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Inside directors' characteristics and accruals management: The roles of controlling shareholders' control-cash flow rights deviation, accounting background, and family member

內部董事特性與應計盈餘管理：控制股東的股份控制權和盈餘分配權偏離程度、會計背景及家族成員之影響

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Abstract: This research takes data of 7,106 Taiwanese-listed companies to investigate the association between the characteristics of inside directors and accruals management under the environment with higher controlling shareholders' control-cash flow rights deviation. When the proportion of inside directors in a firm is greater, our findings reveal that the amount the firm engages in accruals management is larger. Under the same environment, inside directors with an accounting background can mitigate the positive relation between the proportion of inside directors in a firm and the amount the firm engages in accruals management. Regardless of a higher or lower percentage of inside directors served by family members, under higher controlling shareholders' control-cash flow rights deviation, there is a positive relation between the proportion of inside directors and the amount the firm engages in accruals management.

Keywords: Inside director, accruals management, controlling shareholders' control-cash flow rights deviation, accounting background, family member.

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摘要：本研究以台灣 7,106 家上市櫃公司為測試樣本，探討控制股東的股份控制權和盈餘分配權偏離程度較高的環境下，內部董事特質與應計盈餘管理之關聯性。本研究發現在前述環境下，內部董事在公司的比重若較高，則公司進行應計盈餘管理的金額也較大。除此之外，同樣環境下，內部董事具有會計背景可以減緩內部董事比重與公司進行應計盈餘管理金額間的正向關聯性。然而，不論家族成員擔任內部董事的比重係高或低，在控制股東的股份控制權和盈餘分配權偏離程度較高的環境下，內部董事比重與公司進行應計盈餘管理的金額都成正相關。

關鍵詞：內部董事、應計盈餘管理、控制股東的股份控制權和盈餘分配權偏離程度、會計背景、家族成員

1. Introduction

Some studies in the literature have suggested private information refers to a situation in which, unlike external parties, internal parties obtain private information concerning managers' operating efforts at a low cost, because of their participation in the company's operations, and so they are less easily fooled by managers and thus make more accurate decisions (Adams and Ferreira, 2007; Almazan and Suarez, 2003; Drymiotes, 2007; Laux, 2008; Raheja, 2005). There are few studies in the literature covering inside directors, but some examples include Drymiotes (2007) who uses mathematical models to derive the monitoring function of insiders, while Lin *et al.* (2012) explore the impact of research and development (R&D) expenditure on the relation between the role of inside directors and company performance. Tai (2014) studies the director and manager roles of inside directors, while Tai *et al.* (2015) investigate the relationship between inside directors' excess compensation and their company's future performance. According to the results of Drymiotes (2007), Tai (2014), and Tai *et al.* (2015), inside directors clearly play the role of monitoring through board operations, and therefore inside directors have a certain impact on earnings management.

Because inside directors typically hold a high percentage of shareholdings,

the wealth of inside directors shares a close relationship with the firm value. Therefore, inside directors care not just about private benefits, but also emphasize shared benefits. In other words, they will reduce behaviors, such as real earnings management that can harm the value of the company due to the sharing interests of firms (Anderson and Reeb, 2003a, 2003b; Miller *et al.*, 2007). Thus, this study expects that an inside director, in the presence of earnings management incentives, will less likely engage in any real earnings management mechanism that can hurt the real interests of the company (Roychowdhury, 2006), implying an inside director will more likely engage in the accruals management mechanism when facing earnings management incentives. Therefore, this study examines the relation between inside directors and accruals management to fill the gap in the literature related to inside directors and earnings management.

The agency theory suggests an interest conflict exists between the principal and the agent due to information asymmetry (Jensen and Meckling, 1976), yet agency problems vary due to differences in ownership structures between countries. For example, agency problems in Asia are mainly principal-principal conflicts (Claessens *et al.*, 2000; La Porta *et al.*, 1998; Shleifer and Vishney, 1997). La Porta *et al.* (1999) and Claessens *et al.* (2000) also note for most emerging economies, like East Asian countries, that many firms are run by a small number of controlling shareholders, who easily manipulate earnings for their own wealth, which can lead to fraud and embezzlement if there is no appropriate supervisor mechanism.

The literature has indicated that controlling shareholders have an incentive to seize minority shareholders' wealth to maintain their own interests (Gilson and Gordon, 2003; Shleifer and Vishny, 1997) by manipulating earnings (Haw *et al.*, 2004; Leuz *et al.*, 2003). Moreover, a large separation level between control rights and share rights facilitates controlling shareholders to embezzle the wealth of minority shareholders (Claessens *et al.*, 2000; Claessens *et al.*, 2002; La Porta *et al.*, 1999). Du and Dai (2005) find that the level of controlling shareholders' embezzlement is higher when the level of separation between control and share rights is greater. In short, investigating the influence of controlling shareholders'

control-cash flow rights deviation is appropriate when exploring earnings management. To summarize the above discussions, this study examines the influence of inside directors on accruals management behavior under the environment with higher controlling shareholders' control-cash flow rights deviation. To expand our research contribution, we further explore the impact of two characteristics of inside directors.

According to prior studies, such as Krishnan and Visvanathan (2008) and Dhaliwal *et al.* (2010), only financial experts with an accounting background increase the quality of accruals and have less incentives to engage in earnings management. Baxter and Cotter (2009) also suggest a positive relation between the ratio of financial experts with an accounting background and the quality of accruals. In short, inside directors with an accounting background influence accruals management behavior. Therefore, the first characteristic of inside directors we consider is whether inside directors have an accounting background.

Prior literature also finds that over half of Taiwanese firms are categorized as family firms (Claessens *et al.*, 2000; Kuo and Wang, 2017; Yeh *et al.*, 2001), and so we further consider the factor related with family firms. If family members are inside directors, then it means they typically hold a large percentage of shareholdings. Under this situation, inside directors served by family members have greater incentive to sacrifice the interests of minority shareholders to enhance their private benefits (Gopalan and Jayaraman, 2012). In other words, if the proportion of inside directors served by family members is higher, then this kind of inside directors has greater incentive to employ earnings management (i.e., accruals management) to expand their private benefits. Therefore, the second characteristic of inside directors we consider is whether inside directors are also family members.

Our results find that under the environment with higher controlling shareholders' control-cash flow rights deviation, when the percentage of inside directors in the firms is greater, the amount of accruals management is also larger. In addition, under the environment with higher controlling shareholders' control-cash flow rights deviation, inside directors with an accounting background can

mitigate the positive relation between the proportion of inside directors in a firm and the amount for the firm to engage in accruals management. Furthermore, under such a situation, regardless of a higher or lower percentage of inside directors served by family members, if the proportion of inside directors in a firm is higher, then the firm's accruals management amount is also higher.

Four studies taking Taiwanese firms as samples closely resemble our paper. First, Chen *et al.* (2010) explore the incentive and entrenchment effects of controlling shareholders on the relation between the level of investment opportunity and earnings management. They find that high-growth firms with a high deviation between cash flow rights and control rights of controlling shareholders have larger incentives to engage in earnings management. Our paper examines the relation between the characteristics of inside directors and accruals management under the environment with higher controlling shareholders' control-cash flow rights deviation. The main difference between Chen *et al.* (2010) and our work is that the exploring issue in Chen *et al.* (2010) is the investment opportunity set, while the exploring issue of our paper is two characteristics of inside directors: inside directors who have an accounting background and inside directors served by family members.

Second, Wang and Chang (2012) investigate the effect of controlling shareholders' control-cash flow rights deviation on earnings management, but they do not discuss the role of inside directors on this relation. For example, we discuss whether inside directors with an accounting background mitigate the positive relation between the proportion of inside directors in a firm and the amount that the firm engages in accruals management. In addition, we explore whether a higher percentage of inside directors served by family members enhances the positive relation between the proportion of inside directors in a firm and the amount that the firm engages in accruals management.

Third, Tai (2017) investigates the effect of inside directors on earnings management in family companies. The first difference between her paper and ours is that she does not discuss the impact of controlling shareholders' control-cash flow rights deviation. The second one is that she does not examine the effect of

inside directors on earnings management in non-family companies. The last difference is that she does not explore the impact of two characteristics (accounting background and family members) of inside directors, whereas we discuss their influences in this paper. Therefore, our work offers additional findings compared with those of Tai (2017).

Fourth, Lee and Liao (2004) examine the impacts of five characteristics of board of directors, including board independence, size of the board, CEO-duality, institutional ownership, and managerial ownership, on earnings management. There are two different points between Lee and Liao (2004) and our paper. The first point is that the five characteristics of board of directors, which Lee and Liao (2004) explore, do not include "the characteristics of inside directors", implying the two characteristics of inside directors (accounting background and family members) we explore in our paper are not tested in Lee and Liao (2004). The second point is that Lee and Liao (2004) do not examine the influence of controlling shareholders' control-cash flow rights deviation, but our paper does. To summarize the above discussions, our research is different from those four studies, and so our empirical results complement the existing literature and provide wider implications for participants.

We list our contributions for filling the gap in the literature as below. First, the results herein find under the environment with higher controlling shareholders' control-cash flow rights deviation that increasing the proportion of inside directors in firms raises the amount that they engage in accruals management. This finding is consistent with the viewpoint of private information and the interest conflict hypothesis.

Second, the workings of family firms are often a popular topic (e.g., Ali *et al.*, 2007; Anderson *et al.*, 2003; Chang *et al.*, 2013; Fan *et al.*, 2007; Lin *et al.*, 2011; Wang, 2006), yet most studies focus on the association between family firm characteristics and firm performance (e.g., Anderson and Reeb, 2003a; Demsetz, 1983; Gibb Dyer Jr, 2006; Lin *et al.*, 2011; Maury, 2006). Some studies explore the earnings quality of family firms. For example, Hsu *et al.* (2013) and Goh *et al.* (2014) suggest family firms have a higher incentive for earnings management,

because the risk of being supervised is low. Tai (2017) presents that inside directors reduce the behavior of earnings management in family companies. Our study examines the impact of inside directors served by family members, and the results reveal that regardless of a higher or lower percentage of inside directors served by family members, under the environment with higher controlling shareholders' control-cash flow rights deviation, if the firm has a greater percentage of inside directors, then the amount it engages in accruals management increases. The findings fill the previous gap in the literature with regard to the issue of earnings management of family firms.

Third, the results herein complement the shortcomings of the literature related to controlling shareholders' control-cash flow rights deviation. In other words, the study shows that inside directors play the role of wealth expropriation in companies with higher controlling shareholders' control-cash flow rights deviation. This runs in accordance with the interest conflict hypothesis. Such a finding also assists outside auditors to measure audit risk.

Fourth and finally, according to our results, under the environment with higher controlling shareholders' control-cash flow rights deviation, inside directors with an accounting background mitigate the positive relation between the proportion of inside directors in a firm and the amount for the firm to engage in accruals management. In other words, an accounting education does have an impact on the accounting treatment of accountants, which is in line with the role theory.

Aside from filling the gap in the literature, this paper also provides some management implications. First, some past fraud cases in Taiwan have been caused by controlling shareholders embezzling company assets and manipulating earnings. Therefore, according to our findings, if companies have a higher controlling shareholders' control-cash flow rights deviation, then inside directors have critical influence on decreasing the amount of accruals management, such as electing one person with an accounting background to serve as an inside director. However, choosing a family member to be an inside director is not a suitable decision, because based on our findings, regardless of a higher or lower percentage

of inside directors served by family members, under higher controlling shareholders' control-cash flow rights deviation, there is a positive association between the proportion of inside directors and the amount the firm engages in accruals management. In short, our findings provide some implications to practitioners as they discuss the effect of inside directors on earnings management under the environment with higher controlling shareholders' control-cash flow rights deviation.

Second, following the above discussions, under the environment with higher controlling shareholders' control-cash flow rights deviation, inside directors with an accounting background mitigate the positive relation between the proportion of inside directors in a firm and the amount for the firm to engage in accruals management, implying accounting education does have an impact on the accounting treatment of accountants. Therefore, the possibility of inside directors engaging in earnings management can be mitigated through accounting education, which supports the viewpoint of the role theory.

The rest of this paper runs as follows. Section 2 gives a literature review and the development of the research hypotheses. Section 3 discusses the data and methodology. Section 4 presents the empirical results. Finally, Section 5 provides conclusions and recommendations.

2. Literature review and hypotheses' developments

Some studies suggest that outside directors on the board only provide a limited supervisory function (Chen and Hsieh, 2011; Sue *et al.*, 2009; Tang, 2010); in other words, the monitoring role of inside directors is important. Unlike external parties, internal parties are able to obtain private information related to managerial efforts at a low cost (Chen *et al.*, 2020), because of their participation in the company's operations. A large strand of literature suggests that inside directors are thus less likely to be fooled by managers and hence can make better decisions (Adams and Ferreira, 2007; Almazan and Suarez, 2003; Bedard *et al.*, 2014; Laux, 2008; Drymiotes, 2007; Raheja, 2005). In summary, according to the viewpoint of private information, inside directors have the ability to influence the amount of

accruals management through their private information.

Controlling shareholders greatly impact firms' investment (Wei and Zhang, 2008), financing (Aslan and Kmar, 2012), or information disclosure (Fan and Wong, 2002), implying their decisions influence firms' operations, other shareholders' wealth, and stakeholders' benefits. In addition, Aslan and Kumar (2012) find that controlling shareholders' risk is less than the benefits they can gain if their control rights are larger than the share rights. In short, if the controlling shareholders' control-cash flow rights deviation is severe, then controlling shareholders have an incentive to sacrifice the interests of minority shareholders to expand their own interests (Gilson and Gordon, 2003; Shleifer and Vishny, 1997). Moreover, one strand of the literature discusses the interest conflict hypothesis (e.g., Browne *et al.*, 1984; Najafian and Safari Gerayli, 2017; Probst *et al.*, 2015) and proposes a common argument: a conflict of interest enhances the risk that one judgment will be unduly influenced by a secondary interest. According to the interest conflict hypothesis linked to corporate governance, such as in Najafian and Safari Gerayli (2017), directors take advantage of related stakeholders' transactions for their private benefits so that firms with related stakeholders' transactions present less comparable financial information to hide the adverse effects of such transactions. In other words, if an inside director is an interest depriver, then the inside director with an internal information advantage may also through self-interest reasons collude with controlling shareholders and violate the wealth of minority shareholders. For instance, information asymmetry provides inside directors with opportunities to manipulate earnings and harm the quality of financial reporting (Yeh *et al.*, 2003). Thus, inside directors may choose to exchange interests with controlling shareholders for their own self-interests through adopting accruals management (Fizel and Louie, 1990; Lorsch and Young, 1990; Mizruchi, 1983; Rosenstein and Wyatt, 1997).

Summarizing the viewpoint of private information and the interest conflict hypothesis, inside directors have abilities to influence the amount of accruals management due to their private information. However, as the percentage of controlling shareholders' control-cash flow rights deviation turns higher, the

collusion incentive between inside directors and controlling shareholders also increases (e.g., Cheung *et al.*, 2006; Wang and Chang, 2012). Therefore, we propose that under the environment with higher controlling shareholders' control-cash flow rights deviation, the higher the proportion is for inside directors in a firm, the larger is the amount for the firm to employ accruals management. Based on this, Hypothesis 1 appears as follows.

Hypothesis 1: According to the viewpoint of private information and the interest conflict hypothesis, under the environment with higher controlling shareholders' control-cash flow rights deviation, the higher the proportion is for inside directors in a firm, the larger is the amount for the firm to engage in accruals management.

From the information perspective, several research studies such as Keck (1997), Van Knippenberg and Schippers (2007), and Zhang (2019) argue that differences in information, knowledge, and preferences of team members may lead to different information processing. For instance, Defond *et al.* (2005) and Dhaliwal *et al.* (2010) indicate in an audit committee that financial experts have different impacts on the quality of financial statements depending on if they have an accounting background or not. Halim *et al.* (2021) suggest that directors with accounting and financial academic/professional qualifications in the boardroom lead to an increase of monitoring and controlling functions. Krishnan and Visvanathan (2008) and Dhaliwal *et al.* (2010) also assert that only financial experts with an accounting background are able to enhance the quality of accruals and are less likely to conduct earnings management. Baxter and Cotter (2009) also find a positive relation between the proportion of financial experts with an accounting background and the quality of accruals. McDaniel *et al.* (2002) and Goh *et al.* (2014) point out that financial experts with an accounting background are the critical factor to enhance the quality of financial statements and decrease the amount of accruals. Therefore, inside directors with an accounting background have the ability to influence the quality or the amount of accruals in financial statements.

From the information perspective, inside directors with an accounting

background can present their correct accounting knowledge about accruals management that will be counterbalanced (offset) in the future to other directors. In other words, accruals management refers to a change in earnings due to the flexibility given by accounting principles or accounting estimations that does not actually affect real cash flows (Wang and D'Souza, 2006); therefore, the manipulation under accruals management will be counterbalanced (offset) in the future. Hence, if the proportion of inside directors with an accounting background is higher, then they can share their correct accounting knowledge to other directors and lead them to decrease their intentions to engage in accruals management, because accruals management will be reversed in the future.

To summarize, if more inside directors have an accounting background, then they may not choose to engage in accruals management, because they know that accruals management will be reversed in the following period (e.g., Bedard *et al.*, 2014). As a result, inside directors with an accounting background are able to mitigate the assertion of H1. Hypothesis 2 is therefore expressed as follows.

Hypothesis 2: According to the information perspective and the interest conflict hypothesis, under the environment with higher controlling shareholders' control-cash flow rights deviation, inside directors with an accounting background mitigate the positive relation between the proportion of inside directors in a firm and the amount that the firm engages in accruals management.

Prior studies have asserted that shareholders enjoy two benefits at the same time: (1) shared benefits, which refer to if the firm's value increases, then shareholders' sharing interests will also increase; therefore, shareholders will care about the ultimate value of the company (e.g., Shleifer *et al.*, 2003); and (2) private benefits, which refer to a situation in which shareholders waste corporate resources and erode the rights of minority shareholders to increase their private own interests (e.g., Barclay and Holderness, 1989; Gopalan and Jayaraman, 2012; Holderness, 2003). In other words, from the viewpoint of private benefits, family members care more about private benefits than shared benefits, implying they will increase behaviors that may harm the ultimate value of the company, but increase their private benefits.

If inside directors are served by family members, then they typically hold a high percentage of shareholdings, and their behaviors are similar with those of controlling shareholders. Therefore, according to the interest conflict hypothesis, inside directors served by family members have an incentive to sacrifice the interests of minority shareholders to expand their private benefits (Gopalan and Jayaraman, 2012). In short, if the proportion of inside directors served by family members is higher, then this kind of inside directors has greater incentive to employ earnings management (i.e., accruals management) to expand their private benefits.

Summarizing the viewpoint of private benefits and the interest conflict hypothesis, we propose that under the environment with higher controlling shareholders' control-cash flow rights deviation, a higher percentage of inside directors served by family members increases the positive relation between the proportion of inside directors in a firm and the amount that the firm employs accruals management. Hypothesis 3 is expressed as follows.

Hypothesis 3: According to the viewpoint of private benefits and the interest conflict hypothesis, under the environment with higher controlling shareholders' control-cash flow rights deviation, a higher percentage of inside directors served by family members enhances the positive relation between the proportion of inside directors in a firm and the amount that the firm engages in accruals management.

3. Research method

The sample covers the eight-year period from 2010 to 2017,[2] and we first select Taiwanese-listed company data from the end of 2010 to 2017. Next, we delete samples with missing data. The source of the variables' data in this research is from the Taiwan Economic Journal (TEJ) database, supplemented by relevant information disclosed in the financial statements of the sample companies. The

[2] The 2007-2008 global financial crisis is also known as the 2008 financial crisis or the sub-mortgage crisis. This study chooses the research period from the start of 2010 in order to avoid the impact of this global contagion event on Taiwanese firms' performances.

Table 1

Sample collection process (N=7,106)

	2010	2011	2012	2013	2014	2015	2016	2017	Total
Initial firm-year samples (number of Taiwanese-listed companies at the end of 2010 to 2017)	886	898	948	966	962	952	928	940	7,480
Less observations with missing data of variables	(30)	(45)	(49)	(51)	(46)	(53)	(49)	(51)	(374)
Firm-year samples used for empirical tests	856	853	899	915	916	899	879	889	7,106

paper shows the process of choosing the samples in Table 1.

3.1 Variables

3.1.1 Dependent variables

According to Dechow *et al.* (1995), the modified version of the Jones (1991) model is regarded as the most powerful one for determining accrual-based earnings management (*DA*), and so this study adopts a modified version of Jones (1991) model to estimate abnormal accruals. In addition, when estimating discretionary accruals, it is appropriate to control for firm performance, because accruals relate to it (Kothari *et al.*, 2005; Young *et al.*, 2012). Therefore, this study employs the modified version of the Jones (1991) model and incorporates return on assets (*ROA*) into it, which is shown below.

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{\Delta REV_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \alpha_4 ROA_{i,t} + \varepsilon_{i,t} \quad (1)$$

where:

$TA_{i,t}$: Total accruals measured by $EBXI_{i,t}$ - $CFO_{i,t.}$, where $EBXI_{i,t}$ is defined as earnings before extraordinary items and discontinued operations at year t; CFO is defined as operating cash flows at year t;

$A_{i,t-1}$: Total assets at the end of year t-1;

$\Delta REV_{i,t}$: Change in revenues from the preceding year;

$PPE_{i,t}$: Gross value of property, plant, and equipment at the end of year t; and

$ROA_{i,t}$: Return on assets, defined as net income divided by total assets at the end of year t.

3.1.2 Proportion of inside directors *(IB)*

The proportion of inside directors is their total number divided by the total number of people on the board of directors (*IB*). This study defines an "inside director" as someone serving as both manager and director.

3.1.3 Controlling shareholders' control-cash flow rights deviation *(SCS)*, inside directors with an accounting background *(AC)*, and the proportion of inside directors served by family members *(IBFAM)*

The controlling shareholders' control-cash flow rights deviation (*SCS*) is the difference between the control rights of controlling shareholders and their share rights. This paper obtains the numbers from the TEJ database.

Referring to the related literature, such as Sultana and Mitchell Van der Zahn (2015), if an inside director graduated from a school's accounting department or holds a master degree of accounting, or has experience as an accountant, chief financial officer, or manager of finance and accounting, or has served in audit firms, then he is defined as an "expert with an accounting background" (*AC*)[3]. We denote it to be 1 if at least one inside director in a firm has an accounting background and 0 otherwise.

We define a family member as one who has a spouse or level-II kinship relation in a firm. Therefore, we use the total number of inside directors served by a family member divided by the total number of directors (*IBFAM*).

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[3] The accounting background data are acquired from the TEJ database, and the name of the TEJ model is "the experience of directors, supervisors, and managers". The definition of accounting background in the TEJ database is master degree of accounting, or graduated from accounting department, or experience of financing and accounting, or experience of an accountant, or used to work in an audit firm. If the column of accounting background of an inside director is ticked, then we define that an inside director has an accounting background.

3.1.4 Control variables

Referring to the previous literature, this study adds real earnings management (*REM*) to the regression to control its influence on accruals management (Cohen and Zarowin, 2010; Gunny, 2010; Roychowdhury, 2006; Young *et al.*, 2012; Zang, 2012). The *REM* calculation is based on the research of Dechow *et al.* (1998), Roychowdhury (2006), and Chi *et al.* (2011) and is defined as the standardized abnormal production costs ($\Delta\ \frac{PROD_{i,t}}{A_{i,t-1}}$) minus the total of standardized abnormal operating cash flows ($\Delta\frac{CFO_{i,t}}{A_{i,t-1}}$) and standardized abnormal discretionary expenses ($\Delta\ \frac{DISEXP_{i,t}}{A_{i,t-1}}$).

This paper expresses normal operating cash flows as a linear function of sales and change in sales as Equation 2, and the abnormal operating cash flows ($\Delta\frac{CFO_{i,t}}{A_{i,t-1}}$) are measured by subtracting the normal level of operating cash flows.

$$\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1\ \frac{1}{A_{i,t-1}} + \alpha_2\ \frac{Sales_{i,t}}{A_{i,t-1}} + \alpha_3\ \frac{\Delta Sales_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (2)$$

where for fiscal year t and firm i:

$CFO_{i,t}$: Operating cash flows in year t;

$A_{i,t-1}$: Year-end total assets in year t-1;

$Sales_{i,t}$: Net sales during year t; and

$\Delta Sales_{i,t}$: Change in sales in year t.

Production costs are defined as the sum of the cost of goods sold and change in inventory during the year. The production costs are a linear function of sales as in Equation 3, and the abnormal production costs ($\Delta\ \frac{PROD_{i,t}}{A_{i,t-1}}$) are measured by subtracting the normal level of production costs.

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1\ \frac{1}{A_{i,t-1}} + \alpha_2\ \frac{Sales_{i,t}}{A_{i,t-1}} + \alpha_3\ \frac{\Delta Sales_{i,t}}{A_{i,t-1}} + \alpha_4\ \frac{\Delta Sales_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (3)$$

where:

$PROD_{i,t}$: Production costs in year t.

The definitions of the other variables are from Equation 2.

Discretionary expenses are shown as a linear function of lagged sales. This research expresses the discretionary expenses as a linear function of lagged sales as Equation 4, and the abnormal discretionary expenses ($\Delta \frac{DISEXP_{i,t}}{A_{i,t-1}}$) are measured by subtracting the normal level of discretionary expenses.

$$\frac{DISEXP_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{Sales_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (4)$$

where:

$DISEXP_{i,t}$: Discretionary expenses in year t, defined as the sum of advertising expenses, R&D expenses, selling expenses, and general and administrative expenses.

Prior literature has pointed out that the higher a company's debt ratio is, the more incentive the company has toward earnings management (Garven, 2015; Matsuura, 2008; Wang and Chang, 2012; Watts and Zimmerman, 1986; Young *et al.*, 2012). Therefore, this study also uses the variable of the debt ratio (*LEV*). It is defined as year-end total debts divided by year-end total assets (Garven, 2015; Matsuura, 2008). Kothari *et al.* (2005) present that the amount of earnings management relates to company performance, and so this study also uses a control variable for return on assets (*ROA*). It is defined as net income divided by year-end total assets.

Following Kim *et al.* (2010), this study adds a dummy variable of whether the CPA firm is one of the big 4 (*BIG4*), which is denoted 1 if a firm is audited by a big 4 audit firm and 0 otherwise. Moreover, if there is a threshold for a company's earnings, then that company will more likely engage in earnings management in order to exceed this threshold (Graaf, 2018). Therefore, this study adds a control variable, *BEN*, for whether the threshold is met. The dummy variable *BEN* equals 1 if a company meets one of the following two thresholds and otherwise 0: (1) after-tax profit is greater than 0; and (2) after-tax profit is

higher than that in the previous year. Chi *et al.* (2011) mention that a company's growth opportunities and its size influence the company's accruals management. This study also includes three variables in the model: year-end market value of equity to the year-end book value of equity ratio (*MB*), natural logarithm of the year-end market value of shareholders' equity (*SIZE*), and the proportion of outside directors on the board (*OB*).[4] The agency theory suggests that an appropriate incentive compensation policy can mitigate a conflict of interest between the principal and the agent (Jensen and Meckling, 1976), and so we control the influence of CEO's compensation (*COMPEN*). Prior literature also suggests that stronger corporate governance mechanisms will mitigate the behavior of earnings management (Dechow *et al.*, 1995; Fan and Wong, 2002). Thus, we control the influence of the CEO taking a dual position by serving concurrently as chairman of board (*DUAL*) and whether the firms set up an audit committee (*AUDITCOM*). *DUAL* is a dummy variable that is 1 if the firm's CEO is also the chairman of the board and 0 otherwise. *AUDITCOM* is also a dummy variable that is 1 if the firm sets up an audit committee and 0 otherwise.

3.2 Regression equation

This study uses Equation 5 to test our hypothesis. Equation 5 is shown below.

$$DA_{i,t} = \alpha+\beta_1 IB_{i,t} +\beta_2 REM_{i,t} +\beta_3 LEV_{i,t}+\beta_4 ROA_{i,t} +\beta_5 BIG4_{i,t} +\beta_6 BEN_{i,t}+\beta_7 MB_{i,t.} +\beta_8 SIZE_{i,t} +\beta_9 OB_{i,t}+\beta_9 DUAL_{i,t} +\beta_9 AUDITCOM_{i,t} +\beta_9 COMPEN_{i,t} +\varepsilon_{i,t.} \quad (5)$$

where:

DA: Accruals management is defined as the amount of real accruals ($\frac{TA_{i,t}}{A_{i,t-1}}$) divided by amount of normal accruals ($\frac{\widehat{TA}_{i,t}}{A_{i,t-1}}$);

IB: Proportion of inside directors to the total number of directors on the

[4] There are three kind directors serving on the board: inside directors, outside directors, and independent directors. Therefore, IB and OB included in the regression model at the same time would not incur a multicollinearity problem.

board;

REM: Real earnings management of firm *i* for period *t*. It is defined as the standardized abnormal production costs ($\Delta \frac{PROD_{i,t}}{A_{i,t-1}}$) minus the total of standardized abnormal operating cash flows ($\Delta \frac{CFO_{i,t}}{A_{i,t-1}}$) and standardized abnormal discretionary expenses ($\Delta \frac{DISEXP_{i,t}}{A_{i,t-1}}$);

LEV: Ratio of year-end total debt to year-end total assets;

ROA: Return on assets, defined as net income divided by year-end total assets;

BIG4: Dummy variable equal to 1 if a company's CPA firm is one of the big 4 and otherwise 0;

BEN: Dummy variable equal to 1 if a company meets one of the following two thresholds and otherwise 0: (1) after-tax profit is greater than 0; (2) after-tax profit is higher than that in the previous year;

MB: Ratio of year-end market value to year-end book value;

SIZE: Natural logarithm of the year-end market value of shareholders' equity;

OB: Proportion of outside directors to the total number of directors on the board;

DUAL: A dummy variable equal to 1 if the firm's CEO is also the chairman of board and otherwise 0;

AUDITCOM: A dummy variable equal to 1 if the firm has set up an audit committee and otherwise 0;

COMPEN: Managers' compensation, which includes salaries and bonus;

t: Year t, where the research period is from 2010 to 2017;

i: i^{th} observation;

ε_t: Residuals.

La Porta *et al.* (1999) suggest that firms with a greater difference between control rights and share rights have more severe agency problems. Following prior

research, such as Xu and Huang (2021), this study uses the median of controlling shareholders' control-cash flow rights deviation as the standard value to separate observations into two groups: higher-deviation and lower-deviation companies. If the estimated coefficient of *IB* in higher-deviation companies is significantly positive and the estimated coefficient of *IB* in lower-deviation companies is not significantly positive, then H1 is supported. This implies under the environment with a higher percentage of controlling shareholders' control-cash flow rights deviation that the higher the proportion is for inside directors in a firm, the higher the amount is that the firm engages in accruals management.

To test H2 and H3, we further separate higher-deviation companies into four sub-groups by *AC* =1 or 0 and the median of *IBFAM*. To further illustrate this, if the estimated coefficient of *IB* in *AC* =1 group is not significantly positive, then H2 is supported. In addition, if the estimated coefficient of *IB* in the higher *IBFAM* group is significantly positive, then H3 is supported.

4. Empirical results

4.1 Descriptive statistics and correlation analyses

Table 2 reports descriptive statistics of the variables in Equation 5. Referring to Panel A in Table 2 for the full sample, the mean (median) values for *DA* and *REM* are respectively -0.039 (-0.050) and 0.045 (0.052). In addition, the mean values for four independent variables, *IB*, *SCS*, *AC*, and *IBFAM*, are respectively 0.279, 4.845, 0.094, and 0.128, showing that about 28% of the board of directors are inside directors, the difference between the control rights of controlling shareholders and share rights of them is around 5%, around 9% of observations have at least one inside director with an accounting background, and the proportion of inside directors served by family members is around 13%. On the other hand, the mean values for *BIG4* and *BEN* are respectively 0.853 and 0.856, denoting that 85% of the sample companies' CPA firm are one of the big 4, and 86% of the samples meet one of two thresholds: (1) after-tax profit is greater than 0; and (2) after-tax profit is higher than that in the previous year. The mean values for *DUAL*

Table 2

Descriptive statistics

Panel A: Descriptive statistics for the full sample

Variable	N	Mean	Min	Median	Max	Std Dev
DA	7106	-0.039	-0.332	-0.050	0.732	0.115
IB	7106	0.279	0.050	0.222	0.900	0.150
SCS	7106	4.845	0.000	1.080	93.550	9.515
AC	7106	0.094	0.000	0.000	1.000	0.292
IBFAM	7106	0.128	0.000	0.143	0.429	0.109
REM	7106	0.045	-0.672	0.052	0.502	0.140
LEV	7106	41.262	3.640	41.270	91.700	17.440
ROA	7106	8.463	-22.600	7.910	36.360	8.564
BIG4	7106	0.853	0.000	1.000	1.000	0.354
BEN	7106	0.856	0.000	1.000	1.000	0.351
MB	7106	1.552	0.000	1.184	9.923	1.334
SIZE	7106	21.587	18.068	21.424	26.202	1.309
OB	7106	0.445	0.000	0.429	1.000	0.208
DUAL	7106	0.379	0.000	0.000	1.000	0.485
AUDITCOM	7106	0.126	0.000	0.000	1.000	0.332
COMPEN	7106	18377.380	0.000	9578.500	883320.000	36927.170

Panel B: Descriptive statistics for the sample of SCS>=median

Variable	N	Mean	Min	Median	Max	Std Dev
DA	3550	-0.040	-0.332	-0.050	0.732	0.115
IB	3550	0.288	0.053	0.286	0.900	0.155
AC	3550	0.089	0.000	0.000	1.000	0.285
IBFAM	3550	0.112	0.000	0.143	0.429	0.108
REM	3550	0.051	-0.672	0.054	0.502	0.139
LEV	3550	40.643	3.640	40.670	91.700	17.427
ROA	3550	8.958	-22.600	8.540	36.360	8.715
BIG4	3550	0.885	0.000	1.000	1.000	0.319
BEN	3550	0.873	0.000	1.000	1.000	0.333

MB	3550	1.577	0.000	1.216	9.923	1.359
SIZE	3550	21.617	18.068	21.385	26.202	1.387
OB	3550	0.426	0.000	0.429	0.875	0.195
DUAL	3550	0.321	0.000	0.000	1.000	0.467
AUDITCOM	3550	0.137	0.000	0.000	1.000	0.344
COMPEN	3550	21030.840	0.000	10615.500	734745.000	40067.290

Panel C: Descriptive statistics for the sample of SCS<median

Variable	N	Mean	Min	Median	Max	Std Dev
DA	3556	-0.038	-0.332	-0.050	0.732	0.114
IB	3556	0.271	0.050	0.222	0.857	0.144
AC	3556	0.099	0.000	0.000	1.000	0.299
IBFAM	3556	0.145	0.000	0.143	0.429	0.106
REM	3556	0.039	-0.672	0.050	0.502	0.140
LEV	3556	41.881	3.640	41.770	91.700	17.432
ROA	3556	7.969	-22.600	7.420	36.360	8.382
BIG4	3556	0.821	0.000	1.000	1.000	0.383
BEN	3556	0.839	0.000	1.000	1.000	0.368
MB	3556	1.526	0.000	1.151	9.923	1.308
SIZE	3556	21.558	18.068	21.475	26.202	1.226
OB	3556	0.463	0.000	0.500	1.000	0.219
DUAL	3556	0.437	0.000	0.000	1.000	0.496
AUDITCOM	3556	0.115	0.000	0.000	1.000	0.319
COMPEN	3556	15728.400	7.000	8592.500	883320.000	33295.430

Notes: 1. *DA*: Accruals management is defined as amounts of real accruals ($\frac{TA_{i,t}}{A_{i,t-1}}$) divided by amounts of normal accruals ($\frac{\widehat{TA}_{i,t}}{A_{i,t-1}}$). *IB*: The proportion of inside directors on the board. *SCS*: The difference between the control rights of controlling shareholders and their share rights. *AC*: A dummy variable equal to 1 if at least one inside director in a firm has an accounting background and otherwise 0. *IBFAM*: The proportion of numbers of inside directors served by a family member to the total number of directors. *REM*: Real earnings management is defined as the standardized abnormal production costs ($\Delta \frac{PROD_{i,t}}{A_{i,t-1}}$) minus the total of standardized abnormal operating cash flows ($\Delta\frac{CFO_{i,t}}{A_{i,t-1}}$) and standardized abnormal discretionary expenses ($\Delta \frac{DISEXP_{i,t}}{A_{i,t-1}}$). *LEV*: The ratio of year-end total debt to year-end total assets. *ROA*: Return on assets, defined as net

income divided by year-end total assets. *BIG4*: A dummy variable equal to 1 if a company's CPA firm is one of the big 4 and otherwise 0. *BEN*: A dummy variable equal to 1 if a company meets one of the following two thresholds and otherwise 0: (1) the after-tax profit is greater than 0; and (2) the after-tax profit is higher than that in the previous year. *MB*: Ratio of year-end market value to year-end book value. *SIZE*: Natural logarithm of the year-end market value of shareholders' equity. *OB*: The proportion of outside directors in board. *DUAL*: A dummy variable equal to 1 if the firm's CEO is also the chairman of board and otherwise 0. *AUDITCOM*: A dummy variable equal to 1 if the firm has set up an audit committee and otherwise 0. *COMPEN*: The managers' compensation, which include the salaries and bonus.

2. ** and * indicate significance at the 1% and 5% levels, respectively.

and *AUDITCOM* are respectively 0.379 and 0.126, denoting that 38% of CEO in the sample companies are also the chairman of board, and 13% of the sample companies set up an audit committee.

Referring to Panels B and C in Table 2 for the subsample based on *SCS*, the mean values for *DA*, *IB*, and *REM* are respectively -0.040, 0.288, and 0.051 for the subsample of *SCS*>=median and -0.038, 0.271, and 0.039 for the subsample of *SCS*<median. This shows that firms with higher *SCS* have a larger level of *DA* and *REM*.

Table 3 presents the Pearson product-moment correlation of variables and shows that *DA* and *IB* are significantly positively correlated. Moreover, *DA* and *REM* have a significantly negative correlation, which means that the accruals management mechanism and the real earnings management mechanism have a substitution relationship. This situation is consistent with past literature, such as Cohen *et al.* (2008) and Chi *et al.* (2011). However, by simply looking at the significance of the correlation coefficients between the two variables, it is not possible to decide accurately whether our hypotheses can be supported, because the correlation coefficients between the two variables do not control the impact of other variables. Therefore, regression analysis is used to investigate the hypotheses in more detail.

4.2 Regression analyses

Table 4 lists the empirical results of H1. We find the coefficient of *IB* is 0.022 for the full sample and is significantly positive at the 1% level (t= 2.98), implying

Table 3
Correlation matrix (N=7,106)

	DA	*IB*	*SCS*	*AC*	*IBFAM*	*REM*	*LEV*	*ROA*	*BIG4*	*BEN*	*MB*	*SIZE*	*OB*	*DUAL*	*AUDITCOM*	*COMPEN*
DA	1.000															
IB	0.048***	1.000														
SCS	-0.045***	-0.079***	1.000													
AC	0.005	0.176***	-0.004	1.000												
IBFAM	0.000	0.422***	-0.197***	-0.009	1.000											
REM	-0.573***	0.015	0.068***	-0.014	0.002	1.000										
LEV	0.119***	0.027**	-0.001	-0.003	-0.019	0.056***	1.000									
ROA	-0.229***	0.014	0.059***	0.025**	0.017	-0.072***	-0.171***	1.000								
BIG4	-0.083***	-0.037***	0.091***	0.015	-0.050***	0.006	-0.026**	0.152***	1.000							
BEN	0.029**	0.045***	0.009	0.031***	0.009	-0.064***	-0.049***	0.477***	0.023**	1.000						
MB	-0.007	-0.027**	0.042***	-0.019	-0.032***	-0.149***	-0.028**	0.310***	0.054***	0.093***	1.000					
SIZE	-0.097***	0.047***	0.113***	0.073***	-0.088***	0.090***	0.109***	0.207***	0.139***	0.146***	-0.037***	1.000				
OB	-0.044***	-0.347***	-0.099***	-0.096***	-0.022*	-0.031***	-0.089***	0.037***	0.041***	-0.051***	0.095***	-0.268***	1.000			
DUAL	-0.023*	0.232***	0.097***	0.072***	-0.123***	0.071***	-0.044***	0.056***	0.037***	0.045***	0.031***	0.030**	-0.125***	1.000		
AUDITCOM	-0.048***	-0.186***	0.128***	-0.022*	-0.114***	-0.024**	-0.027**	0.065***	0.094***	-0.005	0.084***	0.133***	0.207***	-0.045***	1.000	
COMPEN	-0.051***	0.081***	0.032***	0.011	-0.036***	0.089***	0.108***	0.127***	0.101***	0.097***	0.101***	0.467***	-0.068***	0.121***	0.128***	1.000

Notes: 1. For the definitions of variables, please refer to Table 2.

2. ** and * indicate significance at the 1% and 5% levels, respectively.

Table 4

Regression statistics for equation 5 - testing H1

	Full Sample		Higher *SCS* group (*SCS*>=median)		Lower *SCS* group (*SCS*<median)	
Variable	Coefficient	t value	Coefficient	t value	Coefficient	t value
Intercept	0.022	0.99	0.046	1.41	-0.005	-0.15
IB	0.022***	2.98	0.030***	2.74	0.016	1.52
REM	-0.499***	-63.83	-0.481***	-42.22	-0.531***	-49.01
LEV	0.001***	10.23	0.001***	9.66	0.0004***	4.85
ROA	-0.004***	-28.53	-0.005***	-21.70	-0.004***	-18.19
BIG4	-0.006**	-2.12	-0.005	-0.97	-0.011***	-2.93
BEN	0.047***	14.37	0.050***	9.92	0.042***	10.02
MB	0.001	0.90	0.002**	2.13	-0.001	-0.64
SIZE	-0.003***	-2.66	-0.005***	-3.69	0.0001	0.05
OB	-0.002	-0.27	0.008	0.82	-0.003	-0.43
DUAL	-0.002	-0.80	0.002	0.53	-0.003	-0.96
AUDITCOM	-0.005	-1.50	-0.002	-0.44	-0.011**	-2.43
COMPEN	0.000***	3.53	0.000***	3.90	0.000	0.27
Industry Fixed Effect	YES		YES		YES	
Year Fixed Effect	YES		YES		YES	
R-square	0.472		0.452		0.509	
Adj. R-square	0.469		0.447		0.504	
N	7,106		3,550		3,556	

Notes: 1. For the definitions of the variables, please refer to Table 2.

2. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

the higher the proportion is for inside directors in a firm, the greater the amount is that the firm engages in accruals management. In addition, the *IB* value in the higher *SCS* group is significantly positive (coefficient = 0.030, t = 2.74), but in the lower *SCS* group it is not significantly positive (coefficient = 0.016, t = 1.52). The

result shows under the environment with higher controlling shareholders' control-cash flow rights deviation that the higher the proportion is for inside directors in a firm, the greater the amount is for the firm to engage in accruals management. The findings support the viewpoint of private information, the interest conflict hypothesis, and H1.

The control variables in Equation 5 are also consistent with previous research. First, the coefficient of *LEV* is significantly positive (full sample: coefficient = 0.001, t = 10.23; higher *SCS* group: coefficient = 0.001, t = 9.66; lower *SCS* group: coefficient = 0.0004, t = 4.85), which supports the findings of Watts and Zimmerman (1986), Matsuura (2008), Garven (2015), and Young *et al.* (2012). Second, the coefficient of return on assets (*ROA*) is significantly negative (full sample: coefficient = -0.004, t = -28.53; higher *SCS* group: coefficient = -0.005, t = -21.70; lower *SCS* group: coefficient = -0.004, t = -18.19), showing that the amount of accruals management negatively relates to company performance, which is consistent with Kothari *et al.* (2005). Finally, the coefficient of *BEN* (whether the threshold is met) is significantly positive (full sample: coefficient = 0.047, t = 14.37; higher *SCS* group: coefficient = 0.050, t = 9.92; lower *SCS* group: coefficient = 0.042, t = 10.02), which agrees with the assertions of Lee *et al.* (2015).

Table 5 lists the empirical results of H2. In the *AC=1* group, the coefficient of *IB* is 0.055, which is not significant (t= 1.46), but the coefficient of *IB* is significantly positive (coefficient = 0.026, t = 2.23) in the *AC = 0* group. The result supports H2, showing that under the environment with higher controlling shareholders' control-cash flow rights deviation, inside directors with an accounting background can mitigate the positive relation between the proportion of inside directors in a firm and the amount the firm engages in accruals management. Similarly, inside directors without an accounting background may not understand that manipulation under accruals management will be counterbalanced (offset) in the future, and so they have an incentive to engage in accruals management. In short, having an accounting education does impact the accounting treatment of students after graduation, which is in line with the role theory.

Table 5
Regression statistics for equation 5 - testing H2

	AC group (*AC*=1)		Non-*AC* group (*AC*=0)	
Variable	Coefficient	t value	Coefficient	t value
Intercept	0.040	0.28	0.027	0.79
IB	0.055	1.46	0.026**	2.23
REM	-0.481***	-10.78	-0.487***	-40.93
LEV	0.002***	4.37	0.001***	9.08
ROA	-0.004***	-4.97	-0.005***	-21.07
BIG4	-0.012	-0.54	-0.006	-1.29
BEN	0.044**	2.35	0.052***	9.82
MB	0.002	0.45	0.003**	2.32
SIZE	-0.004	-0.68	-0.004***	-3.05
OB	-0.016	-0.54	0.012	1.20
DUAL	0.003	0.29	0.002	0.56
AUDITCOM	0.004	0.21	-0.001	-0.16
COMPEN	0.000	-1.13	0.000***	4.36
Industry Fixed Effect	YES		YES	
Year Fixed Effect	YES		YES	
R-square	0.455		0.460	
Adj. R-square	0.391		0.454	
N	316		3234	

Notes: 1. For the definitions of the variables, please refer to Table 2.
2. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 6 lists the empirical results of H3. Whether in the higher *IBFAM* group or in the lower *IBFAM* group, the coefficient of *IB* is 0.028 and 0.044, which is significant at the 10% level (t = 1.93) and 5% level (t = 2.45), respectively. Thus, the results do not support H3, because regardless of a higher or lower percentage of inside directors served by family members, under higher controlling

Table 6
Regression statistics for equation 5 - testing H3

	Higher *IBFAM* group (*IBFAM* >=median)		Lower *IBFAM* group (*IBFAM* <median)	
Variable	Coefficient	t value	Coefficient	t value
Intercept	-0.015	-0.29	0.121***	2.68
IB	0.028*	1.93	0.044**	2.45
REM	-0.465***	-28.50	-0.495***	-30.74
LEV	0.001***	8.48	0.001***	5.00
ROA	-0.004***	-13.98	-0.005***	-16.11
BIG4	-0.003	-0.39	-0.002	-0.22
BEN	0.043***	6.11	0.054***	7.38
MB	0.001	0.27	0.004***	2.85
SIZE	-0.003	-1.37	-0.008***	-4.31
OB	0.015	1.10	0.002	0.12
DUAL	0.002	0.39	0.009	1.40
AUDITCOM	-0.001	-0.14	-0.002	-0.26
COMPEN	0.000*	1.77	0.000***	3.75
Industry Fixed Effect	YES		YES	
Year Fixed Effect	YES		YES	
R-square	0.420		0.498	
Adj. R-square	0.408		0.488	
N	1814		1736	

Notes: 1. For the definitions of the variables, please refer to Table 2.
2. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. † denotes significance at the 10% level on a one-tailed test based on t-statistics.

shareholders' control-cash flow rights deviation, there is a positive relation between the proportion of inside directors and the amount the firm engages in accruals management. In short, the results show that under the environment with

higher controlling shareholders' control-cash flow rights deviation, no matter whether the percentage of inside directors served by family members is higher or lower, it enhances the positive relation between the proportion of inside directors in a firm and the amount the firm engages in accruals management.

4.3 Endogeneity analysis

DA and *IB* may have an endogenous issue due to missing data and the relationships among accruals management. Thus, this study employs the Heckman two-stage test (Heckman, 1976, 1979) to resolve this issue. The results are in Table 7.

IMR in Table 7 is the Mills' ratio from the first stage. Panel B in Table 7 shows the coefficient of *IB* is 0.026 for the full sample and is significant at 1% (t = 3.41); in addition, the coefficient of *IB* is 0.034 for the higher SCS group and is significant at 1% (t = 3.14); and the coefficient of *IB* is 0.018 for the lower SCS group and is significant at 10% (t = 1.67). Therefore, the results are consistent with those in Table 4.[5] In other words, the results using the Heckman two-stage test also support H1, the viewpoint of private information, and the interest conflict hypothesis, implying under the environment with higher controlling shareholders' control-cash flow rights deviation that the higher the proportion is for inside directors in a firm, the greater the amount is that the firm engages in accruals management.

4.4 Additional analysis

In the first additional test, we try to use dummy variables and interaction terms to test H1, H2, and H3 again. We use the firms with higher controlling shareholders' control-cash flow rights deviation as samples. Based on the results of Table 8, we find *IB* is significantly positive (coefficient = 0.034, t =2.95 for testing H1; coefficient = 0.045, t = 2.62 for testing H2 and H3), which supports H1. In addition, we define *IBFAM1* as a dummy variable equal to 1 if the

[5] We also test the difference of IB between SCS>=median and SCS<median groups via the Chow test. The result shows they are different at the 1% significant level (t value = 3.28).

Table 7

Regression statistics for equation 5 - Using the Heckman two-stage test

Panel A: Regression statistics for first stage

	Higher *SCS* group (*SCS*>=median)		Lower *SCS* group (*SCS*<median)	
Variable	Coefficient	t value	Coefficient	t value
Intercept	0.128***	2.76	-0.112**	-2.36
FAMILY	0.072***	9.52	0.059***	6.93
ROA	0.000	0.88	-0.001**	-2.32
MB	-0.001	-0.33	0.003	1.30
SIZE	0.003*	1.66	0.013***	5.93
Industry Fixed Effect	YES		YES	
Year Fixed Effect	YES		YES	
R-square	0.091		0.070	
Adj. R-square	0.084		0.062	
N	3,550		3,556	

Panel B: Regression statistics for second stage

	Full Sample		Higher *SCS* group (*SCS*>=median)		Lower *SCS* group (*SCS*<median)	
Variable	Coefficient	t value	Coefficient	t value	Coefficient	t value
Intercept	-0.105**	-2.15	-0.263***	-3.24	-0.250**	-2.01
IB	0.026***	3.41	0.034***	3.14	0.018*	1.67
REM	-0.500***	-63.91	-0.483***	-42.46	-0.532***	-49.07
LEV	0.001***	10.27	0.001***	9.88	0.0004***	4.85
ROA	-0.004***	-28.51	-0.004***	-21.22	-0.004***	-18.16
BIG4	-0.006**	-2.01	-0.005	-1.14	-0.011***	-2.98
BEN	0.047***	14.37	0.050***	9.94	0.042***	9.97
MB	0.001	0.88	0.002*	1.89	-0.0004	-0.36
SIZE	-0.002**	-2.04	-0.004***	-2.86	0.002	1.23
OB	-0.003	-0.44	0.006	0.65	-0.003	-0.46

DUAL	-0.001	-0.67	0.004	1.06	-0.002	-0.69
AUDITCOM	-0.005	-1.57	-0.003	-0.56	-0.012**	-2.49
COMPEN	0.000***	3.49	0.000***	3.75	0.000	0.28
IMR	0.174***	2.94	0.446***	4.14	0.298**	2.04
Industry Fixed Effect	YES		YES		YES	
Year Fixed Effect	YES		YES		YES	
R-square	0.473		0.455		0.510	
Adj. R-square	0.470		0.449		0.505	
N	7,106		3,550		3,556	

Notes: 1. For the definitions of the variables, please refer to Table 2.
2. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

proportion of numbers of inside directors served by a family member to the total number of people on the board of directors is above the median of the sample and otherwise 0. According to Table 8, both the interactions of *IB* and *AC* and of *IB* and *IBFAM1* are not significant. The results show that there is no moderating effect of *AC* and *IBFAM* on *DA* in the higher SCS group.

This study investigates the effect of *IB* on *DA* in the situation of higher controlling shareholders' control-cash flow rights deviation and further considers the influence of two additional conditions: inside directors with an accounting background (*AC*) and the proportion of inside directors served by family members (*IBFAM*) on such situations. Therefore, our paper does not explore the moderating effect of two variables - *AC* and *IBFAM* on *DA*; instead, we examine the impact of these two conditions. In the main test we separate the sample into subsamples based on median values instead of using interaction terms.

The prior literature suggests that exploring the interaction effect of variables may raise some problems, such as non-linear or non-normal relationships (e.g., Kenny and Judd, 1984; Moosbrugger *et al.*, 1997). This is another reason why we separate the observations into subsamples based on median values instead of using interaction terms.

According to prior research, another popular discretionary model is the

Table 8

Regression statistics for equation 5 using interaction of *IB* and *SCS* - testing H1 to H3

	Testing H1		Testing H2 and H3	
Variable	Coefficient	t value	Coefficient	t value
Intercept	0.052	1.58	0.049	1.50
IB	0.034***	2.95	0.045***	2.62
AC	0.002	0.47	-0.014	-1.12
IBFAM1	-0.005	-1.55	0.002	0.25
IB AC*			0.046	1.47
IB IBFAM1*			-0.026	-1.25
REM	-0.481***	-42.22	-0.481***	-42.17
LEV	0.001***	9.74	0.001***	9.75
ROA	-0.005***	-21.52	-0.005***	-21.58
BIG4	-0.004	-0.92	-0.005	-1.00
BEN	0.050***	9.86	0.050***	9.90
MB	0.002**	2.10	0.002**	1.99
SIZE	-0.005***	-3.85	-0.005***	-3.82
OB	0.009	0.93	0.008	0.88
DUAL	0.004	1.01	0.004	1.01
AUDITCOM	-0.003	-0.59	-0.002	-0.47
COMPEN	0.000***	3.87	0.000***	3.84
Industry Fixed Effect	YES		YES	
Year Fixed Effect	YES		YES	
R-square	0.453		0.453	
Adj. R-square	0.447		0.447	
N	3,550		3,550	

Notes: 1. *SCS1*: A dummy variable equal to 1 if the difference between the control rights of controlling shareholders and their share rights is above the median of sample and otherwise 0. *IBFAM1*: A dummy variable equal to 1 if the proportion of numbers of inside directors served by a family member to the total number of people on the board of directors is above the median of sample and otherwise 0. For the definitions of the other variables, please refer to Table 2.

2. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

standard Jones model (Jones, 1991). We use two stages to find managed and unmanaged earnings in total accruals. Therefore, we also use the standard Jones model (Jones, 1991) to measure accrual earnings management and retest H1 to H3 in our second additional test.

The standard Jones model (Jones, 1991) uses a two-stage approach to partition total accruals into their managed and unmanaged components. Total accruals (*TA*) are calculated by the change of current assets minus the change of cash minus the change of current liabilities minus depreciation and amortization expense. Next, our first stage is to regress *TA* on the change of sales and property, plant, and equipment. We then determine the abnormal accruals from total accruals based on the estimated parameters in the first stage. According to our results, *IB* is significantly positive in the higher SCS group (coefficient = 0.019, t = 1.77), which supports H1. In addition, IB is significantly positive in the *AC*=0 group (coefficient = 0.017, t = 1.60, significance at the 10% level on a one-tailed test), which supports H2. Furthermore, IB is significantly positive in both the higher *IBFAM* group and lower *IBFAM* group (coefficient = 0.018, t = 1.41, significance at the 10% level from a one-tailed test in the higher *IBFAM* group and coefficient = 0.033 t = 1.68 in the lower *IBFAM* group), which does not support H3. In short, the results of the second additional test match those in Table 5 and Table 6.

5. Conclusions

Ownership concentrations in most companies are higher in emerging countries, and these companies are typically run by controlling shareholders (Claessens *et al.*, 2000; La Porta *et al.*, 1999). Compared to companies with a lower level of ownership concentration, the agency problem of companies with a higher level of ownership concentration occurs between controlling shareholders and minority shareholders (Shleifer and Vishny, 1997). Moreover, the control rights of controlling shareholders are usually higher than share rights (Claessens *et al.*, 2000; Faccio and Lang, 2002; La Porta *et al.*, 1999). When the separation level of control and share rights is greater, controlling shareholders might infringe upon company assets for their own wealth gains, manipulate earnings to cover

their behavior, and cause agency problems, like some well-known Taiwanese embezzlement cases that occurred in the past.

Inside directors are those who have private information and have an information advantage. They can share private information with other directors in order to reduce information asymmetry amongst themselves. At the same time, they may also harm the wealth of minority shareholders for their own self-interests due to their information advantage. Thus, in the environment with higher controlling shareholders' control-cash flow rights deviation, what role inside directors play is worth exploring, especially for most East Asian countries that have many family firms and are under a business environment with higher controlling shareholders' control-cash flow rights deviation. Most Taiwanese companies, like those in other East Asian countries, are operated by controlling shareholders. Therefore, this research explores the correlation between the characteristics of inside directors and accruals management under the environment with higher controlling shareholders' control-cash flow rights deviation. The findings herein help us understand the role of inside directors on accruals management in those countries with the same business environment.

This paper employs a sample of Taiwanese-listed companies for the period 2010-2017 and finds under the environment with higher controlling shareholders' control-cash flow rights deviation that the higher the proportion is for inside directors in a firm, the greater the amount is that the firm engages in accruals management, which is consistent with the viewpoint of private information and the interest conflict hypothesis. In addition, inside directors with an accounting background are able to mitigate the above-mentioned relation, which supports the information perspective. Regardless of a higher or lower percentage of inside directors served by family members, under higher controlling shareholders' control-cash flow rights deviation, there is a positive relation between the proportion of inside directors and the amount the firm engages in accruals management.

Aside from filling the gap in the literature, this study also provides some management implications. First, we believe the findings of our research can assist

investors to choose better investment targets that happen to be in countries with higher controlling shareholders' control-cash flow rights deviation. This means under a situation with higher controlling shareholders' control-cash flow rights deviation, the higher the proportion is for inside directors in a firm, the larger is the amount that the firm engages in accruals management; therefore, in such an environment, the firm with a higher proportion of inside directors has financial statements of worse quality. Therefore, investors can choose a firm with a lower proportion of inside directors in an environment with higher controlling shareholders' control-cash flow rights deviation, if they intend to have less probability of the company engaging in accruals management.

Second, companies in an environment operated by controlling shareholders can refer to our findings when designing their corporate governance mechanisms. In other words, our findings offer feedback and some suggestions to the authority and firm managers to plan the inside director mechanism in an environment operated by controlling shareholders. Based on our results, this means we provide two workable methods to mitigate the incentive of inside directors to adopt accruals management in an environment operated by controlling shareholders: one is that inside directors should have an accounting background; the other is a firm can decrease the level of controlling shareholders' control-cash flow rights deviation.

Third, this work also helps outside auditors or creditors to measure the audit risk or debt risk of companies run by controlling shareholders. Fourth, the results remind regulators in countries with higher ownership concentration to consider the supervisorial features of inside directors when they formulate relevant laws.

Finally, our research also provides some implications for accounting education. According to the role theory, each person's role is not only based on his own definition, but also includes the expectations of other people in society (Merton, 1957). In other words, the positioning of each role is done by integrating the privileges enjoyed by this role, the responsibilities it bears, and the obligations given by society (Sarbin and Allen, 1968). Based on the empirical results of this study, an accounting education does affect the role-playing of students related with

accruals management after graduation, which is in line with the role theory.

This research does have the following two limitations. (1) Different studies have varying definitions for accounting background and family member, and so the empirical results of this work are based on our definitions of accounting background and family member. (2) The purpose of this study is to investigate the correlation between the characteristics of inside directors and accruals management. In other words, based on our findings readers cannot firmly conclude that companies employing accruals management behaviors have worse financial performance than others.

This study also has two recommendations for future investigations. (1) Researchers can explore the differences among effects of different types of directors on accruals management, such as outside directors, independent directors, majority directors, and minority directors. (2) The association between the characteristics of inside directors and corporate governance related issues can be examined so as to further compare their differences. One example can be to compare the influences among ESG (environment, social, and governance), CSR (corporate social responsibility), and SDGs (sustainable development goals).

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