
Auditor brand name, industry specialisation, and earnings management: evidence from Taiwanese companies

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Abstract: We investigate the relationship between auditor brand name, industry specialisation, and earnings management as measured by discretionary accruals for a sample of listed companies in Taiwan, where the litigation risk against auditors is much less than the risk in the USA. We find that the use of Big 5 auditors is related to less earnings management in Taiwan. We also find that industry specialist auditors are related to less income increasing earnings management, which, to our knowledge, has not been demonstrated by any audit quality and earnings management studies in Taiwan.

Keywords: industry specialisation; earnings management; audit quality.

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1 Introduction

Auditing is expected to serve as a monitoring role to reduce agency costs between managers and firms' stakeholders. Auditors are supposed to act in shareholders' interests and assist financial statement users by verifying the validity of financial reporting, but this ideal is not necessarily true in reality. The information asymmetry between managers and firms' stakeholders creates an opportunity for managers to engage in earnings management. Managers also have self-interested incentives to take advantage of such information asymmetry to window-dress reported earnings (e.g., Chang et al., 2003; Stolowy and Breton, 2004). Sometimes, auditors are likely to go along with managers' self-interested earnings management since they want to please a client's management and keep the client. Regulators and investors often criticise auditors about doing a poor job because the audited financial statements have been proved to be false and misleading in many accounting scandals like those at Enron, WorldCom, Ahold, Parmalat, Procomp Informatics (Taiwan), and Infodisc (Taiwan) (Information related to Procomp Informatics, 2004a, 2004b). Given these concerns from regulators and investors, it is important to investigate the association of audit quality with earnings management, an association that could potentially affect the integrity of financial reporting.

There is a growing literature examining the relation between audit quality and earnings management (e.g., Becker et al., 1998; Francis et al., 1999; Krishnan, 2003; Balsam et al., 2003). This stream of literature finds that the use of higher quality auditors (Big 5 and industry specialist auditors) is positively related to less earnings management. However, these studies are usually limited to US companies and there are significant differences between the USA and Taiwan. For example, there are many more publicly listed companies in the USA (approximately 10,000 in Compustat (Francis et al., 2005) vs. 925 Taiwanese-listed companies reported in Chen and Wu (2004), and more industry sectors in the USA (72 unique two-digit SIC codes in the Compustat population vs. 20 stock exchange categories in the *Taiwan Economic Journal* (TEJ) database), and thus it is relatively easier for auditors to develop along industry expertise because there are a number of companies in any given industries. Also the USA companies are much larger on average than Taiwanese companies. Therefore, whether the results in the US study can apply to other countries or regions is still an open question. In this paper, we begin to address this question by using a sample of Taiwanese companies to investigate whether the USA results can extend to Taiwan.

Prior audit quality research has focused primarily on the differences between Big 5 and non-Big 5 firms, where auditor brand name has been used as a proxy of audit quality (DeAngelo, 1981). Becker et al. (1998) and Francis et al. (1999) found that Big 5 auditors are associated with lower discretionary accruals, suggesting Big 5 auditors' ability to constrain earnings management. Industry specialisation can also be thought of as a dimension of audit quality (e.g., Krishnan, 2003; Balsam et al., 2003; Plamrose, 1986; Craswell et al., 1995). Krishnan (2003) and Balsam et al. (2003) document the performance of industry specialists to constrain earnings management. In this study, we investigate whether auditor brand name (i.e., Big 5) and industry specialist auditors could constrain earnings management in the Taiwan audit market.¹

We selected a sample from the TEJ database, which includes companies listed in the Taiwan Stock Exchange (TSE) and GreTai Securities Market (GTSM). Our sample period covers 1998–2002, which is after the Asian financial crisis period and after the regulation of audit fee floor has been abolished by the Fair Trade Commission (FTC)^{2,3}. We use Big 5 auditors and industry specialists to proxy for audit quality and use discretionary accruals estimated from the cross-sectional modified Jones model to proxy for earnings management. Using 2324 observations satisfying all the data requirements, we find that Big 5 auditors are associated with lower earnings management. When we separate earnings management into income increasing and income decreasing earnings management, we further find that industry specialist auditors are associated with less income increasing earnings management, suggesting differential ability for brand name auditors and industry specialist auditors to constrain earnings management.

To our knowledge, our study demonstrates that industry specialisation is an important factor to constrain earnings management, which has not been demonstrated by any audit quality and earnings management studies in Taiwan. Therefore, our findings provide another channel for capital market participants to understand better the behavior of earnings management in the Taiwan audit market.

The remainder of this paper is organised as follows. The next section presents the background and institutional features of the Taiwan audit and capital market. Section 3 describes the related research and the development of the hypotheses, followed by the research design, and sample description in Section 4. Section 5 discusses the empirical results, and Section 6 concludes.

2 Background and institutional features of the Taiwan audit market

2.1 Background

The so-called 'Big Eight' accounting firms in the 1980s dwindled to the Big Four after Andersen ceased operation on August 31, 2002. 'Professional auditing standards require audit firms to understand the clients' industry and business (AICPA, 1993). KPMG Peat Marwick was the first audit firm to restructure its organisation along industry service lines (Emerson, 1993). Audit firms use such restructuring to find their niche in focal industries to deal with a growing emphasis of a global and sophisticated marketplace. Audit firms can also develop industry expertise in order to accomplish multiple objectives to better serve their clients' needs (Gramling and Stone, 2001), and thus can increase market shares in their focal industries. For example, KPMG Taiwan lists five 'target industries' on its homepage and claims these as its areas of expertise to help

clients to achieve sustainable competitive advantage.⁴ Given the increasing importance of the role of industry specialisation in the audit market, many audit firms have followed the lead of KPMG. For example, PWC is organised along 23 industries and claim that

“the depth of our industry expertise, like our international perspective, is an attribute that our clients value highly. We invest significant resources in building and sharing such expertise.”⁵

The FTC of the Executive Yuan abolished the regulation of the audit fee floor in May 1998, which led to increasing competition in Taiwan audit market (Wu, 2002).⁶ To confront this changing audit market, every audit firm is using its brand name reputation and trying to develop industry expertise to maintain its competitiveness and to enlarge its market share (Chang and Wu, 2005). Therefore, the growth of audit firm size and the development of industry specialisation could be due to the increasing competitiveness of the Taiwan audit market. Consequently, audit firms are dedicating more resources to build brand name reputation and industry specialisation in Taiwan.

Earnings management has been of consistent concern to regulators Levitt (1998). Previous research has identified three main motivations for earnings management: capital-market motivation, contracting motivation, and regulatory motivation (Healy and Wahlen, 1999). According to Stolowy and Breton (2004), managers manipulate earnings to minimise the cost of capital or political costs, or to maximise their compensation (e.g., bonus plan or stock options). The first type of earnings management identified Stolowy and Breton (2004), (to minimise the cost of capital or political costs) will work to the advantage of the companies, while the second type of earnings management (to maximise compensation) will benefit management at the cost of shareholders. Based on agency hypothesis and information hypothesis described in Wallace (1980), management’s self-interested earnings management can be mitigated by hiring high quality auditors. High quality auditors can limit the wealth transfer from shareholders to managers through their constraint on earnings management. The market may not always be efficient, which provides managers opportunities to transfer wealth to their own advantage (Dechow and Skinner, 2000). Furthermore, the information asymmetry between management and shareholders creates a suitable environment for earnings management (e.g., Dye, 1988; Trueman and Titman, 1988). Therefore, shareholders need to rely on contracting and monitoring to reduce agency costs. A high quality auditor can be an effective monitoring tool.

2.2 Institutional features of the Taiwan audit and capital market

The capital market is less developed and the average listed company size is much smaller in Taiwan as compared to the USA, so the information intermediary role played by auditors may be even more important in Taiwan. The regulatory environment in Taiwan may also create an environment for managers to engage in earnings management. For example, listed companies on the TSE and GTSM are required to forecast earnings and disclose the financial forecasts to the public with the following events: before and after an IPO or SEO, before the issuance of convertible bonds and mergers, when net income decreases substantially, or other significant events.⁷ Managers are required to revise their forecasts if errors and biases exist. Chin et al. (2002) investigated the relation between the 1991 regulation of management earnings forecast and the IPO anomalies in Taiwan and find that the post-1991 IPOs are significantly less under-priced, which

supports the theory that mandatory management earnings forecasts help to mitigate the information asymmetry between management and investors.

According to Claessens et al. (2000), 65.6% of companies listed in TSE are family-owned as of the end of fiscal year 1996, based on the ultimate control at the 10% cutoff levels of voting rights. The family-control firm structure in Taiwan is different from the widely dispersed ownership structure in the USA. Recent high-profile financial scandals such as Procomp Informatics and Infodisc in Taiwan have also eroded public confidence in the accounting profession.⁸

With regard to the legal environment, the USA is comparatively more litigious than Taiwan. In the USA, auditors face a higher likelihood of frivolous but expensive lawsuits Seetharaman et al. (2002) and the class action lawsuits and the joint and several liabilities are also more common than in Taiwan.⁹ Compared with large aggregate legal liability exposures exceeding \$40 billion (Arens, 2005) for audit firms in the USA, audit firms in Taiwan are basically regulated by administrative sanctions, *rather than* civil and criminal liabilities (Palmrose, 1991a, 1991b, 1997; Cloyd et al., 1998).¹⁰ According to Article 40 of the Certified Public Accountant Law in Taiwan amended on May 29, 2002, disciplinary sanction shall take any of the following forms as may be deemed appropriate: warning, reprimand, suspension of practice for a period from two months up to two years, and expulsion. As to the recent high-profile financial scandals such as Procomp Informatics and Infodisc, the CPAs involved were only suspended of practice for one year. This is quite different from the USA, where Arthur Andersen was found guilty for the obstruction of justice on June 15, 2002 and was forced to go out of business on August 31, 2002.¹¹ Therefore, the significant difference in the legal environment between the USA and Taiwan may result in different results when we examine the relation between audit quality and earnings management in Taiwan.

There are also regulation differences with regard to audited financial statements in the financial statement between USA and Taiwan. The auditor report in the financial statements filed to the Financial Supervisory Commission (FSC, a SEC counterpart in Taiwan), is signed by two audit partners in addition to a signature representative of the audit firm, whereas only a signature representative of the audit firm is required in the USA.

3 Related researches and hypotheses development

Audit quality is not directly observable.¹² Prior studies demonstrate that higher auditor quality (Big 5 and industry specialist auditors) can play an important role to constrain earnings management (e.g., Becker et al., 1998; Francis et al., 1999; Krishnan, 2003; Balsam et al., 2003).

3.1 Auditor brand name and earnings management

Following Simunic and Stein (1987), we first use auditor's brand name (i.e., Big 5) to proxy for audit quality. Becker et al. (1998) found that companies with non-Big 5 auditors (a proxy for lower audit quality) report discretionary accruals that significantly increase income compared to companies with Big 5 auditors. They also find that managers respond to debt contracting and income-smoothing incentives by strategically reporting discretionary accruals. In addition, companies with incentives to smooth

earnings upwards (downwards) report significantly greater income-increasing (decreasing) discretionary accruals when they have non-Big 5 auditors. Francis et al. (1999) argue that high-accrual firms have greater opportunity for opportunistic earnings management and have an incentive to hire a Big 5 auditor to provide assurance that earnings are credible. They find that high accrual firms are more likely to hire a Big 5 auditor, but report lower discretionary accruals, consistent with Big 5 auditors constraining opportunistic reporting of accruals.

Audit quality could help the regulatory role of supervision. Using data from the Chinese stock market, Chen et al. (2001) investigated the relation between earnings management induced by profitability regulation and Modified Audit Opinions (MAOs) and find that companies engaging in earnings management in order to meet the profitability requirements are more likely to receive modified audit opinions, suggesting that asymmetric profitability requirements exacerbate managers' propensity to engage in earnings management. From the above discussion about the relationship between auditor brand name and earnings management, we expect that companies using Big 5 audit firms will engage in less earnings management than companies with non-Big 5 auditors.

Hypothesis 1: Taiwanese companies audited by Big 5 auditors engage in less earnings management than Taiwanese companies audited by non-Big 5 auditors.

3.2 Industry specialisation and earnings management

Many large audit firms have restructured along industry lines to address the increasing importance of the role of industry specialisation in the audit market (see Gramling and Stone (2001), for a literature review). Audit firms can invest extensively in developing industry expertise, and provide differentiated audit services to meet clients' unique needs that are not replicated by competitors (Chan, 2001).

Using an experimental design, Owhoso et al. (2002), demonstrate that seniors and managers within the industry specialised auditor team contribute to the team's overall performance by detecting more errors during sequential audit review, which implies industry specialists produce more effective audits. Balsam et al. (2003) found that clients of industry specialist auditors have lower absolute unexpected accruals and higher earnings response coefficients, suggesting auditor industry expertise is associated with high quality audits as evidenced by lower accruals, which implies less earnings management. Krishnan (2003) also reported that clients of industry specialist auditors report lower absolute unexpected accruals. With industry knowledge and expertise, industry specialist auditors should be more likely to constrain clients' earnings management than non-specialists. Therefore, we examine whether industry specialist auditors are associated with reduced earnings management.

Hypothesis 2: Taiwanese companies audited by industry specialist auditors engage in less earnings management than Taiwanese companies audited by non-industry specialist auditors.

4 Research design

4.1 Discretionary accruals

Accruals are likely to capture evidence of earnings management because they reflect managers' accounting estimates and accounting choices. Dechow et al. (1995) provide evidence that the modified Jones model is the most powerful to detect earnings management among the alternative models to measure unexpected accruals.

The model is estimated as follows:

$$\begin{aligned} \text{TACC}_{it} &= NI_{it} - \text{OCF}_{it} \\ \text{TACC}_{it} &= a_1(1/TA_{it-1}) + a_2(\Delta\text{REV}_{it} - \Delta\text{REC}_{it})/TA_{it-1} + a_3 \text{PPE}_{it}/TA_{it-1} + \varepsilon_{it} \end{aligned}$$

where

TACC_{it} : Total accruals for company i in year t , defined as above.

NI_{it} : Net income before discontinued segments and extraordinary items.

OCF_{it} : Cash flow from operation.

ΔREV_{it} : Change in revenue for company i in year t .

ΔREC_{it} : Change in receivables for company i in year t .

PPE_{it} : Property, plant and equipment for company i in year t .

TA_{it-1} : Total assets for company i in year $t-1$.

ε_{it} : Residual.

Following Teoh et al. (1998), we regress the above equation cross-sectionally every year for each two-digit TEJ code industry using all available companies. Following Park and Shin (2004), at least six firm year observations are required in a two-digit TEJ code.¹³

Total accruals are measured as net income minus cash flows from operation. Then discretionary accruals, a proxy for earnings management, are estimated by subtracting nondiscretionary accruals from total accruals, where all accrual variables are scaled by lagged total assets to control for potential scale bias. Normal levels of working capital accruals related to sales are controlled through the changes in revenue adjusted for changes in accounts receivable. Normal levels of depreciation expense and related deferred tax accruals are controlled through the property, plant and equipment. Finally, the residual (ε_{it}) from the regression is the discretionary accruals. The cross-sectional model reflects common industry factors applied to discretionary accruals. This implies that estimated discretionary accruals are more likely to represent management's choice rather than industry factors. Also, since the model is estimated year-by-year, changes in industry conditions are factored in the model.

4.2 Auditor brand name and auditor industry specialisation

Prior studies find that clients of brand name auditors are associated with income-decreasing discretionary accruals (e.g., Becker et al., 1998) and clients with high-accruals are more likely to hire a Big 5 auditor to provide assurance of credible earnings. Following Simunic and Stein (1987), we use the Big 5 to measure the auditor's brand name, which equals to 1 if a client is with a Big 5 auditor and 0 otherwise.

Similarly to Craswell et al. (1995) and Ferguson and Stokes (2002), we calculate the market share of audit firms to define industry specialist. They calculate the market share based on audit fees earned by audit firms and define an auditor to be an industry specialist if the auditor attains a 10% market share. Since the audit fees data is not available in Taiwan for our sample period, we cannot use this procedure and instead we use a sales-based industry specialist measure (Francis et al. 2005).¹⁴ Since the Taiwan market is comparatively smaller than the US market, we require there to be at least six firms in a two-digit TEJ code industry for an auditor to qualify as an industry specialist. The sales-based market share (MS) of industry k audited by auditor i can be calculated as follows.

$$MS_{ik} = \frac{\sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}}{\sum_{i=1}^{I_k} \sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}}$$

where

- A_{ijk} : Total sales of client firm j in industry k audit by auditor i ,
 $i = 1, 2, \dots, I$: an index for audit firms.
 $j = 1, 2, \dots, J$: an index for client firms.
 $k = 1, 2, \dots, K$: an index for client industry.
 I_k : The number of audit firms i in industry k .
 J_{ik} : The number of clients served by audit firm i in industry k .

Industry specialists are calculated yearly based on the firm-year observations from the TEJ database. When auditor i 's market share is greater than 25% in a two-digit TEJ code industry, the auditor i is classified as an industry specialist.

4.3 Regression model

We use the following regression model to test the relation of auditor brand name and industry specialisation to earnings management.

$$\begin{aligned} DAC_{it} = & \beta_0 + \beta_1 \text{BIG5}_{it} + \beta_2 \text{SPEC}_{it} + \beta_3 \text{NEWAUD}_{it} + \beta_4 \text{OLDAUD}_{it} + \beta_5 \text{ABSTA}_{it} \\ & + \beta_6 \text{OCF}_{it} + \beta_7 \text{LEV}_{it} + \beta_8 \text{MTB}_{it} + \beta_9 \text{SIZE}_{it} + \beta_{10} \text{ShareInc}_{it} + \beta_{11} \text{ShareDec}_{it} \\ & + \beta_{12} \text{PERSIST}_{it} + \beta_{13} \text{INCCHG}_{it} + \beta_{14} \text{LOSS}_{it} + \varepsilon_{it} \end{aligned}$$

where

- DAC_{it} : Discretionary accruals.
 BIG5_{it} : 1 if the auditor is member of Big 5; 0 otherwise.
 SPEC_{it} : 1 if the auditor is an industry specialist; 0 otherwise.
 NEWAUD_{it} : 1 if the first sample year is the first year with a new auditor; 0 otherwise.
 OLDAUD_{it} : 1 if the last sample year is followed by an auditor change; 0 otherwise.
 ABSTA_{it} : Absolute value of total accruals.
 OCF_{it} : Operating cash flow deflated by lagged total assets.
 LEV_{it} : Leverage, defined as total liabilities over total assets.
 MTB_{it} : Market to book ratio.
 SIZE_{it} : Log of sales.

- ShareInc_{it}: 1 if there is an increase of more than 10% of total outstanding shares during the year; 0 otherwise.
- ShareDec_{it}: 1 if there is a decline of more than 10% of the total outstanding shares during the year; 0 otherwise.
- PERSIST_{it}: 1 if absolute value of change in income before extraordinary items fall into extreme deciles; 0 otherwise.
- INCCHG_{it}: 1 if this year's income is greater than previous year's income; 0 otherwise.
- LOSS_{it}: 1 if the company incurs a loss; 0 otherwise.
- ε_{it} : Residual.

In the regression model for testing our hypotheses, the dependent variable is discretionary accruals which proxy for earnings management, whereas the research variables are auditor brand name (BIG 5) and industry specialists (SPEC) which proxy for audit quality.

Many other variables may play a role in management's discretionary accruals decision. Becker et al. (1998) find companies that change auditors were likely to report negative discretionary accruals during the last year with their predecessor auditor (OLDAUD) and the first year with their successor auditor (NEWAUD). Becker et al. (1998) provide evidence that absolute value of total accruals (ABSTA) is significantly related to discretionary accruals. Becker et al. (1998) also found that Operating Cash Flows (OCF) are significantly different for companies audited by Big 5 auditors vs. companies audited by Non-Big 5 auditors.

High leverage has been found to be related to the violation of debt covenants (Press and Weintrop, 1990). DeFond and Jiambalvo (1994) and Sweeney (1994) found that managers use discretionary accruals to satisfy debt covenant requirements. Therefore, leverage (LEV) is added to the regression model to control for the possible association with earnings management. In addition, Market-To-Book (MTB) value is used as a surrogate for growth opportunity because high growth firms are more concerned with earnings disappointment and have more incentives to engage in earnings management. Further, the log of sales (SIZE) is used as an independent variable to control for the possible effect of size on earnings management. Large companies may have less incentive to engage in earnings management because they are subject to more scrutiny from financial analysts and investors.

Beneish (1997) reported that managers will tend to increase earnings for the incentives to sell personal holdings as part of and subsequent to equity offerings. This is similar to the findings of Teoh et al. (1998a). However, managers also have incentives to decrease earnings prior to share repurchases. To capture managers' incentives with regard to stock transactions, we follow Becker et al. (1998) to include dummy variables (ShareInc and ShareDec) to represent whether the outstanding shares have increased or decreased.

Following (Ali, 1994; Krishnan, 2003), we add earnings persistence (PERSIST) as a performance-related control. Companies in each year are divided into ten groups according to their absolute value of change in income before extraordinary items. The value in the four extreme deciles (top-two and bottom-two deciles) are categorised as low-persistence and coded as 1. Others in the middle six deciles are categorised as high-persistence and coded as 0. Burgstahler and Dichev (1997) find that companies manage reported earnings to avoid reporting earnings decreases and losses. Accordingly,

we control for loss (LOSS) and income change (INCCHG). These variables are added to control for managers' incentive to avoid earnings decreases and losses.

5 Sample selection and results

5.1 Sample selection

Table 1 provides the details about the sample selection process and sample characteristics. We begin with 5,355 firm observations that are listed in the TEJ database for the period between 1998 and 2002. We exclude 176 observations in the financial services and insurance industries, because the discretionary accruals model does not apply to financial industries. We also eliminate 546 IPO and 438 SEO observations since there is evidence indicating that firms engage in income-increasing earnings management prior to IPO and SEO.¹⁵ Necessary data for calculating total accruals, discretionary accruals, industry specialists, market-to-book, earnings persistence, shares increasing and decreasing, leverage, and cash flow should be available from the database. We further exclude 1865 observations without complete data and four firms with extreme values. We also exclude two firms with negative net book values, because market-to-book variable does not make sense for negative book value firms. The auditor information for the sample firm should also be available from the database. The final sample after satisfying all the data requirements between 1998 and 2002 amounted to the 2324 firm-year observations. The sample selection criteria are presented in Panel A of Table 1.

Panel B of Table 1 provides sales-based and client-based market share about the sample distribution by year and by auditor type. For the sales-based market share, the Big 5 market share increased year by year during the sample period, especially from 1998 to 1999. For the client-based market share, the number of sample firms also increased year by year throughout the period. The greatest number of observations occurs in 2002 with 666 observations (28.66% of the total sample firms), and the least number of observations occurs in 1998 with 265 observations (11.40% of the total sample firms). The Big 5 audits more than 87% (78%) of the companies on average for the whole sample on the basis of sales-based (client-based) market share during the sample period.

Panel C of Table 1 provides the industry distribution of sample companies, the number of firms audited by the Big 5 and Non-Big 5 auditors, and the number of specialist auditors in each industry. The sample includes 17 separate TEJ industry codes, indicating a wide distribution of industries. The electronics industry has the largest concentration of companies, with more than 31% of the total observations. The remaining sample companies are widely distributed across TEJ industry codes; no other TEJ industry code contains more than 12% of the sample companies.

Panel D of Table 1 provides the descriptive information related to the distribution of industry specialists for our sample period from 1998 to 2002. The distribution of industry specialists is consistent across sample years for industries such as Foods, Plastics, Steel and Iron, and Constructions. The electronics industry is the largest industry in Taiwan. However, there is no industry specialist for the electronics industry based on our 25% market share cutoff during 1998–2001. Arthur Andersen is an industry specialist for the electronics industry in 2002. Ernst and Young is the only industry specialist for Glass and Ceramics industry between 1998 and 2000, while KPMG increased its market share in 2001 and 2002 and also became a specialist in this industry. The untabulated results show

that the average sales-based market share for KPMG, Arthur Andersen, PWC, Deloitte and Touche, and Ernst and Young, are respectively 21.40%, 18.34%, 14.11%, 13.32%, 10.81% during our sample period. The next largest auditor is BDO Seidman with an average market-share of 3.56%.

Table 1 Sample selection

<i>Panel A: sample selection criteria</i>		Number of firms				
1998–2002 firms from TEJ database		5355				
Exclude financial service and insurance industries		(176)				
Exclude IPO companies		(546)				
Exclude SEO companies		(438)				
Exclude missing data		(1865)				
Exclude extreme value		(4)				
Exclude negative net book value		(2)				
Final sample		2324				
<i>Panel B: sales-based and client-based market share for sample firm by year and by auditor type</i>						
Market share (sales-based)						
Year	1998	1999	2000	2001	2002	Total (average)
Big 5	78.55%	87.18%	89.04%	91.13%	92.03%	(87.58%)
Non-Big 5	21.45%	12.82%	10.96%	8.87%	7.97%	(12.42%)
Total	265	378	455	560	666	2324
Market share (client-based)						
Big 5	198 (74.72%)	294 (77.78%)	349 (76.70%)	443 (79.11%)	537 (80.63%)	1821 (78.36%)
Non-Big 5	67 (25.28%)	84 (22.22%)	106 (23.30%)	117 (20.89%)	129 (19.37%)	503 (21.64%)
Total	265	378	455	560	666	2324
<i>Panel C: TEJ codes distribution (number of specialist observations is based on 25% sales-based market share)</i>						
Industry	TEJ codes	Freq	Percentage	No. firms audited by Big 5	No. firms audited by Non-Big 5	No. specialist observations
Cement	11	39	1.68		6	17
Foods	12,42	102	4.39	71	31	27
Plastics	13,43	99	4.26	79	20	21
Textiles	14,44,65	256	11.02	194	62	38
Electric and Machinery	15,45	136	5.85	102	34	0
Appliance and Cable	16,46	70	3.01	49	21	31
Chemicals	17,41,47	137	5.90	88	49	2
Glass and Ceramics	18,48	33	1.42	23	10	20
Paper	19	28	1.25	14	14	10
Steel and Iron	20,50	127	5.46	73	54	29
Rubber	21,51	44	1.89	27	17	21

Table 1 Sample selection (continued)

<i>Panel C: TFJ codes distribution (number of specialist observations is based on 25% sales-based market share)</i>						
<i>Industry</i>	<i>TFJ codes</i>	<i>Freq</i>	<i>Percentage</i>	<i>No. firms audited by Big 5</i>	<i>No. firms audited by Non-Big 5</i>	<i>No. specialist observations</i>
Electronics	23,24,30,49,52,53,54,61,80	727	31.24	663	64	1
Constructions	25,55,64	181	7.79	121	60	59
Transportations	26,56	94	4.04	79	15	44
Tourism	27,57	29	1.25	25	4	18
Wholesale and retail	29,59	54	2.32	43	11	26
Others	89,98,99	168	7.23	137	31	7
<i>Total</i>		2324	100	1821	503	371
<i>Panel D: distribution of industry specialists across sample years</i>						
<i>Industry</i>	<i>TFJ codes</i>	<i>Specialist auditors</i>				
		<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>
Cement	11	1	1,4	1,4	1,4	1,4
Foods	12,42	3	3	3	3	3
Plastics	13,43	2	2	2	2	2
Textiles	14,44,65	None	5	5	5	None
Electric and machinery	15,45	None	None	None	None	None
Appliance and cable	16,46	5	5	5	2,5	2,5
Chemicals	17,41,47	None	None	None	None	2
Glass and ceramics	18,48	4	4	4	2,4	2,4
Paper	19	2	2	2	2	1,2
Steel and iron	20,50	1	1	1	1	1
Rubber	21,51	2	2,3	2,3	2,3	2,3
Electronics	23,24,30,49,52,53,54,61,80	None	None	None	None	1
Constructions	25,55,64	2	2	2	2	2
Transportations	26,56	None	1,2	1,2	1,2	1,2
Tourism	27,57	1,3,5	1,5	5	1,5	3,5
Wholesale and retail	29,59	2,3	1,3	1,3	1,3	3
Others	89,98,99	None	None	None	2	None

1: Arthur Anderson; 2: KPMG; 3: Price WaterhouseCoopers; 4: Ernst and Young; 5: Deloitte and Touche.

5.2 Empirical results

Table 2 provides the descriptive statistics for the sample. Panel A describes continuous variables and Panel B presents discrete variables. In Panel A, the average discretionary accruals are -0.002 and the median of discretionary accruals is 0.002 . The mean and

median of absolute value of total accruals deflated by lagged assets are 0.076 and 0.054 respectively. The mean and median operating cash flows deflated by lagged assets are 0.054 and 0.048. The mean and median leverage are 0.416 and 0.410, respectively. The average market-to-book ratio is 1.304, and the average log of sales is 14.871.

In Panel B, 78.4% of the sample firms are audited by Big 5 auditors, and around 33% of the sample firms use industry specialist as auditors. Around 31% of the firms reported a loss during the sample period.

Table 2 Descriptive statistics

<i>Continuous variables</i>	<i>Mean</i>	<i>STD</i>	<i>Minimum</i>	<i>Median</i>	<i>Maximum</i>
<i>Panel A: continuous variables</i>					
DAC	-0.002	0.092	-0.501	0.002	0.693
ABSTA	0.076	0.081	0	0.054	1.399
OCF	0.054	0.099	-1.079	0.048	0.722
LEV	0.416	0.166	0.035	0.410	0.978
MTB	1.304	1.153	0.040	0.956	11.093
SIZE	14.871	1.224	10.494	14.753	19.317
<i>Panel B: discrete variables</i>					
BIG 5	0.784	0.412	0	1	1
SPEC	0.330	0.472	0	0	1
NEWAUD	0.071	0.256	0	0	1
OLDAUD	0.102	0.303	0	0	1
ShareInc	0.359	0.480	0	0	1
ShareDec	0.019	0.135	0	0	1
PERSIST	0.463	0.499	0	0	1
INCCHG	0.477	0.500	0	0	1
LOSS	0.312	0.463	0	0	1

DAC_{*it*}: Discretionary accruals.

BIG 5: 1 if the auditor is member of big five; 0 otherwise.

SPEC_{*it*}: 1 if the auditor is an industry specialist; 0 otherwise.

NEWAUD_{*it*}: 1 if the first sample year is the first year with a new auditor; 0 otherwise.

OLDAUD_{*it*}: 1 if the last sample year is followed by an auditor change; 0 otherwise.

ABSTA_{*it*}: Absolute value of total accruals.

OCF_{*it*}: Operating cash flow deflated by lagged total assets.

LEV_{*it*}: Leverage, defined as total liabilities over total assets.

MTB_{*it*}: Market to book ratio.

SIZE_{*it*}: Log of sales.

ShareInc_{*it*}: 1 if there is an increase of more than 10% of total outstanding shares during the year; 0 otherwise.

ShareDec_{*it*}: 1 if there is a decline of more than 10% of the total outstanding shares during the year; 0 otherwise.

PERSIST_{*it*}: 1 if absolute value of change in income before extraordinary items fall into extreme deciles; 0 otherwise.

INCCHG_{*it*}: 1 if this year's income is greater than previous year's income; 0 otherwise.

LOSS_{*it*}: 1 if the company incurs a loss; 0 otherwise.

Table 3 reports the correlations between the dependent and independent variables. The Pearson correlation is shown above the diagonal while the Spearman correlation is shown below the diagonal. The Big 5 variable is negatively related to discretionary accruals whereas industry specialist (SPEC) is insignificantly and negatively related to discretionary accruals. This suggests that Big 5 auditors are associated with lower earnings management, although the formal analyses are based on multivariate analyses. As expected, there is a positive correlation between the Big 5 and industry specialist variables. Large companies are more likely to use Big 5 firms. Firms audited by Big 5 are more likely to make a profit.

Tests of the research hypotheses using discretionary accruals as the dependent variable are reported in Table 4. The first two columns report the results using separate Big 5 brand name and industry specialist measures, and the third column reports the results using both measures. The Auditor Brand Name is associated with lower discretionary accruals at the 1% level or better in both model specifications. These results suggest that firms audited by Big 5 auditors engage in less earnings management, and auditor brand name plays an important role in reducing earnings management. Therefore, we provide evidence consistent with Hypothesis 1.

The coefficient on the industry specialist variable is insignificantly positive in the second and third column of the full sample. One possible explanation is that the Taiwan audit market is comparatively smaller than the USA.

Several control variables in the third column are significantly related to discretionary accruals. Consistent with Becker et al. (1998), the absolute value of total accruals is negatively associated with discretionary accruals, which indicates that firms exercising more discretion on accruals are less likely to use discretionary accruals to increase earnings. Operating cash flow is negatively related to discretionary accruals, which suggests that firms with a strong operating cash flow position are less likely to use discretionary accruals to increase earnings. Leverage is also negatively related to earnings management, suggesting that these firms are not using discretionary accruals to satisfy debt covenant requirements. The MTB is positively related to discretionary accruals, indicating that firms with a higher market-to-book value are more likely to engage in earnings management. Firm size is also positively related to earnings management, suggesting that large firms engage more in income increasing earnings management. Further, the income change variable is positively associated with discretionary accruals, which suggests that income increasing can be partially attributed to the earnings management through discretionary accruals. The loss variable is negatively related to discretionary accruals, which suggests that loss firms are likely to push earnings further down to save income for the next period.

In order to control for auditor brand name, we also conducted a direct test for the incremental impact of industry specialist on earnings management focusing only on firms that use Big 5 auditors, and the results are reported in the last column of Table 4. However, the industry specialist variable is insignificantly positive related to discretionary accruals, which is similar to the results shown in the full sample.

Table 3 Correlation matrix for dependent and independent variable (The Pearson (Spearman) correlation is shown above (below) the diagonal)

	DAC	BIG5	SPEC	NEWAUD	OLDAUD	ABSTA	OCF	LEV	MTB	SIZE	ShareInc	ShareDec	PERSIST	INCCHG	LOSS
DAC	1														
BIG5	-0.036**	1													
SPEC	-0.015	0.161***	1												
NEWAUD	-0.063***	-0.161***	0.003	1											
OLDAUD	-0.013	-0.012	-0.008	0.003	1										
ABSTA	-0.293***	0.066***	-0.020	-0.093***	0.010	1									
OCF	-0.464***	0.067***	-0.027*	-0.040**	-0.026	0.106***	1								
LEV	-0.102***	-0.008	0.020	0.086***	0.026	0.193***	-0.274***	1							
MTB	0.165***	0.124***	-0.162***	-0.031*	-0.022	0.076***	0.242***	-0.160***	1						
SIZE	0.056***	0.100***	0.001	-0.004	-0.038**	-0.053***	0.138***	0.133***	0.199***	1					
ShareInc	0.150***	0.115***	-0.134***	-0.049***	-0.058***	-0.001	0.109***	-0.195***	0.498***	0.127***	1				
ShareDec	-0.062***	0.002	0.022	0.000	0.048***	0.068***	-0.026	0.136***	-0.068***	-0.054***	-0.103***	1			
PERSIST	-0.004	0.056***	0.024	0.024	0.000	0.035**	-0.067***	0.138***	0.003	0.244***	-0.035**	0.058***	1		
INCCHG	0.116***	0.038**	-0.038**	0.013	0.024	-0.037**	0.163***	-0.029*	0.156***	0.059***	-0.064***	0.073***	0.005	1	
LOSS	-0.318***	-0.014	0.027*	0.068***	0.039**	0.277***	-0.303***	0.343***	-0.374***	-0.153***	-0.272***	0.114***	0.111***	-0.288***	1

Table 4 Regression of discretionary accruals on auditors and industry specialisation (sales-based industry specialisation measure)

	<i>Full sample</i>			<i>Big 5 only</i>
	<i>DAC</i>	<i>DAC</i>	<i>DAC</i>	<i>DAC</i>
	<i>n = 2324</i>	<i>n = 2324</i>	<i>n = 2324</i>	<i>n = 1821</i>
Intercept	-0.018	-0.020	-0.017	-0.027
(t-statistic)	(-0.933)	(-1.014)	(-0.851)	(-1.190)
BIG5 (-)	-0.009	-	-0.009	-
	(-2.994)***	-	(-3.126)***	-
SPEC (H-)	-	0.001	0.004	0.004
	-	(0.256)	(0.950)	(1.127)
NEWAUD (-)	-0.017	-0.015	-0.018	-0.028
	(-3.130)***	(-2.751)***	(-3.163)***	(-3.540)***
OLDAUD (-)	-0.004	-0.003	-0.003	-0.004
	(-0.941)	(-0.862)	(-0.885)	(-0.788)
ABSTA (-)	-0.172	-0.175	-0.172	-0.179
	(-2.473)***	(-2.511)***	(-2.461)***	(-2.309)***
OCF (?)	-0.651	-0.652	-0.651	-0.638
	(-13.326)***	(-13.368)***	(-13.316)***	(-11.860)***
LEV (?)	-0.088	-0.087	-0.087	-0.094
	(-7.084)***	(-7.071)***	(-7.076)***	(-6.636)***
MTB (+)	0.012	0.012	0.012	0.012
	(5.571)***	(5.488)***	(5.565)***	(4.601)***
SIZE (-)	0.007	0.006	0.006	0.007
	(4.468)***	(4.257)***	(4.364)***	(4.031)***
ShareInc (+)	0.012	0.012	0.013	0.014
	(3.321)***	(3.198)***	(3.475)***	(3.451)***
ShareDec (-)	-0.002	-0.002	-0.002	-0.003
	(-0.177)	(-0.195)	(-0.181)	(-0.245)
PERSIST (+)	-0.002	-0.003	-0.002	-0.003
	(-0.815)	(-0.894)	(-0.833)	(-0.820)
INCCHG (+)	0.021	0.021	0.021	0.020
	(7.468)***	(7.371)***	(7.469)***	(6.270)***
LOSS (+)	-0.054	-0.055	-0.054	-0.057
	(-11.903)***	(-12.037)***	(-11.940)***	(-10.720)***
Adj. R-square	0.541	0.539	0.541	0.540
F-value	209.126***	207.985***	194.239***	163.291***

*, ** and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, one-tailed test where appropriate. We report asymptotic *t*-statistic in parentheses based on White (1980) standard error. Variables are defined in Table 2.

5.3 Additional analyses and robustness tests

To further understand the phenomenon of earnings management and the role played by the Big 5 and industry specialist auditors in Taiwan, we divide our sample into two groups: positive discretionary accruals and negative discretionary accruals and rerun our regression. In the first three columns of Table 5, we report the regression results by using 1190 observations having positive discretionary accruals where the behavior of income increasing discretionary accruals is present. The test results indicate that industry specialisation variable is significantly negatively related to positive discretionary accruals, suggesting that firms using industry specialists are less likely to engage in income-increasing earnings management. The finding is consistent with others (Krishnan, 2003; Balsam et al., 2003; Craswell et al., 1995), in that industry specialisation is an important element in auditor quality. To the authors' knowledge, this is the first study demonstrating industry specialisation is an important factor to constrain earnings management in a sample of Taiwanese companies. However, we did not find a significant relation between Big 5 and positive discretionary accruals.

Table 5 Regression of positive (negative) discretionary accruals on auditors and industry specialisation (sales-based industry specialisation measure)

	+DAC (<i>n</i> = 1190)			-DAC (<i>n</i> = 1134)		
Intercept	0.038	0.034	0.034	-0.033	-0.035	-0.032
(<i>t</i> -statistic)	(2.882)***	(2.557)***	(2.556)***	(-1.423)*	(-1.594)*	(-1.395)*
BIG5 (-)	-0.001	-	0.0004	-0.008	-	-0.009
	(-0.444)	-	(0.160)	(-2.778)***	-	(-2.909)***
SPEC (-)	-	-0.006	-0.006	-	0.002	0.004
	-	(-2.448)***	(-2.417)***	-	(0.552)	(1.187)
NEWAUD (-)	-0.0001	0.0003	0.0004	-0.018	-0.016	-0.018
	(-0.020)	(0.092)	(0.119)	(-3.471)***	(-3.068)***	(-3.473)***
OLDAUD (-)	-0.010	-0.010	-0.010	-0.004	-0.004	-0.004
	(-2.082)**	(-2.156)**	(-2.154)**	(-1.066)	(-0.951)	(-0.977)
ABSTA (-)	0.606	0.607	0.607	-0.524	-0.528	-0.525
	(10.730)***	(10.788)***	(10.791)***	(-5.106)***	(-5.143)***	(-5.142)***
OCF (?)	-0.184	-0.182	-0.182	-0.253	-0.252	-0.252
	(-3.922)***	(-3.900)***	(-3.898)***	(-2.648)***	(-2.640)***	(-2.656)***
LEV (?)	-0.012	-0.011	-0.011	-0.053	-0.053	-0.053
	(-1.219)	(-1.201)	(-1.196)	(-3.511)***	(-3.505)***	(-3.520)***
MTB (+)	0.004	0.004	0.004	0.0003	0.0003	0.0005
	(2.993)***	(2.811)***	(2.795)***	(0.134)	(0.112)	(0.208)
SIZE (-)	-0.001	-0.0002	-0.0003	0.005	0.005	0.005
	(-0.581)	(-0.270)	(-0.277)	(2.711)***	(2.598)***	(2.689)***

Table 5 Regression of positive (negative) discretionary accruals on auditors and industry specialisation (sales-based industry specialisation measure) (continued)

	<i>+DAC</i> (<i>n</i> = 1190)			<i>-DAC</i> (<i>n</i> = 1134)		
ShareInc (+)	0.001 (0.346)	-0.00002 (-0.007)	-0.00005 (-0.023)	-0.003 (-1.004)	-0.004 (-1.243)	-0.003 (-0.845)
ShareDec (-)	0.003 (0.492)	0.004 (0.571)	0.004 (0.577)	0.008 (0.714)	0.007 (0.678)	0.008 (0.733)
PERSIST (+)	0.003 (1.382)*	0.003 (1.489)*	0.003 (1.486)*	-0.003 (-0.971)	-0.003 (-1.020)	-0.003 (-0.950)
INCCHG (+)	0.002 (1.142)	0.002 (1.023)	0.002 (1.014)	0.009 (2.179)**	0.009 (2.086)**	0.009 (2.173)**
LOSS (+)	-0.024 (-8.065)***	-0.024 (-8.099)***	-0.024 (-8.089)***	-0.013 (-1.444)*	-0.013 (-1.468)*	-0.013 (-1.438)*
Adj. R-square	0.714	0.715	0.715	0.646	0.644	0.646
F-value	226.313***	227.490***	211.067***	157.238***	155.856***	146.147***

*, **, and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, one-tailed test where appropriate. $+DAC_{it}$ ($-DAC_{it}$) denotes positive (negative) discretionary accruals. We report asymptotic *t*-statistic in parentheses based on White (1980) standard error. Variables are defined in Table 2.

In the last three columns of Table 5, we report the regression results by using 1134 sample firms having negative discretionary accruals. The test results support that Big 5 auditor's ability to constrain income-decreasing earnings management, which further corroborates the evidence shown in Table 4 that Big 5 auditor is an important factor to constrain earnings management. However, we do not find a significant relation between industry specialists and negative discretionary accruals.

In summary, we find that Big 5 auditors are related to less earnings management in Taiwan whereas industry specialist auditors are related to less income increasing earnings management in Taiwan. To examine whether there is incremental impact of industry specialisation beyond auditor brand name, we rerun the regression based on 25% sales-based measure for industry specialisation for Big five clients only and the results are reported in Table 6. The coefficient of SPEC (based on sales-based 25% market share cutoff) and the coefficient of SBMS (based on a continuous sales-based market share measure for industry specialisation) are significantly negatively related to positive discretionary accruals. The results are consistent with the full sample's results reported in Table 5. However, we find no such relation between industry specialist and negative discretionary accruals for the Big 5 sample.

Table 6 Regression of positive discretionary accruals on auditors, industry specialisation, and market shares for BIG 5 sample

	+DAC (<i>n</i> = 917)		-DAC (<i>n</i> = 904)	
Intercept	0.042	0.046	-0.088	-0.090
(<i>t</i> -statistic)	(2.819)***	(2.878)***	(-3.573)***	(-3.598)***
SPEC (-)	-0.006	-	0.003	-
	(-2.252)**	-	(0.768)	-
SBMS	-	-0.017	-	0.002
	-	(-1.294)*	-	(0.135)
NEWAUD (-)	-0.004	-0.004	-0.026	-0.025
	(-0.880)	(-1.033)	(-3.499)***	(-3.498)***
OLDAUD (-)	-0.011	-0.011	-0.005	-0.005
	(-1.880)**	(-1.796)**	(-1.107)	(-1.173)
ABSTA (-)	0.605	0.604	-0.504	-0.504
	(9.514)***	(9.460)***	(-5.129)***	(-5.103)***
OCF (?)	-0.172	-0.172	-0.267	-0.267
	(-3.279)***	(-3.277)***	(-3.041)***	(-3.034)***
LEV (?)	-0.006	-0.007	-0.065	-0.065
	(-0.567)	(-0.588)	(-4.231)***	(-4.223)***
MTB (+)	0.004	0.004	0.0004	0.0003
	(2.276)**	(2.432)***	(0.182)	(0.131)
SIZE (-)	-0.001	-0.001	0.008	0.008
	(-0.810)	(-0.937)	(4.548)***	(4.551)***
ShareInc (+)	0.0004	0.001	-0.002	-0.003
	(0.157)	(0.462)	(-0.633)	(-0.742)
ShareDec (-)	0.007	0.007	0.005	0.005
	(1.053)	(0.937)	(0.536)	(0.525)
PERSIST (+)	0.004	0.004	-0.006	-0.006
	(1.603)*	(1.551)*	(-1.890)**	(-1.914)**
INCCHG (+)	0.002	0.002	0.010	0.010
	(0.904)	(0.954)	(2.391)***	(2.395)***
LOSS (+)	-0.025	-0.025	-0.018	-0.018
	(-7.220)***	(-7.166)***	(-1.864)**	(-1.866)**
Adj. R-square	0.730	0.729	0.653	0.653
F-value	187.742***	187.028***	128.984***	128.869***

*, **, and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, one-tailed test where appropriate. We report asymptotic *t*-statistic in parentheses based on White (1980) standard error. Variables are defined in Table 2, except for SBMS indicating a continuous sales-based market share measure for industry specialisation.

Continuous measures of industry specialisation allow for greater variation in the specialist measure, although dichotomous measures may provide greater power by capturing the perception of industry specialisation, which categorises the auditor as a specialist or a non-specialist. The regression results, using a continuous sales-based market share measure of industry specialists, for both the full sample and the Big 5 sample are reported in Table 7. The coefficient of Big 5 is also significantly negative as expected. The results for the coefficient of industry specialist (SBMS) are qualitatively similar to that of SPEC and are insignificant in Table 4.

We also conducted other tests by using an asset-based measure or using number of clients as a measure of industry specialist to examine the relation between Big 5, industry specialists and discretionary accruals. The results (not tabulated) are consistent with those for the sales-based industry specialist measures.

Table 7 Regression of discretionary accruals on BIG 5 and industry specialisation based on continuous sales-based market share measure

	<i>Full sample</i>		<i>Big 5 only</i>
	<i>DAC</i>	<i>DAC</i>	<i>DAC</i>
	<i>n = 2324</i>	<i>n = 2324</i>	<i>n = 1821</i>
Intercept	-0.026	-0.022	-0.053
(<i>t</i> -statistic)	(-1.260)	(-1.080)	(-2.259)**
BIG 5 (-)	-	-0.008	-
	-	(-2.240)**	-
SBMS (-)	-0.022	-0.002	0.005
	(-1.776)**	(-0.127)	(0.325)
NEWAUD (-)	-0.016	-0.018	-0.028
	(-2.894)***	(-3.156)***	(-3.502)***
OLDAUD (-)	-0.004	-0.004	-0.005
	(-1.017)	(-1.058)	(-0.982)
ABSTA (-)	-0.172	-0.169	-0.173
	(-2.479)***	(-2.428)***	(-2.242)**
OCF (?)	-0.644	-0.644	-0.632
	(-13.475)***	(-13.432)***	(-11.984)***
LEV (?)	-0.085	-0.084	-0.092
	(-6.802)***	(-6.779)***	(-6.407)***
MTB (+)	0.012	0.013	0.012
	(5.651)***	(5.695)***	(4.677)***
SIZE (-)	0.006	0.006	0.008
	(4.651)***	(4.589)***	(5.115)***

Table 7 Regression of discretionary accruals on BIG 5 and industry specialisation based on continuous sales-based market share measure (continued)

	<i>Full sample</i>		<i>Big 5 only</i>
	<i>DAC</i>	<i>DAC</i>	<i>DAC</i>
	<i>n = 2324</i>	<i>n = 2324</i>	<i>n = 1821</i>
ShareInc (+)	0.012 (3.329)***	0.013 (3.525)***	0.014 (3.476)***
ShareDec (-)	-0.004 (-0.360)	-0.004 (-0.354)	-0.005 (-0.406)
PERSIST (+)	-0.003 (-1.135)	-0.003 (-1.091)	-0.005 (-1.372)*
INCCHG (+)	0.021 (7.445)***	0.021 (7.480)***	0.021 (6.393)***
LOSS (+)	-0.057 (-12.397)***	-0.057 (-11.940)***	-0.059 (-11.117)***
Adj. R-square	0.539	0.540	0.542
F-value	208.018***	193.692***	164.455***

*, **, and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, one-tailed test where appropriate. We report asymptotic t-statistic in parentheses based on White (1980) standard error. Variables are defined in Table 2, except for SBMS indicating a continuous sales-based market share measure for industry specialisation.

We also conduct sensitivity analyses (not reported) by using 15% and 20% sales-based market share as a cutoff for industry specialists. The results for Big 5 for both cutoffs are still significantly negative and thus are qualitatively similar to the results reported in Table 4. The only difference is related to industry specialist. For the 20% sales-based cutoff, the coefficient of industry specialist (SPEC) turned into insignificantly positive whereas the coefficient of SPEC for 15% sales-based cutoff is still insignificantly negative. To address the concern whether the results are confounded by the collapse of Andersen in 2002, we reran the regression by using 1658 sample observations during year 1998–2001. The results are qualitatively similar to those reported in Table 4. In Taiwan, T.N. Soong & Co. (a member firm of Arthur Andersen & Co.) merged into Deloitte and Touche, and became Deloitte and Touche on 1 June 2003, which is beyond our sample period from 1998 to 2002. Therefore, our results may not be confounded by the collapse of Arthur Andersen in 2002.

In summary, the significantly negative association between Big 5 and discretionary accruals suggests that auditor brand name is an important factor to constrain earnings management in Taiwan audit market. We also find that auditor industry specialisation is associated with less income increasing earnings management.

6 Summary and conclusions

In this study, we examine whether auditor brand name and industry specialisation are associated with earnings management for companies listed in TSE and GreTai Securities Market. We investigate whether the empirical results that Big 5 auditors and industry specialists constrain earnings management in the USA can extend to Taiwan given the significantly different audit market and legal environments. Using 2324 observations of sample companies selected from (TEJ) during 1998–2002, we find that Big 5 auditors are associated with lower discretionary accruals, consistent with auditors' brand name reputation constraining earnings management. When we further separate the sample firms into positive and negative discretionary accruals, we find that industry specialist auditors constrain income-increasing earnings management. To our knowledge, this is the *first* study demonstrating that auditor industry specialisation is an important factor to constrain income-increasing earnings management in Taiwan. This is important given that managers have incentives to engage in earnings management in the less developed capital market in Taiwan, where the information asymmetry could be more severe than in the USA. Our results suggest that the employment of Big 5 auditors and industry specialist auditors can further enhance the creditability of financial reporting. In contrast to previous research that has focused on companies with particular economic events such as IPO or SEO, we investigate a general sample of public companies in the emerging market of Taiwan.

We conclude with a discussion of limitations and possible extensions. We use the popular cross-sectional modified Jones model to estimate discretionary accruals Bartov et al (2000). However, a drawback of the modified Jones model is that it does so with measurement error Kothari et al. (2005). Some studies even argue that the modified Jones model does not perform well in detecting GAAP violators (e.g., Beneish, 1997). Therefore, future studies might consider using performance-matched discretionary accruals as suggested by Kothari et al. (2005) to measure earnings management. The use of proxies to measure auditor industry specialisation is also a limitation of this study. Recent studies argue that specialisation measures based on national market share may not capture specialisation in situations where the auditor has a concentrated local clientele (e.g., Francis et al., 2005). Since the size of audit market in Taiwan is comparatively smaller than that of the USA, the results of our study may not capture city-specific auditor industry specialisation. Since IPO and SEO settings are different from this general sample of Taiwanese firms used in this study, our results may not extend to the IPO and SEO settings.

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Notes

¹In Taiwan, the Big 5 audit firms are Soong & Co. (a member firm of Arthur Andersen & Co.), PricewaterhouseCoopers, KPMG, Deloitte and Touche, and Diwan Ernst & Young. Due to the Enron scandal and the ceased operation of Arthur Andersen on August 31, 2002, T. N. Soong & Co. merged into Deloitte and Touche and became Deloitte and Touche on June 1, 2003.

²The 1997 Asian Financial Crisis heavily influenced Taiwan. Several explanations are proposed to explain the 1997 Asian Financial Crisis: unfavorable macroeconomic conditions, weakness of corporate governance and lack of reliable accounting information.

³Under the Code of Professional Conduct, a CPA is not allowed to charge an audit fee below the floor set by the Taiwan CPA Association. However, the FTC of the Executive Yuan abolished the policy of regulating the audit fee floor in May 1998, because FTC argues that the audit fee floor set by the CPA Association was against the Fair Trade Act, which is enacted to maintain trading order, protect consumers' interest, ensure fair competition, and promote economic stability and prosperity. Therefore, the competition of the Taiwan audit market is expected to be increasing hereafter.

⁴The five focus industries claimed by KPMG Taiwan are:

- financial services
- information communication and entertainment
- industrial products
- consumer products
- infrastructure, public services, and health care

which can be retrieved from <http://www.kpmg.com.tw>.

⁵The quote is available from <http://www.pwcglobal.com/gx/eng/about/ind/index.html>.

⁶Wu (2002) examines whether the effect of the abolishment of the regulation of the audit fee floor by the FTC on audit fee and auditor switch decision. The results indicate that insignificant decrease of audit fee. However, she finds that the probability of auditor switch is significantly increased after the abolishment of the audit fee floor, suggesting the increase of competition of audit market in Taiwan.

⁷According to the Guidelines for Disclosure of Financial Forecasts by Public Companies initiated in 1991, companies are required to publicise their financial forecasts also for the following events: major business contract signing, one-third of the original directors have changed during the same term of office, major operation segments have changed, and the company faces operational

difficulties. However, the rules in the Guidelines have been revised on August 24, 2004 by the Financial Supervisory Commission (formerly known as Securities and Futures Commission) and changed the mandatory financial forecasts to voluntary financial forecasts, effective on January 1, 2005. The newly promulgated rule does not apply to our study, because our sample period is from 1998 to 2002.

⁸Procomp Informatics was founded in 1991 with four employees to engage in the import-export of computer peripherals, and became a listed company in TSE in 1999. Procomp originally planned to raise US\$117 million through the issuance of global depositary receipts (GDRs) in early June 2004, but the actual amount it raised was only US\$48 million. The company filed for restructuring on June 15, and the CEO and 31 other employees were accused of the alleged embezzling of company funds and making fraudulent financial reports to boost the company's revenues on October 25, 2004. Infodisc, a maker of compact discs and digital video discs, suffered a huge loss of over NTD 7.9 billion for the half of year 2004. However, the company can not provide proof for NTD 2.4 billion transaction that is with Rabobank (Singapore branch). Infodisc stock was downgraded as a full-delivery stock on September 8, 2004.

⁹The first class action lawsuit in Taiwan occurred in 1998. It involves Cheng I Food Company, where the claim by investors is NTD 71,017,531 (NTD stands for New Taiwan Dollar. One US dollar approximately equals 32 NTD during early March 2005, depending on the flotation of the foreign currency exchange rate). This case was reported by the Commercial Times (a daily newspaper in Taiwan) on November 23, 1998.

¹⁰Related research on auditor litigation in the USA can be referred to studies such as Palmrose (1991a, 1991b, 1997) and Cloyd *et al.* (1998).

¹¹The Supreme Court of Justice of the USA unanimously overturned Andersen's conviction on May 31, 2005, which was just a symbolic victory for Andersen given that Andersen had lost all of its clients.

¹²Prior research infers audit quality from audit firm size (e.g., DeAngelo, 1981) or audit firm's brand name (e.g., Simunic and Stein, 1987). DeAngelo (1981) suggests that audit quality is related to firm size. She argues that large audit firms are more likely to be independent because they receive a smaller percentage of total firm revenues from a given client. Simunic and Stein (1987) assume that audit quality can be inferred from an audit firm's brand name. They argue that

“multiple unobservable levels of audit quality cannot, in principle, be sold under a single brand name. In addition, if investments in reputation associated with the delivery of a specific level of assurance are not movable, the auditor is motivated to maintain intertemporal stability in the delivered quality level.”

¹³Park and Shin (2004) investigate the effect of board composition on the practice of earnings management in Canada, where they require six observations as the industry classification based on the Toronto Stock Exchange subindices. The size of TSE is comparable to that of Toronto Stock Exchange, and therefore we also require at least six observations for each industry.

¹⁴Recent study (Francis *et al.*, 2005) use each Big 5's share of audit fees (ranked from one to five) in each industry groupings based on two-digit SIC codes to measure auditor industry specialisation as the audit fee data are publicly available since February 5, 2001.

¹⁵Teoh *et al.* (1998a) find that IPO firms engage in earnings management and at issue earnings management is found to be negatively related to post issue earnings performance, while Teoh *et al.* (1998b) find that SEO firms who report higher net income through earnings management have lower post issue long-run abnormal returns and net income.