustness we investigate whether the changes in the standard impact on the relationship between the independent variables and dependent variable. To accomplish this, a dummy variable approach is used whereby the dummy variable *D* takes a value of “1” in the period before the change in standard and ”0” after the change. Again we construct a likelihood ratio test and the result is shown in Table 7, column 2. The LR result (p-value = 0.00) shows a rejection of the restrictions. It does not tell us whether this is due to a change in the relevance of the variables in the model or to an increase in *VD* generally.

To identify the cause of the structural break, we conduct additional regression and likelihood ratio tests on the restriction that the change in the slope coefficients are jointly zero. These results are shown in column 3 of Table 7. The LR result (p-value = 0.30) demonstrates that the change in the intercept can be interpreted as an overall increase in underlying/natural disclosure which is unrelated to the internal or external environment and indeed to the underlying characteristics of the firm itself. There could be several logical reasons for the increase in voluntary disclosure after the implementation of the revised standard. A probable reason is that the revised segment standard is more explicit about voluntary disclosures and encourages the disclosure of segment cash flows and any other relevant items as illustrated in sections 6.1.3 and 6.1.4 of the standard. In summary, the economic model featuring *OWNDIFF*, *RETURN*, *LOGTA* and *IOHI* is robust to a change in standard and continues to apply with the same strength on each variable.

7.2 Acquisition and disposal dummies and voluntary disclosures

We further test the robustness of the model by taking into consideration acquisition and disposal activities of the firms.¹¹ We constructed acquisition and disposal dummies for the pooled sample. The acquisition dummy variable is coded “1” if the firm makes a physical asset acquisition during the year and “0” otherwise. Similarly, the disposal dummy is coded “1” if the firm disposes of physical assets during the year, and “0” otherwise. We test whether the acquisition or disposal variables influence voluntary segment disclosures. Table 7, column 4 reports our results and highlights that with the acquisition and disposal restriction, the variables *IOHI* ($t=-2.97$), *OWNDIFF* ($t=-3.04$) and *RETURN* ($t=-3.10$) remain significant. Our firm size variable *LOGTA* no longer shows up as significant ($t=1.78$). However, large firms are more likely to be involved in acquisition/disposal activity and therefore these variables are likely to be highly correlated. Therefore, to more reliably test the impact of the *ACQ* and *DISP* variables we use the likelihood ratio test and find that the restriction that the variables *ACQ* and *DISP* are jointly zero is not rejected ($p\text{-value} = 0.27$).

7.3 Cross Listing

We further test the robustness of our model by distinguishing cross listed firms from single listed firms. Previous research (Bradbury 1992, Leuz, 1999) has identified that an overseas listing is a significant explanatory variable for voluntary segment disclosures. We construct a *CROSS* dummy variable for the pooled sample. The *CROSS* dummy variable is coded “1” if the firm is cross listed and “0” otherwise. The results of this regression are found in Table 7, column 5. Even with the *CROSS* restriction, we find that our *IOHI* variable is still significant ($t=-2.92$) and the variables *OWNDIFF* ($t=-3.16$) and *RETURN* ($t=-2.96$) also remain significant. Our firm size variable *LOGTA* ($t=1.41$) is not significant but again this could be due to the fact that larger firms cross list and therefore we would expect a high correlation between the *LOGTA* and *CROSS* variables. To more reliably gauge the impact of the *CROSS* we use the likelihood ratio test and find that the restriction that the *CROSS* variable coefficient is zero is marginally rejected (p -

value = 0.05). Therefore, whether a firm is cross listed on a foreign stock exchange, does seem to influence the existence of voluntary disclosures. However, based on the previous literature's vast usage of the size variable our preference is to use size in our model rather than the cross variable.

7.4 *IOHI, IO and HI variables*

We conduct a final test of robustness to determine whether the variables *IOHI*, *IO* and *HI* are complimentary in their ability to explain disclosure. We add the variables *IO* and *HI* to the regression individually. Table 7, column 6 shows that when the two variables are added to the model, the *IOHI* variable is no longer significant. This result could be due to the fact that there are high levels of correlation between the *IOHI*, *IO* and *HI* variables similar to the scenario between *SIZE* and *CROSS* and *SIZE* and *ACQ* and *DISP* variables in the earlier discussion. In fact the correlation between the *IO* and *IOHI* variables is 0.837 and between the *HI* and *IOHI* variables is 0.395. Therefore, to more reliably test whether the variables *IOHI*, *IO* and *HI* are complimentary in their ability to explain disclosure we conduct a likelihood ratio test and find the restriction that the *HI* and *IO* variables and *IOHI* are jointly zero is unable to be rejected (p-value = 0.09). The LR result is consistent with the strategic management and industrial organization theory which motivates the joint effect of the internal/external variable not the individual effect of the *IO* and *HI* variables.

8. **Conclusions**

The literature examining the determinants of discretionary disclosures offers a number of different theories including agency, information asymmetry, political costs, and proprietary costs. In this study, we examine a model featuring a new variable *IOHI* which we feel captures jointly the internal and external environment of the firm. Literature in the industrial organization and strategic management disciplines suggest that external factors such as competition joint with internal factors such as incentive schemes e.g. directors' shareholdings are important inputs to a firm's decision making approach

(Saloner, 1991). We hypothesize that the inclusion of the *IOHI* variable to the model enhances the ability of the model to explain voluntary segment disclosures. Our empirical results indicate a strong significant result is evident between *IOHI* and voluntary segment disclosures. When we add our *IOHI* variable to other commonly tested variables we obtain significant results for our *IOHI* variable, *SIZE*, *RETURN* and *OWNDIFF*. Furthermore, when we test our economic model against a model based only on commonly tested variables, we find that the null hypothesis, that the *IOHI* variable fails to add to the explanatory power of the existing variables, is soundly rejected. This provides evidence that our *IOHI* variable capturing both the internal and external environments of the firm, does enhance the ability of the model and is therefore useful in explaining the existence of voluntary segment disclosures. Our findings are robust to changes in the Australian segment reporting standard, capital market changes of acquisitions and disposals of physical assets and to non-linearities in ownership.

The results of our study are timely as countries worldwide are moving towards harmonization of accounting standards. Theories that help explain globally how firm's disclose will contribute to our understanding of information presented in financial reports. Our findings contribute to the disclosure literature by suggesting the inclusion of a variable in a voluntary disclosure model which captures a firm's internal and external environments. Further research could investigate whether our internal/external variable could be used to explain voluntary segment disclosures under other jurisdictions (e.g., the U.S. as well as countries adopting IFRS). The new test methodology may also prove useful in studies examining other discretionary disclosures.

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TABLE 1. Summary of estimation results in studies of corporate disclosure. Sign and significance (at the five percent probability level) of variables are: ++ significantly positive, + positive but insignificant, - negative but insignificant, and – significantly negative.

Market legend:								
N = NYSE								
A =ASX								
NZ = NEW ZEALAND								
G = GERMANY								
		Bradbury (1992)	Aitken, Hooper, Pickering (1994)	Leuz (1999)	McKinnon and Dalimunthe (1993)	Harris (1998)	Mitchell, Chia and Loh (1995)	Berger and Hann (2002)
<i>Market</i>		NZ	A	G	A	N	A	N
<i>No. of firms</i>		29	65	109	65	929	129	1207
<i>Agency variables</i>	<i>Variable definition</i>							
Firm size	Log of total assets	++	++	++	++		++	--
Leverage	Book value of debt to sum of book value of debt and market value of equity	++	++	-	+		++	
Assets in place	Book value of fixed assets to total assets	+	+	++			+	
Ownership diffusion	Percent of ordinary shares not owned by top 20 shareholders		+		++		++	
Profitability	Net profit to total assets			--				
Minority interest	1-% of subs not held by Top 20 shareholders		+		++		++	
Free float	Percent of voting shares held for free trading			++				
Number of shareholders	Natural logarithm of number of shareholders		++					
Number of subsidiaries			++					
Market-to-book	Ratio of market/book equity							+
<i>Proprietary Cost Variables</i>	<i>Variable definition</i>							
Competition – 4 firm concentration ratio	4 firm ratio					--		+
Competition – speed of profit adjustment	Speed of profit adjustment					--		++
Abnormal profit	Industry adjusted ROA and ROE							+
Herfindahl index	Industry concentration							+
Industry diversification	Dummy variable of high/low diversity		+	+	+			
Segment Diversification	Number of SIC codes across segments to number of segments							--
Heterogeneity	Heterogeneity in earnings persistence					-		+
<i>Other variables</i>	<i>Variable definition</i>							
Overseas association	Overseas listing	+	+	+			++	
Earnings volatility	Five-year coeff of variation	-	-				-	
Trading volume	Share turnover			+				
Number of segments	Number of segments							++
Number of industries	Number of industries					--		
Scale of operations/Firm size	Industry sales/Firm sales					++		
Foreign sales	% of sales outside domicile			+				
Big “5” or “6” auditor	Big “5” or “6” auditor			+				
Industry membership	Mining and oil classification		++		++		++	

TABLE 2. Summary of number of firms in sample by year and industry category. The voluntary disclosure variable *VD* denotes firms that disclosed information in addition to that required by the standard. *TOTAL* indicates the number of firms in each industry, while *COUNT* shows the total count across all industries. *IO* is the median insider ownership (expressed in percentages) in each industry and *HI* is the concentration level in each industry (expressed in percentages) based upon the median *HI* calculated using 36 industries using based on the top 500 firms on the ASX.

CRIF Class Name	Energy	Chemicals	Construction Materials	Diversified metals and mining	Gold	Precious metals and minerals	Steel and aluminium	Paper and forest products and packaging	Building products	Construction and engineering	Machinery	Conglomerates and other capital goods	Commercial services and supplies	Transportation	Automobile and components	Consumer durables and apparel	Hotels restaurants and leisure	Media	Retailing	Food and drug retailing	Beverages	Food and other products and tobacco	Health care equipment and supplies	Health care providers and services	Pharmaceuticals and biotechnology	Banks	Diversified financials	Insurance	Real estate investment trusts	Real estate management and development	Internet software and services	IT consulting and services	Software	Technology hardware and equipment	Telecommunications	Utilities	Count	
CRIF Class No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
2001 sample																																						
<i>VD</i>	3	4	2	7	3	1	1	1	1	2	1	2	5	0	3	0	4	4	7	1	4	8	2	3	4	5	5	1	2	3	1	1	6	5	3	2	107	0.406844106
<i>TOTAL</i>	11	6	5	16	13	2	3	8	2	10	5	8	14	2	5	3	7	14	10	4	8	14	4	4	8	6	13	4	9	6	2	2	13	7	9	6	263	
<i>IO (%)</i>	3	13	3	0	7	0	1	25	13	12	38	25	2	32	1	44	10	29	28	1	11	15	0	15	4	0	4	0	0	30	6	41	34	18	5	2		
<i>HI (%)</i>	49	32	46	41	19	58	42	45	36	29	66	44	31	60	38	24	22	52	12	36	22	21	64	51	34	23	16	47	9	65	42	35	18	18	45	58		
2002 sample																																						
<i>VD</i>	6	4	2	4	3	2	2	6	3	5	1	2	9	3	2	2	3	4	8	1	6	10	6	3	7	7	2	2	4	2	3	1	7	5	3	2	142	0.514492754
<i>TOTAL</i>	9	6	4	9	14	2	4	9	3	8	4	6	20	4	4	6	6	15	12	3	10	14	11	6	12	8	16	4	7	9	3	5	9	7	3	4	276	
<i>IO (%)</i>	2	2	2	0	5	5	13	11	12	6	17	20	3	19	0	28	2	40	17	0	17	15	13	20	3	0	4	0	17	28	11	35	51	18	0	25		
<i>HI (%)</i>	50	31	43	46	16	51	43	48	34	36	60	62	29	52	31	27	23	55	10	36	36	23	51	50	32	22	25	56	11	70	45	32	25	17	39	63		
2003 sample																																						
<i>VD</i>	8	4	3	8	6	2	6	6	1	6	3	3	12	1	4	4	6	11	9	3	5	9	7	2	8	6	7	4	8	4	1	2	8	8	5	3	193	0.674825175
<i>TOTAL</i>	10	5	6	13	14	2	6	6	1	7	5	6	15	6	5	5	14	16	11	4	7	11	10	4	12	6	17	5	11	8	3	5	10	8	6	6	286	
<i>IO (%)</i>	1	2	3	8	4	21	3	5	1	10	30	10	2	0	0	36	5	38	21	0	1	10	17	16	4	0	2	0	2	29	4	15	50	19	0	4		
<i>HI (%)</i>	37	44	37	43	12	37	33	51	43	32	61	58	24	43	22	18	17	49	10	34	30	13	37	47	30	22	28	26	11	51	31	33	17	15	42	59		
Full Sample																																						
<i>VD</i>	17	12	7	19	12	5	9	13	5	13	5	7	26	4	9	6	13	19	24	5	15	27	15	8	19	18	14	7	14	9	5	4	21	18	11	7	442	0.535757576
<i>TOTAL</i>	30	17	15	38	41	6	13	23	6	25	14	20	49	12	14	14	27	45	33	11	25	39	25	14	32	20	46	13	27	23	8	12	32	22	18	16	825	
<i>IO (%)</i>	2	3	3	1	5	2	3	11	11	10	30	20	2	6	0	36	3	37	23	0	13	13	13	20	3	0	4	0	2	30	7	27	39	18	3	5		
<i>HI (%)</i>	49	32	43	43	16	51	42	48	35	32	61	58	29	43	31	24	17	52	10	36	30	21	37	50	32	22	25	47	11	65	42	33	18	17	43	59		

TABLE 3. Descriptive statistics of the independent variables.

The variables in our model include: *IO*, the percentage of shares held directly or indirectly by the directors of the company; *HI*, the level of Herfindahl revenue; and, *IOHI*, the product of *IO* and *HI*. In the benchmark model, the variables are: *OWNDIFF*, the percentage of ownership diffusion; *RETURN*, the log stock return over the year; *FAIP*, the fixed assets in place; *LOGTA*, the natural logarithm of total assets; *LEV*, the book value of debt divided by the market value and the book value of debt; and, *AUDITOR*, whether the firm is audited by a big 5 or big 4 auditor.

Variable	No. of obs.	Mean	Std Dev	Min	25%	Median	75%	Max
<i>IO</i>	825	0.1788	0.2217	0	0.0038	0.0725	0.3104	0.9513
<i>HI</i>	825	0.3347	0.1526	0.0885	0.2189	0.3167	0.4513	0.7024
<i>IOHI</i>	825	0.0609	0.0900	0	0.0011	0.0179	0.0875	0.5606
<i>OWNDIFF</i>	825	0.3741	0.2023	0	0.2200	0.3530	0.5100	0.9800
<i>RETURN</i>	825	-0.0419	0.6015	-2.0242	-0.2541	0.0366	0.2685	2.379
<i>FAIP</i>	825	0.5986	0.2420	0	0.4257	0.6212	0.8005	1
<i>LOGTA</i>	825	12.7371	2.0823	8.2779	11.2248	12.4284	14.0398	19.8006
<i>LEV</i>	825	0.4485	0.2247	0.0068	0.2898	0.4599	0.5949	0.9837
<i>AUDITOR</i>	825	0.8230	0.3819	0	1	1	1	1

TABLE 4. Pairwise correlation structure among variables.

IO is the percentage of shares held directly or indirectly by the directors of the company, *HI* is the level of Herfindahl revenue, and *IOHI* is the product of *IO* and *HI*, *OWNDIFF* is the percentage of ownership diffusion, *RETURN* is the stock return over the year, *FAIP* is the fixed assets in place, *LOGTA* is the natural logarithm of total assets, *LEV* is the book value of debt divided by total assets, and *AUDITOR* indicates whether firm is audited by a big 5 or big 4 auditor.

<i>Variable</i>	<i>IO</i>	<i>HI</i>	<i>IOHI</i>	<i>OWNDIFF</i>	<i>RETURN</i>	<i>FAIP</i>	<i>LOGTA</i>	<i>LEV</i>
<i>HI</i>	0.032							
<i>IOHI</i>	0.837	0.395						
<i>OWNDIFF</i>	-0.346	0.006	-0.276					
<i>RETURN</i>	-0.091	0.031	-0.058	0.004				
<i>FAIP</i>	-0.111	0.036	-0.048	-0.043	0.093			
<i>LOGTA</i>	-0.307	0.101	-0.212	0.051	0.111	0.302		
<i>LEV</i>	-0.056	0.041	-0.041	0.047	0.033	-0.031	0.529	
<i>AUDITOR</i>	-0.125	0.043	-0.072	0.013	-0.006	0.044	0.235	0.210

TABLE 5. Results of the IOHI regression and test for potential non-linearities. The voluntary disclosure variable (*VD*) is the dependent variable in both regressions. Panel A reports the results of a regression of the voluntary exposure variable *VD* against the interaction variable *IOHI*, where *IOHI* is the product of inside ownership *IO* and the Herfindahl index *HI*. Panel B contains the results of a test for potential nonlinearities. $IOHI^2$ and $IOHI^3$ are the *IOHI* variable squared and cubed, respectively, $D1 = [HI \times (IO - .05)]^3$ if $IO > .05$ and is zero otherwise, and $D2 = [HI \times (IO - .25)]^3$ if $IO > .25$ and equals zero otherwise. *LLF* is the log likelihood function. The likelihood ratio test statistic (*LR*) is calculated as $LR = -2(RLLF - ULLF)$ and is distributed as a χ^2_4 under the null, where *RLLF* (*ULLF*) is the restricted (unrestricted) log likelihood function.

PANEL A

Dependent variable	No. of obs.	Coefficient estimate (and t-ratio) for:		
		Constant	<i>IOHI</i>	<i>LLF</i>
<i>VD</i>	825	0.172 (3.24)	-1.357 (-2.74)	-565.92

PANEL B

Dependent variable	No. of obs.	Coefficient estimate (and t-ratio) for:								
		Constant	<i>IOHI</i>	$IOHI^2$	$IOHI^3$	<i>D1</i>	<i>D2</i>	<i>LLF</i>	<i>LR</i>	<i>p-value</i>
<i>VD</i>	825	0.156 (2.50)	-1.245 (-0.44)	18.790 (0.86)	-892.597 (-1.90)	1392.036 (1.64)	-555.609 (-1.29)	-561.89	8.06	0.09

TABLE 6. Results of the likelihood ratio tests of the restricted and unrestricted regressions. The voluntary disclosure variable (*VD*) is the dependent variable in both regressions. The restricted model includes an intercept term, *OWNDIFF*, *FAIP*, *AUDITOR*, *RETURN*, *LEV* and *LOGTA*. The unrestricted model includes an intercept term, *IOHI*, *OWNDIFF*, *FAIP*, *AUDITOR*, *RETURN*, *LEV* and *LOGTA*. The likelihood ratio test statistic (*LR*) is calculated as $LR = -2(RLLF - ULLF)$ and is distributed as a χ_1^2 under the null, where *RLLF* (*ULLF*) is the restricted (unrestricted) log likelihood function.

<i>Independent Variables</i>	Restricted Model	Unrestricted Model
	<i>Dependent variable</i>	
	<i>VD</i>	<i>VD</i>
No. of obs.	825	825
Constant	-0.706 (-2.36)	-0.352 (-1.09)
<i>IOHI</i>		-1.583 (-2.97)
<i>OWNDIFF</i>	-0.511 (-2.32)	-0.701 (-3.05)
<i>FAIP</i>	-0.324 (-1.64)	-0.308 (-1.55)
<i>AUDITOR</i>	0.047 (0.39)	0.035 (0.29)
<i>RETURN</i>	-0.196 (-2.61)	-0.205 (-2.72)
<i>LEV</i>	0.333 (1.39)	0.406 (1.68)
<i>LOGTA</i>	0.077 (2.79)	0.060 (2.13)
<i>LLF</i>	-553.69	-549.19
LR		9.00
p-value		0.00

TABLE 7. Results of robustness tests.

The structural break dummy D takes a value of 1 in the period before the change in standard and 0 otherwise. Similarly the acquisition dummy variable ACQ takes a value of one if a company makes a physical asset acquisition during the year while the disposal dummy variable $DISP$ takes a value of one for those firms that dispose of physical assets during the year. $CROSS$ denotes firms that cross-listed. LLF is the log likelihood function. The likelihood ratio test statistic (LR) is calculated as $LR = -2(RLLF - ULLF)$ and is distributed as a χ_k^2 under the null, where k is the number of coefficients being restricted. For each regression, the coefficients being restricted are presented in bold.

<i>Independent variables</i>	<i>Dependent variable</i>				
	<i>VD</i>	<i>VD</i>	<i>VD</i>	<i>VD</i>	<i>VD</i>
No. of obs.	825	825	825	825	825
Constant	-0.053 (-1.27)	-0.188 (-0.57)	-0.131 (-0.40)	-0.020 (-0.06)	-0.286 (-0.78)
<i>IOHI</i>	-1.424 (-2.17)	-1.607 (-2.98)	-1.604 (-2.97)	-1.571 (-2.92)	-1.880 (-1.48)
<i>OWNDIFF</i>	-0.839 (-2.92)	-0.711 (-3.06)	-0.707 (-3.04)	-0.735 (-3.16)	-0.614 (-2.57)
<i>FAIP</i>	-0.641 (-2.45)	-0.295 (-1.47)	-0.287 (-1.43)	-0.279 (-1.38)	-0.295 (-1.46)
<i>AUDITOR</i>	-0.007 (-0.04)	-0.009 (-0.07)	-0.009 (-0.07)	-0.011 (-0.09)	0.011 (0.09)
<i>RETURN</i>	-0.203 (-1.96)	-0.231 (-3.03)	-0.237 (-3.10)	-0.226 (-2.96)	-0.225 (-2.94)
<i>LEV</i>	0.547 (1.79)	0.462 (1.89)	0.464 (1.90)	0.514 (2.09)	0.415 (1.69)
<i>LOGTA</i>	0.104 (2.68)	0.061 (2.12)	0.053 (1.78)	0.043 (1.41)	0.076 (2.56)
<i>D</i>	0.087 (0.12)	-0.507 (-5.25)	-0.505 (-5.22)	-0.503 (-5.20)	-0.507 (-5.24)
<i>D*IOHI</i>	-0.485 (-0.42)				
<i>D*OWNDIFF</i>	0.415 (0.84)				
<i>D*FAIP</i>	0.790 (1.86)				
<i>D*AUDITOR</i>	-0.055 (-0.22)				
<i>D*RETURN</i>	-0.066 (-0.43)				
<i>D*LEV</i>	-0.355 (-0.70)				
<i>D*LOGTA</i>	-0.078 (-1.32)				
<i>ACQ</i>			0.084 (0.81)		
<i>DISP</i>			0.085 (0.65)		
<i>CROSS</i>				0.287 (1.97)	
<i>IO</i>					0.364 (0.74)
<i>HI</i>					-0.518 (-1.28)
LLF	-531.11	-535.28	-534.66	-533.32	-532.85
LR	36.16	8.34	1.24	3.92	4.86
p-value	0.00	0.30	0.27	0.05	0.09

Endnotes

¹ See Botosan (1997), Deegan and Gordon (1996) and Kelly (1994).

² See Bradbury (1992), McKinnon and Dalimunthe (1993), and Aitken *et al* (1997).

³ See Kochanek (1974) and Aitken *et al* (1994).

⁴ The “management approach” has been adopted from the U.S. standard SFAS 131 and the international standard IAS 14.

⁵ A geographic segment is classified as primary if the entity’s risks and returns are affected predominantly by the fact that it operates in different countries or other geographical areas. A business segment would be primary if the entity’s risks and returns are affected predominantly by the differences in the products and services it provides. This is based on the assumption that the predominant source of risks and returns determine how an entity is organized and managed and is hence known as the management approach. This follows similar standards adopted by the Financial Accounting Standards Board (SFAS 131) and also the International Standards Committee (IAS 14R).

⁶ See Belkaoui and Karpik (1989).

⁷ See Healy and Palepu (2001).

⁸ See, also, Hayes and Lundholm (1996) and Ronen and Livnat (1981).

⁹ We use two different definitions of industry categories but apply to two different samples. Under the first definition, the four-digit GICS is applied to the sample of segment disclosing firms. Under the second, the four-digit GICS applied to the Top 500 firms. The third definition uses the GICS two-digit industry sector classification scheme applied to the sample of segment disclosing firms. (The GICS two-digit classification scheme classifies firms into the following industry sectors: materials, energy, industrials, consumer discretionary, consumer staples, health care, utilities, financials and information technology.) The final definition uses this classification of GICS applied to the Top 500 firms. Since the results are remarkably consistent across the four measures, we report only the results for the most general (second) definition (i.e., four digit GICS applied to the Top 500 firms).

¹⁰ The development of this cubic spline model and its knot points is contained in Smith and Kohn (1996).

¹¹ The acquisition and disposal dummy was suggested by Professor Gordon Richardson at the AFAANZ conference, Brisbane, 2003.