Corporate Management Review
Vol. 37 No. 1, 2017
pp. 77-114

Earnings management in family firms: The role of inside directors
家族企業之盈餘管理行為－內部董事的調節效果

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Abstract: This paper investigates earnings management in family firms and further examines the moderating effects of inside directors. The empirical results show that family firms are more likely to engage in accruals management than in real earnings management. The compensation to inside directors for their director role is far less than that for their manager role, and thus the incentive for inside directors to share private information individually is not strong. However, increasing the proportion of inside directors and bringing together all private information is one workable way for family firms to reduce the possibility of engaging in accruals management.

Keywords: Family firms, Real earnings management, Accruals management, Inside director proportion, Inside director compensation.

1. Introduction

Research findings of La Porta *et al*. (1999) show that if a 20% voting right is set as the threshold in wealthy countries around the world, then 30% of large companies are considered to be family controlled. Targeting nine East Asian countries, Claessens *et al*. (2000) find that in more than half of the companies in this region, the main controlling shareholders of firms are families. Yeh *et al*. (2001) also point out that 76% of Taiwanese-listed companies are controlled by

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The author gratefully acknowledge the financial support from the National Science Council (NSC 102-2410-H-130-073-) and the blind reviewers for their value comments and suggestions.

families. Recent research by Lin and Chang (2009) indicates that from 1998 to 2006, Taiwanese family firms accounted for about 57% of Taiwan Stock Exchange-listed companies and companies listed on the Taipei Exchange. Therefore, throughout the world and especially in Taiwan, family firms are an important organizational type of business.

The workings of family firms have been a popular topic of study in recent years (Ali *et al*., 2007; Anderson, 2003; Chang *et al*., 2013; Fan *et al*., 2007; Lin *et al*., 2011; Reeb *et al*., 2006; Wang, 2006), yet most past studies focus on the association between family firm characteristics and firm performance (Anderson and Reeb, 2003; Demsetz, 1983; Dyer, 2006; Lin *et al*., 2011; Maury, 2006). Only recently have studies begun to explore the earnings quality of family firms. For example, Wang (2006) looks at the family holding ratio and the effect of the firm founder's involvement on the earnings quality of family and non-family firms. Ali *et al*. (2007) explore the difference between the quality of financial information disclosure by family and non-family firms, while Jaggi *et al*. (2009) find that the independence of the board of directors of family firms has a lower inhibitory effect on earnings management. Furthermore, Sue *et al*. (2009) investigate the difference between the quality of financial information disclosure by family and non-family firms, while Tang (2010) points out that only the number of family board members shows a positive correlation with earnings quality. Therefore, whether a family firm will engage in earnings management is an issue worth investigating.

Schipper (1989) divides earnings management into two types: accruals and real earnings. Real earnings management has a negative impact on future cash flows and may damage business value, making it a poor choice (Roychowdhury, 2006). Previous research presents that accruals management and real earnings management are two types of earnings management mechanisms that management authorities can use alternately (Chi *et al*., 2011; Cohen *et al*., 2008; Roychowdhury, 2006; Zang, 2007). Much of the earlier U.S. empirical research, such as Jones (1991) and Teoh *et al*. (1998), defines earnings management as accruals management, but the majority of recent empirical research from the U.S., including Roychowdhury (2006), Kim *et al*. (2010), Cohen and Zarowin (2010), and Chi *et al*. (2011), examines real earnings management. Regarding Taiwan Stock Exchange (TSE)-listed and Taipei

Exchange-listed companies, Chang and Fang (2006) find that companies adopting accruals management are significantly fewer, because of the reduction of information asymmetry. Dechow *et al*. (1996), Peasnell *et al*. (2000), and Bowen *et al*. (2008), among many other studies, use individual corporate governance variables to investigate the impact of corporate governance on earnings management. However, few studies have addressed the issue of which mechanism a company chooses when it has a motive for earnings management, and in Taiwan specifically only Hsu *et al*. (2013) note the behavior of board of directors and their choice of earnings management mechanism, but the focus is not on family firms. Therefore, the first purpose of this study is to investigate which type of earnings management mechanism a family firm prefers.

A number of studies find that the corporate governance mechanisms of family firms are not effective, because the controlling shareholders have control of the company, and the equity mechanism and outside (or independent) directors only have a limited influence (Chen and Hsieh, 2011). Firms with inside directors that hold outside directorships exhibit better firm performance, especially when monitoring is difficult (Masulis and Mobbs, 2011). The decision-making unit of Taiwanese firms encompasses the board of directors (Lin *et al*., 2015) and inside directors who fulfill the roles of both manager and director. So-called "private information" refers to a situation in which, unlike external parties, internal parties can 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 can thus make more accurate decisions (Adams and Ferreira, 2007; Almazan and Suarez, 2003; Drymiotes, 2007; Laux, 2006; Raheja, 2005). Because inside directors also belong to internal parties, they possess private information that they can share with other directors in order to reduce information asymmetry among them. Moreover, since each inside director has private information, the board of directors has an internal balancing power that can be used to test the authenticity of the private information shared by inside directors (Tai *et al*., 2015), thus reducing the possibility of incorrect information transfer. Therefore, the second purpose of this study is to investigate the possibility of reducing earnings management in family firms through private information sharing among inside directors.

Family firms have always been an important type of organization (Claessens *et al*., 2000). Most previous literature on family firms has focused on their development, succession mode, management style, and performance (Tang, 2010), but only recently have some studies adopted family firm earnings quality as a research issue. Therefore, the first contribution of this study is to find out which type of earnings management mechanism family firms choose to engage in, which can thus serve as a reference for countries' formulation of laws and regulations on corporate governance.

Past studies find that the equity mechanism and outside (or independent) directors only play a limited supervision role in a family firm (Chen *et al*., 2011); in other words, determining the behaviors that inhibit earnings management in family firms is a meaningful exercise. This study takes the private information view as its theoretical basis to explore whether inside directors of family firms exhibit earnings management behavior. The findings can serve as a reference for the controlling shareholders of a family firm or external investors in order to build a corporate governance structure for the family firm. This is the second contribution of this study.

2. Literature review and hypothesis developments

Schipper (1989) divides earnings management into two types: accruals and real earnings. 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). Conversely, real earnings management signifies the transaction arrangement that affects real cash flows, such as the manipulation of sales discounts or collection period, purchasing of additional materials for the production of inventory, or a reduction of discretionary expenses. Real earnings management has a negative impact on future cash flows and may damage the firm's value. Therefore, real earnings management is a poor choice (Roychowdhury, 2006).

Previous literature has indicated that shareholders enjoy two benefits at the same time: (1) shared benefits, which refer to when the company's value increases; when this happens, shareholders' sharing interests will also increase, and so shareholders will care about the ultimate value of the company (Shleifer,

and Vishny, 1986; Holderness, 2003); and (2) private benefits, which refer to a situation in which shareholders waste corporate resources and erode the rights of small shareholders in order to maximize their own interests (Barclay and Holderness, 1989; Gopalan and Jayaraman, 2012; Holderness, 2003). Because family members typically hold a high percentage of shareholdings, the wealth of family members shares a close relationship with the value of the company. Therefore, family members will not just care about private benefits, but will also emphasize shared benefits. In other words, they will reduce behaviors that can harm the value of the company due to the sharing interests of family members (Anderson and Reeb, 2003a, 2003b; Gomes, 2000; Miller *et al*., 2007; Weber *et al*., 2003). Because real earnings management has a negative impact on future cash flows and may reduce the firm's value (Roychowdhury, 2006), this study expects to find that a family firm, in the presence of earnings management incentives, will less likely engage in the "real earnings management" mechanism that can hurt the real interests of the company. Hypothesis 1 is therefore expressed as follows.

H1: Other things being equal, a family firm will less likely engage in real earnings management.

The literature has indicated that controlling shareholders have an incentive to seize small shareholders' wealth to maintain their interests (Fama and Jensen, 1983; Goh *et al*., 2014; Lin *et al*., 2015; Morck *et al*., 1988; Shleifer and Vishny, 1997), and in order to achieve this goal, controlling shareholders will manipulate earnings (Leuz *et al*., 2003; Haw *et al*., 2004). Dechow *et al*. (1996) and Bowen *et al*. (2008) also find that when the corporate governance mechanism is ineffective, a company will engage in more aggressive and speculative accounting choices. Sue (2009) also presents that family firms exude more serious earnings management behavior. Because the family firm ownership structure gives controlling shareholders the ability to make accounting information unavailable to external investors, information asymmetry will appear between family members and other shareholders, thus enticing controlling shareholders to manipulate earnings for personal benefit (Shleifer and Vishny, 1997; Fan and Wang, 2002; Leuz *et al*., 2003). Furthermore, Chang and Fang (2006) show that if the information asymmetry is more serious, then a company is more likely to use the accruals management mechanism. Therefore, by

combining H1 and this discussion, the present study suggests that when a family firm engages in earnings management, it is more likely to choose "accruals management". Based on this, Hypothesis 2 is defined as follows.

H2: Other things being equal, a family firm will more likely engage in accruals management.

Jensen (1993) and Klein (2002) point out that when company management is closely related to the family, management behavior is less likely to be effectively supervised by the board of directors. Therefore, if family members also serve as the management, then engaging in self-dealing transactions is easier and cannot be effortlessly supervised by external investors (Chen and Hsieh, 2011). Furthermore, the management and the board of directors are less independent of each other. When a good oversight mechanism is lacking, the behavior of family members will tend to benefit themselves, while the damage to the interests of the company will increase.

If a company is a family firm, then since the controlling shareholders have control of the company, the corporate governance mechanism will be ineffective, and outside (or independent) directors can only perform limited functions (Chen and Hsieh, 2011; Sue *et al.*, 2009; Tang, 2010). From the perspective of private information, because internal parties participate in the affairs of the company, they can obtain private information concerning managers' operating efforts at a low cost, are less likely to be fooled by managers, and can thus make more accurate decisions (Adams and Ferreira, 2007; Almazan and Suarez, 2003; Drymiotes, 2007; Laux, 2006; Raheja, 2005). Because inside directors also belong to internal parties, they possess private information that they can share with other directors in order to reduce information asymmetry among them. Moreover, because each inside director possesses private information, the board of directors has an internal balancing power that can be used to test the authenticity of the internal information shared by inside directors (Tai *et al.*, 2015), thus reducing the possibility of transmitting incorrect information. Therefore, this study infers that the higher the proportion is for inside directors in a family firm, the more private information the inside directors can share; in addition, the balancing power formed by inside directors on private information is greater, which can reduce the degree of information asymmetry among the board of directors. If the information asymmetry is more serious, then the

company is more likely to use accruals management (Chang and Fang, 2006). Therefore, when the degree of information asymmetry decreases, the family business will be less likely to use accruals management. Based on this, Hypothesis 3 is as follows.

H3: Other things being equal, the higher the proportion is for inside directors in the family firm, the lower the possibility is for the firm to engage in accruals management.

Inside directors act as both directors and managers and simultaneously perform supervisory and management jobs (Tai, 2014). According to the agency theory, compensation should be an increasing function of performance (Hölmstrom, 1979), and so the more a family firm pays its inside directors for their director role, the more likely the inside directors will be devoted to supervision, and the greater inside directors' balancing power on private information will be. The balancing power can be used to test the authenticity of the private information shared among inside directors, thus reducing the information asymmetry among the directors (Tai *et al*., 2015). Due to decreased information asymmetry, a family firm should engage less in accruals management (Chang and Fang, 2006). Therefore, this paper proposes Hypothesis 4 as follows.

H4: Other things being equal, the higher the proportion is for an inside director's compensation for a director role in a family firm, the less likely the firm will engage in accruals management.

3. Research method

This study first runs OLS regressions to test H1, H2, H3, and H4. Second, this study proceeds with additional analyses, consisting of four issues: (1) changing "inside directors' compensation for their role as director" from their proportional compensation to the natural logarithm of their compensation for their role as director; (2) using only non-electronics industry sample companies to verify whether the empirical results are applicable; (3) employing regression models with different criteria of the "Family" variable to re-test the hypotheses; and (4) utilizing regression models with different marginal effects to re-examine H2 to H4. Third, this research applies the Hausman test to explore whether the

random effect model or the fixed effect model is suitable for this study. If the fixed effect model is suitable, then this study employs it for endogeneity analysis. Fourth, the factors influence a company to become a family firm and the factors influence a company to engage in earnings management may be jointly determined, so this work employs "instrumental variables in the two-stage least squares (IV-2SLS) regression" to solve the problem of endogeneity. Lastly, real earnings management and accruals management are simultaneously both dependent and independent variables to each other. To solve this simultaneous situation, this paper uses a seemingly unrelated regression to re-test the hypotheses.

3.1 Sample

One independent variable of this study is "the proportion of an inside director's compensation for the role of director". In 2004 the Financial Supervisory Commission (FSC) amended the "Guidelines for Matters to Be Listed in Listed Companies' Annual Reports" and required that the most recent annual salary payments to directors, supervisors, general managers, and deputy general managers must be recorded in the annual report. Nevertheless, such payments may be disclosed as a range in the report. Some companies were already using the new way of compensation disclosure in their 2005 financial statements, and there was a range of numbers instead of each person's accurate numbers. Therefore, this study only uses sample data from before 2005.

Table 1 shows the sample collection process. This research first selects TSE-listed and Taipei Exchange companies' data from the end of 2002, 2003, and 2004. Next, this study deletes samples that cannot be determined as being a family firm or not and also deletes samples with missing data. Finally, a total number of 2,354 observations is obtained, accounting for about 44% of the original samples. The source of the variable 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.

3.2 Variables

3.2.1 Dependent variables

In this study there are two dependent variables, real earnings management

Table 1
Sample collection

	2002	2003	2004	Total
Initial firm-year samples (number of TSE-listed and Taipei exchange companies at the end of 2002, 2003 and 2004)	1,769	1,787	1,776	5,332
Step 1：Less companies that are unable to identify whether the company is family firm	(183)	(178)	(190)	(551)
Step 2：Less companies with missing data				
-Unable to calculate earnings management number	(387)	(359)	(354)	(1,100)
-Missing data apart from earnings management number	(506)	(460)	(361)	(1,327)
Firm-year samples used in the study	693	790	871	2354
Proportion of final observations (%)	39%	44%	49%	44%

(REM) and accruals management (DA), which are described respectively as follows.

3.2.1.1 Real earnings management (REM)

This study takes REM as a proxy variable for real earnings management, and the REM calculation is based on the research of Dechow *et al*. (1998), Roychowdhury (2006), and Chi *et al*. (2011). REM is defined as the total sum of abnormal operating cash flows ($\Delta\frac{CFO_{i,t}}{A_{i,t-1}}$), abnormal production costs ($\Delta\ \frac{PROD_{i,t}}{A_{i,t-1}}$), and abnormal discretionary expenses ($\Delta\ \frac{DISEXP_{i,t}}{A_{i,t-1}}$), which are explained as follows.

(1) Abnormal operating cash flows ($\Delta\frac{CFO_{i,t}}{A_{i,t-1}}$)

This paper first expresses normal operating cash flows as a linear function of sales and change in sales and then estimates the equation for each observation through the cross-sectional regression as Equation 1. 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 as estimated from Equation 1.

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

where for fiscal year t and firm i:

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

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

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

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

(2) Abnormal production costs ($\Delta \frac{PROD_{i,t}}{A_{i,t-1}}$)

Production costs are defined as the sum of the cost of goods sold and change in inventory during the year. First, this study expresses the production costs as a linear function of sales and then estimates the equation for each observation through the cross-sectional regression as estimated from Equation 2. The abnormal production costs ($\Delta \frac{PROD_{i,t}}{A_{i,t-1}}$) are measured by subtracting the normal level of production costs as estimated from Equation 2. Equation 2 is shown below.

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{Sales_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{\Delta Sales_{i,t}}{A_{i,t-1}} + \alpha_4 \frac{\Delta Sales_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}, \quad (2)$$

where

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

The definitions of the other variables are from Equation 1.

(3) Abnormal discretionary expenses ($\Delta \frac{DISEXP_{i,t}}{A_{i,t-1}}$)

Discretionary expenses are shown as a linear function of lagged sales. This research expresses the discretionary expenses as a linear function of lagged sales and then estimates the equation for each observation through the cross-sectional regression as Equation 3. The abnormal discretionary expenses ($\Delta \frac{DISEXP_{i,t}}{A_{i,t-1}}$) are measured by subtracting the normal level of discretionary expenses as estimated from Equation 3. This paper shows Equation 3 as follows:

$$\frac{\text{DISEXP}_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{\text{Sales}_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}, \quad (3)$$

Where

$DISEXP_{i,t}$: The discretionary expenses in year t, defined as the sum of advertising expenses, RandD expenses, selling expenses, and general and administrative expenses.

The definitions of the other variables are from Equation 1.

3.2.1.2 Accruals management (DA)

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, and so this study adopts the modified version of the Jones (1991) model to estimate abnormal accruals. In addition, when estimating discretionary accruals, it is appropriate to control for firm performance, because accruals are related to firm performance (Kothari *et al*., 1995; Young *et al*., 2012). Therefore, this study employs the modified version of the Jones (1991) model and incorporates return on assets (ROA) into it.

Accruals are modeled as a linear function of the change in revenues from the preceding year, the gross value of PPE, and the return on assets. This paper then estimates the equation for each observation through the cross-sectional regression as Equation 4. The abnormal accrual ($\Delta \frac{TA_{i,t}}{A_{i,t-1}}$) is measured by subtracting the normal level of accrual as estimated from Equation 4, which is shown below.

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{\Delta REV_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \alpha_4 ROA_{i,t} + \varepsilon_{i,t}, \quad (4)$$

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; CFO is defined as operating cash flows;

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

$PPE_{i,t}$: The gross value of property, plant, and equipment; and

$ROA_{i,t}$: Return on assets, defined as net income divided by total assets.

The definitions of the other variables are from Equation 1.

3.2.2 Independent variables

This study has three independent variables: (1) the dummy variable of the family firm (Family); (2) the proportion of inside directors (IB); and (3) the proportion of an inside director's compensation for the director role (BS). They are described as follows.

3.2.2.1 Family firm (Family)

The source of the variable data in this research is from the Taiwan Economic Journal (TEJ) database, which uses four criteria to define a "family firm". As long as a company meets one of the four criteria, the TEJ database defines the sample company as a "family firm". The four criteria follow the previous literature, such as Donnelley (1964), Churchil and Hatten (1987), Ward (1987), La Porta *et al*. (1999), Lee and Liao (2004), Claessens *et al*. (2000), Faccio and Lang (2002), Villalonga and Amit (2006), Chen and Ho (2009), Lin and Chang (2009), and Tang (2010). This paper discusses the four criteria as follows.

(1) The family shareholding ratio exceeds the critical proportion of shares.

This study defines the critical proportion of shares following the model of Cubbin and Leech (1983). The model is described as follows:

$$P^* = Z_\alpha \times \sqrt{\frac{\pi H}{1+Z_\alpha^2 \pi}} \qquad H = \sum_{i=1}^{k} \left(\frac{S_i}{N_i}\right)^2 \times N_i,$$

where

P*：The critical proportion of shares;

Z_α：Let Z be a normally distributed random variable with zero mean and unit variable and Z_α be the critical value such that $P(z<Z)=\alpha$;

α： A preassigned degree of control, which is high enough for it to be said to dominate the company;

π： The probability of a shareholder voting (assumes $\pi=0.9999$);[2]

H： Herfindahl index;

S_i： Total shareholding ratio of group i; and

[2] Yeh *et al*. (2001) assert that the number of π does not influence P* significantly.

N_i : Total shareholding number of group i.

The dummy variable "Family" is equal to 1 if the family shareholding ratio exceeds the critical proportion of shares; otherwise it is 0.

(2) The ratio of family board members is more than 50%.

When the ratio of family members serving as the sample company's board members is more than 50%, the family has the ability to control the company (Tang, 2010). This study defines the sample company's dummy variable "Family" as 1; otherwise it is 0.

(3) At least one member of the family is a manager and one member is a director.

Following Villalonga and Amit (2006), this study defines that when the sample company has at least one member of the family as a manager and one family member as a director, the sample company's dummy variable "Family" is set as 1; otherwise it is 0.

(4) The same family at least has two directors.

The same family refers to members of the board of directors who have a spouse or level-II kinship on the board, and the family holds at least more than 5% of the company's shares. This definition is the same as that found in Gómez-Mejía *et al*. (2003) and Tang (2010). When the sample company meets the criteria of a single family having two or more than two directors, the dummy variable "Family" is equal to 1; otherwise it is 0.

3.2.2.2 Proportion of inside directors (IB)

The proportion of inside directors is the total number of inside directors divided by total number of people on the board of directors. This study defines an "inside director" as someone serving as both manager and director. First, this paper obtains the list of directors for each of the sample companies from the Taiwan Economic Journal (TEJ) database. Next, this research deletes from the list those directors who do not have positions in the sample companies. The remaining names make up the list of inside directors.

3.2.2.3 Proportion of inside director's compensation for the director role (BS)

The proportion of inside director's compensation for the role as director (BS) is defined as: the inside director's compensation for their role as director divided

by the total compensation of the inside director. Listed companies usually provide: (1) director compensation, (2) salary/bonus, (3) transportation reimbursements for directors, and (4) other compensations on the annual financial report. This article defines an inside director's compensation for the role as director as the sum of (1) the director compensation and (3) the transportation reimbursement for the director.

3.2.3 Control variables

3.2.3.1 Verification of Hypothesis 1

Roychowdhury (2006), Cohen and Zarowin (2010), Gunny (2010), Yang *et al*. (2012), and Zang (2012) all point out that a company will use accruals management and real earnings management at the same time to make earnings meet their target. Therefore, this study adds accruals management (DA) to the regression to control the influence of accruals management on real earnings management. In addition, when the company has a high debt ratio, the company has a greater incentive to use earnings management (Watts, and Zimmerman, 1986). Therefore, this study also adds the debt ratio (LEV) variable. Kothari *et al*. (2005) note that earnings management is related to company performance, and so this study also employs return on assets (ROA) as a control variable, where ROA is defined as net income divided by total assets.

Kim *et al*. (2010) assert that if a company's CPA firm has more rigorous quality control, then that company is more likely to conduct earnings management with real earnings management. Therefore, this study adds to the regression a dummy variable of whether the CPA firm is one of the Big 4. On the other hand, if there is a threshold for a company's earnings, then that company will more likely engage in earnings management to exceed this threshold (Lee *et al*., 2015). Therefore, this study adds a control variable, BEN, for whether the threshold is met. Finally, Roychowdhury (2006), Tien *et al*. (2011), and Yang *et al*. (2012) mention that a company's growth opportunities and its size will influence the company's operating cash flows, production costs and discretionary expenses. Therefore, this study adds two control variables: the market to book value ratio (MB) and the natural logarithm of the market value of shareholders' equity (SIZE).

3.2.3.2 Verification of Hypothesis 2, Hypothesis 3, and Hypothesis 4

Following the discussion above, this study adds real earnings management (REM) to the regression to control the influence of real earnings management on accruals management (Cohen and Zarowin, 2010; Gunny, 2010; Roychowdhury, 2006; Yang *et al*., 2012; Zang, 2012). In addition, the higher a company's debt ratio is, the more incentive the company has toward earnings management (Garven, 2009; Matsuura, 2008; Watts and Zimmerman, 1986; Yang *et al*., 2012). Therefore, this study also uses the variable of the debt ratio (LEV). Kothari *et al*. (2005) present that the earnings management amount is related to the company's performance, and so this study also uses the control variable of return on assets (ROA).

Referring to Kim *et al*. (2010), this study adds a dummy variable of whether the CPA firm is one of the Big 4. 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. Therefore, this study adds a control variable, BEN (whether the threshold is met). Chi *et al*. (2011) mention that a company's growth opportunities and its size will influence the company's accruals management. Therefore, this study includes two variables of market to book value ratio (MB) and the natural logarithm of the market value of shareholders' equity (SIZE) in the model. Finally, Dechow *et al*. (1995) and Hsu *et al*. (2013) propose that operating cash flows and accruals management are negatively correlated, and so this study also adds the control variable of operating cash flows (OCF).

3.3 Regression equation

3.3.1 Verification of Hypothesis 1 by Equation 5

This study utilizes Equation 5 to test H1. This paper regresses real earnings management (REM) on family firm (Family). H1 can be supported if β_1 is significantly negative. Equation 5 is described as follows:

$$REM_{i,t} = \alpha+\beta_1 Family_{i,t} +\beta_2 DA_{i,t} +\beta_3 LEV_{i,t}+\beta_4 ROA_{i,t} +\beta_5 BIG4_{i,t} +\beta_6 BEN_{i,t}+\beta_7 MB_{i,t} +\beta_8 SIZE_{i,t}+\varepsilon_{i,t}, \quad (5)$$

where

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

Family：The dummy variable for family firm. If a company meets one of the four criteria, then "Family" equal to 1; otherwise, it is 0. (1) The family shareholding ratio exceeds the critical proportion of shares; (2) The ratio of family board members is more than 50%; (3) At least one member of the family is a manager and one member is a director; (4) The same family has at least has two directors;

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

LEV： The ratio of total debt to total assets;

ROA： The return on assets and is defined as net income divided by total assets;

BIG4： The dummy variable equal to 1 if a company's CPA firm is one of the Big 4; otherwise it is 0;

BEN： The dummy variable equal to 1 if a company meets one of the three thresholds; otherwise it is 0; (1) The after-tax profit is more than 0; (2) The after-tax profit is higher than that in last year; (3) The after-tax profit is in line with analysts' expectations;

MB ： The ratio of market value to book value; and

SIZE： Natural logarithm of the market value of shareholders' equity

3.3.2 Verification of Hypothesis 2, Hypothesis 3, and Hypothesis 4 by Equation 6

This study uses Equation 6 to test H2, H3, and H4. If β_1 is significantly positive, then H2 can be supported. H3 can be supported if the interaction item (Family*IB) is significantly negative. If the interaction term (Family*BS) is significantly negative, then H4 can be supported. Equation 6 is shown as below.

$$DA_{i,t} = \alpha+\beta_1 Family_{i,t} +\beta_2 IB_{i,t} +\beta_3 BS_{i,t}+\beta_4 Family_{i,t}* IB_{i,t}+\beta_5 Family_{i,t}* BS_{i,t}+\beta_6 REM_{i,t} +\beta_7 LEV_{i,t}+\beta_8 ROA_{i,t} +\beta_9 BIG4_{i,t} +\beta_{10} BEN_{i,t}+\beta_{11} MB_{i,t}+\beta_{12} SIZE_{i,t}+\beta_{13} OCF_{i,t} +\varepsilon_{i,t}, \quad (6)$$

where
IB： The proportion of inside directors;
BS： The proportion of inside director's compensation for the director role; and
OCF：Operating cash flows.

The definitions of the other variables are from Equation 5.

4. Empirical results

4.1 Descriptive statistics and correlation analyses

Tables 2 and 3 report descriptive statistics of the variables. Referring to Table 2, the mean (median) value for REM is -0.214 (-0.191). In Tables 2 and 3, the mean values for Family are 0.649 and 0.675, respectively. Therefore, about 2/3 of the sample companies are family firms, and the family firm samples used by this study are applicable. In addition, in Table 3 the mean (median) value for DA is 0.186 (0.182). Finally, the mean values for the other two independent variables - IB and BS - are 0.881 and 0.335, respectively, showing that about 88% of the board of directors are inside directors, and their compensation for their role as director is about 1/3 of their total inside director compensation.

Tables 2 and 3 also present the Pearson product-moment correlation of Equation 5 and Equation 6. Table 2 shows that REM and Family are not significantly correlated, and so H1 may not be supported. However, REM and DA have a significant negative correlation, which means that the real earnings management mechanism and the accruals management mechanism have a substitution relationship. This situation is consistent with past literature such as Roychowdhury (2006), Cohen *et al*. (2008), Zang (2007), and Chi *et al*. (2011). In addition, Table 3 shows that DA and Family have no significant correlation, and so H2 may not be supported.

As seen in Table 3, DA has no significant correlation with BS, but does have a significant positive correlation with IB. However, interactive items are tested in Hypotheses 3 and 4. Thus, simply looking at the significance of correlation coefficients between the two variables cannot determine whether Hypothesis 3 or Hypothesis 4 will be supported. Therefore, this study adopts regression analysis for investigative purposes.

Table 2
Descriptive statistics and correlation matrix of Equation 5 (N=2,354)

Variable	Mean	Median	StdDev	Maximum	Minimum	1.	2.	3.	4.	5.	6.	7.	8.	9.
1.REM	-0.214	-0.191	0.551	7.164	-2.428	1								
2.Family	0.649	1	0.477	1	0	-.024	1							
3.DA	0.155	0.169	0.165	2.371	-0.778	-.045*	.013	1						
4.LEV	0.440	0.451	0.159	0.945	0.021	.056**	.015	.391**	1					
5.ROA	0.039	0.041	0.097	0.641	-1.655	-.075**	-.051*	-.392**	-.284**	1				
6.BIG4	0.821	1	0.383	1	0	.013	-.097**	-.093**	-.042*	.049*	1			
7.BEN	0.627	1	0.483	1	0	-.084**	.028	-.089**	.030	.334**	-.013	1		
8.MB	1.475	1.204	0.969	9.037	0.138	-.113**	-.121**	-.206**	-.136**	.568**	.094**	.234**	1	
9.SIZE	6.389	6.319	0.616	8.683	5.072	.010	-.044*	.133**	-.065**	.356**	.120**	.235**	.397**	1

**, * indicates significance at the 1 percent and 5 percent levels, respectively.

Table 3
Descriptive statistics and correlation matrix of Equation 6 (N=1,263)

Variable	Mean	Median	StdDev	Maximum	Minimum	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1.DA	0.186	0.182	0.148	2.371	-0.336	1											
2.Family	0.675	1	0.468	1	0	.006	1										
3.IB	0.881	0.8965	0.093	1	0.478	.076**	.185**	1									
4.BS	0.335	0.143	0.377	1	0	-.008	.076**	.004	1								
5.REM	-0.213	-0.166	0.431	2.391	-2.428	-.130**	-.084**	.001	.032	1							
6.LEV	0.441	0.451	0.155	0.899	0.021	.341**	-.013	.019	.015	.027	1						
7.ROA	0.034	0.035	0.085	0.641	-1.655	-.385**	.005	-.074**	.012	-.075**	-.224**	1					
8.BIG4	0.792	1	0.405	1	0	-.097**	-.106**	-.035	-.021	.051	-.037	.088**	1				
9.BEN	0.671	1	0.469	1	0	-.025	.036	-.014	-.029	-.091**	.091**	.288**	-.003	1			
10.MB	1.272	1.067	0.733	5.017	0.152	-.064*	-.101**	-.074**	-.001	-.047	-.025	.453**	.116**	.171**	1		
11.SIZE	6.534	6.443	0.647	8.677	5.072	.067*	-.096**	.058*	-.031	.037	-.049	.317**	.193**	.195**	.484**	1	
12.OCF	1,499,259	239,760	5,819,971	9,5846,590	-8,867,797	-.173**	-.080**	.014	.000	.015	-.055*	.138**	.110**	.101**	.148**	.537**	1

**, * indicates significance at the 1 percent and 5 percent levels, respectively.

4.2 Regression analyses

Table 4 lists the empirical results of Equations 5 and 6. First, the coefficient of Family in Equation 5 is -0.040, which is significant at the 10% level (t= 1.73) and thus supports H1. Furthermore, this study finds that the coefficient of DA is -0.514, and the t value is 6.21. Therefore, the "real earnings management" mechanism and the "accruals management" mechanism have a significant substitution relationship. This agrees with past literature, such as Roychowdhury (2006), Cohen *et al*. (2008), Zang (2007), and Chi *et al*. (2011). The control variables in Equation 5 are consistent with previous research, and so details will not be provided here.

This research also asserts that the estimated coefficient of Family in Equation 6 is 0.188, and the t value is 2.81; therefore, it has a statistically positive significance and supports H2. This shows that the concentration of family firm ownership causes the controlling shareholders to have the ability to not release private information to external investors, thus causing more information asymmetry between family members and other shareholders (Fan and Wang, 2002; Leuz *et al*., 2003; Shleifer and Vishny, 1997). On the other hand, the estimated coefficient of IB is 0.165, and the t value is 2.71. Therefore, it has a statistically significant positive correlation and shows that the higher the proportion is of inside directors, the more power they have to not release private information to outside investors, thus causing more information asymmetry between inside directors and other shareholders (Fan and Wang, 2002; Leuz *et al*., 2003; Shleifer and Vishny, 1997). However, the estimated coefficient of the interaction term (Family*IB) is -0.217, which is significant at the 1% level (t =-2.85) and supports H3.

The symbol of the estimated coefficient of the interaction term is exactly the opposite of that of Family and of IB. A possible reason for this runs as follows. The proportion of inside directors in a family firm is generally 90%, but the proportion of inside directors in non-family firms is only 80% on average. Inside directors possess private information, which they can share with other directors in order to reduce information asymmetry among them. Moreover, since inside directors own private information, they have a balancing power that can be used to test the authenticity of the private information shared among themselves (Tai *et al*., 2015), thus reducing the possibility of transmitting incorrect information.

Table 4
Regression statistics for Equation 5 and Equation 6

	Equation 5 (N=2,354)		Equation 6 (N=1,263)	
Variable	Parameter estimate	t value	Parameter estimate	t value
Intercept	-0.787	-5.87***	-0.616	-9.28***
Family	-0.040	-1.73*	0.188	2.81***
IB	-	-	0.165	2.71***
BS	-	-	0.005	0.31
Family*IB	-	-	-0.217	-2.85***
Family*BS	-	-	-0.002	-0.10
DA	-0.514	-6.21***	-	-
REM	-	-	-0.0598	-7.60***
LEV	0.324	4.16***	0.2398	10.62***
ROA	-0.277	-1.73*	-0.7141	-15.05***
BIG4	-0.002	-0.07	-0.0321	-3.79***
BEN	-0.091	-3.66***	0.0035	0.46
MB	-0.079	-5.45***	-0.0044	-0.77
SIZE	0.113	5.25***	0.0925	12.82***
OCF	-	-	-0.0007	-11.27***
AdjR^2	0.037		0.355	
F Value	12.36		54.51	

***, ** and * indicates significance at the 1 percent, 5 percent and 10 percent levels, respectively.

The estimated coefficient of the interaction term (Family*BS) is -0.002, and the t value is -0.10, and so there is no statistically significant negative correlation. The results hence do not support Hypothesis 4. One possible reason that this study does not support H4 is that the mean of the proportion of inside directors' compensation for their role as director (BS) from the sample companies is about 0.3, meaning that inside directors receive more compensation for their role as manager. In addition, during the period of this study, the annual reports do not disclose stock compensation for the manager role. If stock compensation for the manager role were to be considered, then the proportion of inside directors' compensation for the role of director role would be even lower.

According to the agency theory, compensation and performance are positively correlated (Hölmstrom, 1979). Therefore, when a company gives

inside directors most of the compensation for the role of manager, inside directors tend to perform more executive functions in the role of manager and fewer monitoring functions in the role of director. This phenomenon leads to the empirical results found in this study, which show that the direction of coefficients is as expected, but does not have statistical significance. Combining the empirical results of H3 and H4, inside directors can reduce the information asymmetry among the board of directors by sharing private information, thus reducing the likelihood of engaging in accruals management. Because inside directors' compensation for the role of director is lower, the power of any individual inside director to share private information is not conspicuous. However, raising the proportion of inside directors and summarizing more private information are ways to suppress a family firm from engaging in accruals management.

As for the other control variables in Equation 6, they are similar to the empirical results found in Equation 5 and consistent with past literature. Therefore, those details will not be discussed here.

4.3 Additional analyses

The additional analyses of this study consist of four issues. First of all, this study changes BS from the proportion of the inside director's compensation for the role of director to the natural logarithm of the inside director's compensation for the role as director. Furthermore, during the period of this study, only cash compensation was disclosed in financial statements, while stock compensation was not. However, based on a survey by Taiwan Industrial Bank Investment Consulting, non-electronics industries' employee stock compensation accounted for only 2.24% of that of those industries' net after-tax profit. Therefore, for non-electronics industries, the proportion of stock compensation will be low in the compensation makeup, and cash compensation may be used to represent all of the compensation actually received. The second additional analysis in this study therefore uses only non-electronics industry sample companies to verify whether the empirical results in the "Regression Analyses" section are applicable.

The "Family" variable used herein is defined as a dummy variable that satisfies one of four criteria: (1) The family shareholding ratio exceeds the

critical proportion of shares; (2) The ratio of family board members exceeds 50%; (3) At least one member of the family is a manager and one member is a director; and (4) The same family has at least two directors. These four criteria of the "Family" variable provide different insights from the perspectives of ownership and membership. The third additional analysis of this study thus uses regression models with different criteria for the "Family" variable to re-run Equation 5. When re-examining Hypotheses 2 to 4 in the fourth additional analysis, this study re-runs regression models with different marginal effects of each hypothesis and expects to run six equations, which are listed below.

DA = f (family, control variables)

DA = f (proportion of inside directors, control variables)

DA = f (proportion of inside director's compensation for director role, control variables)

DA = f (family, control variables, family * proportion of inside director)

DA = f (family, control variables, family * proportion of inside director's compensation for director role)

DA = f (family, control variables, family * proportion of inside director, family * proportion of inside director's compensation for director role, family * proportion of inside director * proportion of inside director's compensation for director role)

4.3.1 Change BS from the proportion to the absolute value

From Table 5, the empirical results after changing BS from the proportion of inside director's compensation for the role of director to the natural logarithm are identical to those in Table 4, and both of them support H2 and H3, but not H4. This shows that the results are the same whether using the proportional value or the absolute value to explore the moderating effect of inside director's compensation for the role of director on the accruals management behavior in a family firm, and neither value has a statistically significant moderating effect.

4.3.2 Using non-electronics industry companies as research samples

From Table 5, the empirical results of using only non-electronics industry companies are in accordance with those obtained by using all sample companies, and they both support H2 and H3, but not H4. In other words, in the "Regression

Table 5
Regression: Change BS from the proportion to the absolute value and Using non-electronics industry companies as research samples

	Change BS from the proportion to the absolute value (N=1,263)		Using non-electronics industry companies as research samples (N=951)	
Variable	Parameter Estimate	t Value	Parameter Estimate	t Value
Intercept	-0.621	-7.59***	-0.727	-8.94***
Family	0.185	1.96*	0.247	3.25***
IB	0.175	2.66***	0.224	3.17***
BS	-	-	0.013	0.67
LnBS	0.004	0.48	-	-
Family*IB	-0.200	-2.41**	-0.275	-3.15***
Family*LnBS	-0.004	-0.34	-	-
Family*BS	-	-	-0.011	-0.47
REM	-0.063	-7.41***	-0.077	-8.48***
LEV	0.254	10.35***	0.301	11.49***
ROA	-0.736	-14.79***	-0.220	-3.01***
BIG4	-0.029	-3.18***	-0.028	-3.00***
BEN	0.002	0.24	-0.008	-0.93
MB	-0.005	-0.79	-0.029	-4.17***
SIZE	0.088	10.92***	0.099	10.87***
OCF	-0.0007	-10.02***	-0.0001	-10.24***
AdjR^2	0.374		0.297	
F Value	50.41		31.87	

***, ** and * indicates significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Analyses" section, using only cash compensation in financial statements as the real compensation is applicable.

4.3.3 Using the regression models with different criteria of the variable "Family"

From Table 6, the empirical results of using the regression models with different criteria for the "Family" variable are consistent with each other and both support H2 and H3, but not H4. In other words, in the "Regression Analyses" section, it is applicable to use the "Family" variable defined as a dummy variable satisfying one of the four criteria.

Table 6
Regression: Using the regression models with different criteria of variable "Family"

$REM_{i,t} = \alpha+\beta_1 Family_{i,t}+\beta_2 DA_{i,t}+\beta_3 Lev_{i,t}+\beta_4 ROA_{i,t}+\beta_5 BIG4_{i,t}+\beta_6 BEN_{i,t}+\beta_7 MB_{i,t}+\beta_8 SIZEe_{i,t}+\varepsilon_i$

Variable	Parameter estimate (1)	Parameter estimate (2)	Parameter estimate (3)	Parameter estimate (4)
Intercept	-0.801	-0.818	-0.817	-0.854
	(-5.93)***	(-6.12)***	(-6.11)***	(-4.87)***
Family	-0.031	-0.001	-0.002	-0.037
	(-1.71)*	(1.66)*	(1.68)*	(1.65)*
DA	-0.513	-0.511	-0.512	-0.513
	(-6.19)***	(-6.18)***	(-6.18)***	(-6.18)***
LEV	0.326	0.325	0.325	0.326
	(4.17)***	(4.16)***	(4.16)***	(4.18)***
ROA	-0.270	-0.276	-0.275	-0.277
	(-1.68)*	(-1.71)*	(-1.72)*	(-1.73)*
BIG4	0.001	0.002	0.002	0.003
	(0.03)	(0.08)	(0.08)	(0.09)
BEN	-0.095	-0.094	-0.094	-0.094
	(-3.78)***	(-3.78)***	(-3.76)***	(-3.76)***
MB	-0.078	-0.077	-0.077	-0.077
	(-5.33)***	(-5.24)***	(-5.27)***	(-5.28)***
SIZE	0.115	0.113	0.113	0.113
	(5.29)***	(5.08)***	(5.08)***	(5.21)***
$AdjR^2$	0.036	0.032	0.033	0.035
F Value	12.05	11.97	11.97	11.98

1.(1) means if the family shareholding ratio exceeds the critical proportion of shares, then "Family" equal to 1; and 0 otherwise.(2) means if the ratio of family board members more than 50%, then "Family" equal to 1; and 0 otherwise.(3) means if at least one member of the family is a manager and one member is a director, then "Family" equal to 1; and 0 otherwise.(4) means if the same family at least has two directors, then "Family" equal to 1; and 0 otherwise.

2.***, ** and * indicates significance at the 1 percent, 5 percent and 10 percent levels, respectively.

4.3.4 Re-running regression models with different marginal effects of Hypotheses 2 to 4

From Table 7, the empirical results of re-running regression models with different marginal effects for Hypotheses 2 to 4 are consistent with previous findings. They both support H2 and H3, but not H4.

4.4 Fixed effect model

This study first employs the Hausman test to explore whether the random effect model or fixed effect model is suitable for this study. The value of the Hausman test is -24.93. Therefore, the fixed effect model is employed for endogeneity analysis. The fixed-effect model can mitigate the endogeneity that arises from omitted unobservable variables (Conyon and He, 2011; Zhang *et al*., 2014). Table 8 reports the regression results by employing the fixed effect model. The empirical results support H2, H3, and H4.

4.5 Instrumental variable in the two-stage least squares (IV-2SLS) regression

Prior literature, such as Cubbin and Leech (1983), has suggested that in a company defined as either being or not being a family firm, "ownership" is a key issue. Family ownership and company performance may be endogenously determined (Demsetz and Lehn, 1985; Anderson and Reeb, 2003a; Jaggi *et al*., 2009), which may bias the empirical results using the OLS regression. This study addresses this problem by employing an instrumental variable in the two-stage least squares (IV-2SLS) regression (e.g., Anderson and Reeb, 2003a; Jaggi *et al*., 2009). Furthermore, Demsetz and Lehn (1985) and Jaggi *et al*. (2009) assert that ownership is a function of firm size and risk. Therefore, according to Anderson and Reeb (2003a), this article first regresses family ownership (FAOWN) on the natural log of total assets, the square item of the natural log of total assets, and monthly stock return volatility (with a standard deviation of the 60 monthly stock returns in the previous five years) to obtain the estimated value of family ownership. In the second stage, this paper uses the estimated value of family ownership to replace the "Family" variable. Table 9 presents the IV-2SLS regression results based on the estimated value of family ownership.

Table 7
Regression: Re-running regression models with different marginal effects of Hypotheses 2 to 4

Variable	Parameter estimate (1)	Parameter estimate (2)	Parameter estimate (3)	Parameter estimate (4)	Parameter estimate (5)	Parameter estimate (6)
Intercept	-0.478	-0.498	-0.480	-0.482	-0.479	-0.483
	(-10.68)***	(-9.56)***	(-10.78)***	(-10.74)***	(-10.68)***	(-10.73)***
Family	0.0004	-	-	0.047	0.001	0.041
	(1.72)*			(1.66)*	(1.68)*	(1.73)*
IB	-	0.027	-	-	-	-
		(1.76)*				
BS	-	-	-0.004	-	-	-
			(-0.45)			
Family*IB	-	-	-	-0.053	-	-0.047
				(-1.98)**		(1.89)*
Family*BS	-	-	-	-	-0.003	-0.017
					(-0.33)	(-0.17)
Family*IB*BS	-	-	-	-	-	-0.016
						(-1.13)
REM	-0.060	-0.060	-0.060	-0.060	-0.060	-0.060
	(-7.60)***	(-7.61)***	(-7.63)***	(-7.60)***	(-7.61)***	(-7.59)***
LEV	0.240	0.240	0.240	0.240	0.240	0.240
	(10.61)***	(10.61)***	(10.60)***	(10.63)***	(10.61)***	(10.62)***
ROA	-0.718	-0.716	-0.719	-0.720	-0.718	-0.721
	(-15.14)***	(-15.10)***	(-15.16)***	(-15.17)***	(-15.13)***	(-15.14)***
BIG4	-0.031	-0.031	-0.031	-0.031	-0.031	-0.031
	(-3.66)***	(-3.64)***	(-3.66)***	(-3.71)***	(-3.65)***	(-3.71)***
BEN	0.003	0.003	0.003	0.003	0.003	0.003
	(0.43)	(0.43)	(0.44)	(0.42)	(0.43)	(0.42)
MB	-0.004	-0.004	-0.005	-0.005	-0.005	-0.005
	(-0.79)	(-0.72)	(-0.79)	(-0.86)	(-0.79)	(-0.87)
SIZE	0.093	0.093	0.093	0.094	0.093	0.094
	(13.01)***	(12.83)***	(13.02)***	(13.06)***	(13.01)***	(13.06)***
OCF	-0.0007	-0.0007	-0.0007	-0.0007	-0.0007	-0.0007
	(-11.27)***	(-11.25)***	(-11.29)***	(-11.29)***	(-11.27)***	(-11.29)***
AdjR^2	0.353	0.353	0.353	0.353	0.352	0.352
F Value	77.45	77.55	77.49	69.85	69.67	58.13

1.(1) means DA = f (family, control variables); (2) means DA = f (proportion of inside director, control variables); (3) means DA = f (proportion of inside director's compensation for director role, control variables); (4) means DA = f (family, control variables, family * proportion of inside director); (5) means DA = f (family, control variables, family * proportion of inside director's compensation for director role); (6) means DA = f (family, control variables, family * proportion of inside director, family * proportion of inside director's compensation for director role, family * proportion of inside director * proportion of inside director's compensation for director role).

2.***, ** and * indicates significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 8
Regression: Fixed effect model (N=1,263)

$DA_{i,t} = \alpha+\beta_1 Family_{i,t}+\beta_2 IB_{i,t}+\beta_3 LnBS_{i,t}+\beta_4 Family_{i,t}*IB_{i,t}+\beta_5 Family_{i,t}*LnBS_{i,t}+\beta_6 REM_{i,t} +\beta_7 LEV_{i,t} +\beta_8 ROA_{i,t} +\beta_9 BIG4_{i,t} +\beta_{10} BEN_{i,t} +\beta_{11} MB_{i,t} +\beta_{12} SIZE_{i,t} +\beta_{13} OCF_{i,t} +\varepsilon_i$

Variable	Parameter Estimate	Standard Error	t Value	Pr> |t|
Intercept	-0.462	0.028	-16.29	<0.0001***
Family	0.329	0.045	7.40	<0.0001***
IB	0.108	0.049	2.22	0.027**
BS	0.127	0.017	7.59	<0.0001***
Family*IB	-0.303	0.055	-5.55	<0.0001***
Family*BS	-0.204	0.021	-9.65	<0.0001***
REM	-0.051	0.011	-4.62	<0.0001***
LEV	0.260	0.016	16.10	<0.0001***
ROA	-0.880	0.054	-16.39	<0.0001***
BIG4	-0.109	0.006	-18.90	<0.0001***
BEN	0.020	0.006	3.17	0.002***
MB	-0.052	0.005	-11.52	<0.0001***
SIZE	0.159	0.004	42.48	<0.0001***
OCF	-1.106	5.107	-21.66	<0.0001***
AdjR^2	0.954			
F value	2001.69			

***, ** and * indicates significance at the 1 percent, 5 percent and 10 percent levels, respectively.

The results show that the estimated coefficient of family ownership (FAOWN) is 0.020, and the t value is 3.86. Therefore, it has a statistically positive significance and supports H2. In addition, the estimated coefficient of interaction term (FAOWN *IB) is -0.024, which is significant at the 1% level (t =-3.98), and so the findings support H3. The results are consistent with previous findings of this paper.

4.6 Seemingly unrelated regression

DA is included as one of the independent variables of REM in Equation 5, while REM is one of the independent variables of DA in Equation 6. Therefore, DA and REM are simultaneously both dependent and independent variables to each other. In other words, this is a scenario in which the errors (residuals) from Equations 5 and 6 are correlated, because all values of the variables are collected from the same set of observations. To solve this simultaneous situation, this study uses a seemingly unrelated regression to re-run Equations 5 and 6.

Table 9
Regression: Instrumental variable in the two-stage least squares (IV-2SLS) regression (N=1,263)

$DA_{i,t} = \alpha+\beta_1 FAOWN_{i,t}+\beta_2 IB_{i,t}+\beta_3 BS_{i,t}+\beta_4 FAOWN_{i,t}*IB_{i,t}+\beta_5 FAOWN_{i,t}*BS_{i,t}+\beta_6 REM_{i,t} +\beta_7 LEV_{i,t} +\beta_8 ROA_{i,t} +\beta_9 BIG4_{i,t} +\beta_{10} BEN_{i,t} +\beta_{11} MB_{i,t} +\beta_{12} SIZE_{i,t} +\beta_{13} OCF_{i,t} +\varepsilon_i$

Variable	Parameter Estimate	Standard Error	t Value	Pr> |t|
Intercept	-0.599	0.059	-10.17	<0.0001***
FAOWN	0.020	0.005	3.86	<0.0001***
IB	0.149	0.049	3.04	<0.0001***
BS	-0.014	0.012	-1.19	0.233
FAOWN*IB	-0.024	0.006	-3.98	<0.0001***
FAOWN*BS	-0.002	0.059	-0.41	0.690
REM	-0.059	0.008	-7.59	<0.0001***
LEV	0.237	0.022	10.55	<0.0001***
ROA	-0.722	0.047	-15.36	<0.0001***
BIG4	-0.031	0.008	-3.71	<0.0001***
BEN	0.002	0.008	0.30	0.764
MB	-0.002	0.006	-0.40	0.689
SIZE	0.092	0.007	12.82	<0.0001***
OCF	-0.0007	0.0001	-11.23	<0.0001***
$AdjR^2$	0.363			
F value	56.27			

***, ** and * indicates significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 10
Regression: Seemingly unrelated regression for Equation 5 and Equation 6

	Equation 5 (N=2,354)		Equation 6 (N=1,263)	
Variable	Parameter Estimate	Z Value	Parameter Estimate	Z Value
Intercept	0.404	0.35	-0.443	-1.08
Family	-0.002	-2.02**	0.033	1.76*
IB	-	-	0.586	2.74***
BS	-	-	-0.024	-0.5
Family*IB	-	-	-0.050	-2.73***
Family*BS	-	-	-0.005	-1.23
DA	0.216	1.02	-	-
LEV	0.219	1.20	0.251	5.46***
ROA	0.828	2.25**	0.094	0.97
BIG4	0.042	0.79	-0.014	-1.27
BEN	-0.038	-0.87	-0.024	-2.11**
MB	0.114	1.85*	0.003	0.02
SIZE	-0.072	-0.54	0.022	0.59
REM	-	-	-0.076	-7.13***
OCF	-	-	-0.0001	-7.34***
$AdjR^2$	0.308		0.303	
F Value	24.89		212.43	

***, ** and * indicates significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table 10 presents the regression results by employing a seemingly unrelated regression. The empirical results support H2 and H3, but not H4, which are consistent with previous findings from this study.

5. Conclusions

From Tables 4 to 10, the empirical results of this study are mostly consistent and support H1, H2, and H3, but not H4. This shows that for a family firm with an earnings management incentive, because the risk of being supervised is low (Goh *et al*., 2014; Hsu *et al*., 2013) and because family members' wealth is closely tied to the value of the company, family members will reduce behaviors that can harm the value of their company for the good of its long-term reputation (Anderson and Reeb, 2003a, 2003b; Gomes, 2000; Miller *et al*., 2007; Weber *et al*., 2003). Therefore, they tend not to use the "real earnings management" mechanism, which can hurt the value of the company, but instead prefer to use the "accruals management" mechanism. Hence, the first contribution of this study is to find out which type of earnings management mechanism a family firm chooses to engage in, which can serve as a reference for regulators.

Inside directors possess private information that they can share with other directors in order to reduce information asymmetry among them. Since each inside director has private information, the board of directors has an internal balancing power that can be used to test the authenticity of the internal information shared by internal directors (Tai *et al*., 2015), thus reducing the possibility of incorrect information transfer. As a result, if the proportion of inside directors is higher in a family firm, then because of the reduction of information asymmetry, the family firm will be less likely to engage in accruals management. Hence, the second contribution of this study is determining that increasing the proportion of insider directors and bringing together all private information are ways for family firms to reduce the likelihood of engaging in accruals management.

Neither of the empirical results shows that a family firm will significantly reduce accruals management behavior if it pays a higher inside director's compensation for the role of director, whether using the proportion of an inside

director's compensation for their role as director or the natural logarithm. A possible reason for this finding is that in this study the mean of the proportion of an inside director's compensation for the role as director (BS) is about 0.3, and during the period of this study, the annual reports do not record stock compensation for the manager role. Therefore, if stock compensation for the manager role is further considered, then the proportion of an inside director's compensation for the role of director will be even lower. According to the agency theory, compensation should be an increasing function of performance (Hölmstrom, 1979), and so when a company mostly gives inside directors managers' compensation, inside directors tend to perform the executive functions of a manager more, and fewer of the supervisory functions of the director role. This led to this study's empirical results that show that the directions of coefficients are as expected but did not have statistical significance.

To summarize the empirical results of this study, because a family firm's risk of being supervised is low (Goh, Rasli, and Khan, 2014; Hsu *et al*., 2013), information asymmetry is more serious. Moreover, because of the close connection between family members' wealth and the value of the company, family members will reduce behaviors that can harm the value of the company for the sake of its long-term reputation (Anderson and Reeb, 2003a, 2003b; Gomes, 2000; Miller *et al*., 2007; Weber *et al*., 2003). Therefore, in the presence of the earnings management incentive, a family firm will choose the "accruals management" mechanism rather than the "real earnings management" mechanism.

In summary, corporate governance regulations can detect earnings management operations (Huang *et al*., 2014), and so if the authorities decide to suppress the reduction of earnings management behavior by family firms, then it can follow the method of reducing the "accruals management" mechanism by improving the information disclosure quality and quantity, thus making information transparency clearer and reducing information asymmetry (Chang and Fang, 2006). This study also tests two inside director characteristics that may inhibit a family firm from engaging in accruals management: increasing the proportion of inside directors and increasing the proportion of an inside director's compensation for the role as director. The empirical results show that inside directors can share private information and reduce information

asymmetry among each other, thus reducing the likelihood of adopting accruals management. However, because an inside director's compensation for the role as director is lower than that for the role as manager, the incentive for inside directors to share private information is not strong. On the contrary, if the proportion of inside directors is increased, then the accumulation of more individual inside directors' private information constitutes a workable way to inhibit a family firm from engaging in accruals management.

This study has some limitations. For example, the purpose of this study is to investigate which type of earnings management mechanism a family firm chooses to engage in. Therefore, this study does not test the reasons behind that choice. A firm's internal resources, external resources, and external environment all affect firm performance (Han *et al*., 2012). As a result, this research recommends that future studies explore why family firms are more likely to engage in accruals management than in real earnings management.

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