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Top Management Team Characteristics and Accrual-Based Earnings Management

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ABSTRACT

This study examines how top management team (TMT) knowledge and average tenure affect accrual-based earnings management by investigating 4791 Taiwanese listed companies from 2006 to 2010. TMT members with more knowledge (higher education level, more accounting expertise, and greater prior top management experience) and longer average tenure have better performances and higher reputations, and are more aware of the litigation costs of earnings manipulations; therefore, they reduce managers' incentives to manage earnings (incentive-reduction effect). On the other hand, these TMT members are also likely to become entrenched and engage in more earnings manipulations (entrenchment-enhancing effect). The empirical results show that firms' TMT knowledge and average tenure are negatively associated with discretionary accruals, suggesting that the incentive-reduction effect is stronger than the entrenchment-enhancing effect, which makes TMT members less likely to engage in earnings management. Moreover, the above results are robust when employing different earnings management measures and suspect firm analyses, as well as considering endogeneity issues. Finally, the study suggests that the presence of a founding family may reduce the influences of TMT knowledge and average tenure on earnings management.

1. Introduction

Many management studies have documented that the demographic characteristics of a firm's top management team (TMT) have enormous impact on its organizational outcomes. Hambrick and Mason (1984) argue that the development of organizational strategies is influenced by the top managers' personal characteristics (upper echelons perspective). These demographic characteristics are assumed to reflect experience, expertise, values, and dispositions of the TMT and influence important decisions made for the whole organization. Using this upper echelons perspective, previous studies have explored the relationship between TMT demographic characteristics and organizational outcomes, such as firm performance, growth, innovation, strategy, strategic change, and executive turnover (Huoviene & Pasanen, 2010). However, it is rarely discussed in management studies how TMT demographic characteristics affect a firm's financial reporting strategies. In addition, most accounting studies focus on discussing the impacts of CEO/CFO characteristics on a firm's financial reporting (Aier, Comprix, Gunlock, & Lee, 2005; Francis, Huang, Rajgopal, & Zang, 2008; Malmendier & Tate, 2009; Matsunaga & Yeung, 2008). It seems that the effects of the whole TMT's characteristics on earnings management are seldom discussed. To address this issue, this study employs discretionary accruals to detect earnings management and discusses the effects of TMT characteristics on earnings management,

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which is believed to be widespread in financial reporting practice.

Earnings management, a purposeful action of intervening financial reporting processes to obtain some private benefit (Schipper, 1989),[1] has been considered a problematic and pervasive activity by practitioners and regulators (Dechow & Skinner, 2000), and it has also been one of the most important topics in accounting studies for more than two decades. In general, earnings management is believed to have a negative effect on earnings quality and reduces the credibility of a firm's financial statements. Market participants can be fooled by relatively simple earnings management practices (Sloan, 1996),[2] and as a result, what constitutes a firm's earnings management is an important issue in management studies. It is believed that TMT members, including CEOs and CFOs, regularly come together to make key decisions that affect the entire organization and help the firm to achieve its goals (Huoviene & Pasanen, 2010; McIntyre, 1998). Therefore, TMT seems to play a critical role in a firm's financial reporting strategies and can be associated with the degree of a firm's earnings management.

This study discusses the effects of TMT characteristics on earnings management along two dimensions. The first dimension is *TMT management knowledge*, including TMT members' education level, accounting expertise, and prior top-management experience (Chemmanur & Paeglis, 2005; Chemmanur, Paeglis, & Simonyan, 2009). The second dimension is *TMT average tenure* (Chemmanur et al., 2009; Chemmanur & Paeglis, 2005; Walters, Kroll, & Wright, 2007; Zhang, 2009). This study proposes that managers with more knowledge or longer tenure have better firm performances (Chemmanur & Paeglis, 2005), higher status levels, and better reputations (Ali & Zhang, 2015; Badolato, Donelson, & Ege, 2014; Zhang, 2009), as well as more awareness of the potential litigation costs of earnings management. These factors would reduce the likelihood that a TMT reaches a group consensus when engaging in earnings manipulation (incentive-reduction effect). On the other hand, managers with more knowledge and longer tenure may gain greater power over a firm's operating strategies (Finkelstein, 1992), which may induce further managerial entrenchment. As a result, managers would engage in more earnings management to conceal their entrenched behavior (Ding, Zhang, & Zhang, 2007). Moreover, some studies argue that long-tenured top managers may become overly committed to their experience of running their company and be conservative toward changes, causing deterioration in firm performance (Miller, 1991; Musteen, Barker, & Baeten, 2006; Zhang, 2009). As a result, long-tenured TMT may have more incentive to manage earnings than short-tenured TMT. The above indicates that a TMT with both higher knowledge and average tenure may provide TMT members more incentive to engage in entrenched behavior (entrenchment-enhancing effect). To sum up, it seems that the effects of TMT knowledge and average tenure have both positive and negative effects on the level of earnings management. Therefore, this study proposes that TMT knowledge and average tenure is associated with firm earnings management, but does not have directional prediction.

This study employs PMS, PCPA, and PFTEAM as proxies for TMT knowledge. PMS and PCPA are used to measure TMT members' education levels and accounting expertise while PFTEAM is used to assess TMT members' relevant work experience. PMS, defined as the percentage of a firm's TMT with master's degrees, captures TMT members' management knowledge and education. PCPA measures TMT accounting expertise and is defined as the percentage of a firm's TMT who are certified public accountants. PFTEAM captures TMT members' relevant work experience and is defined as the percentage of a firm's TMT who served as executive officers and/or vice presidents prior to joining the firm. For TMT average tenure (TENURE), this refers to the average number of years that TMT members have been with the team.[3]

Following most accounting studies that use *discretionary accruals* to measure the degree of a firm's earnings management (Cohen, Dey, & Lys, 2008; Kothari, Leone, & Wasley, 2005), this study employs DA_Jones, DA_Kothari, and DA_EBXI to capture a firm's earnings management practices. The first two variables, DA_Jones and DA_Kothari, are defined as estimated discretionary accruals using the modified Jones model (Dechow, Sloan, & Sweeney, 1995) and the performance-matched Jones model (Kothari et al., 2005), respectively. In addition, since DA_Jones and DA_Kothari are estimated from a balance sheet-based approach, this study also estimates discretionary accruals from a cash flow statement-based approach (DA_EBXI), suggested by Cohen et al. (2008) for robustness purposes. We model earnings management (DA_Jones, DA_Kothari, and DA_EBXI) as a function of TMT knowledge (PMA, PCPA, and PFTEAM), TMT average tenure (TENURE), and various control variables to examine the effect of a firms TMT's characteristics on earnings management.

Using 4791 firm-year observations of Taiwanese listed companies from 2006 to 2010, the results show that TMT knowledge is significantly and negatively associated with earnings management. Specifically, a firm whose TMT has higher education levels, greater accounting expertise, and more relevant work experience will have lower discretionary accruals. Given that managers' having more knowledge usually signifies that they have greater ability, our results imply that more able TMTs may have better operating performance, which reduces their incentives to engage in earnings manipulations. In addition, the TMT average tenure also negatively relates to the level of earnings management. It suggests that a long-tenured TMT may have better performance or higher reputation costs (associated with earnings

[1] In addition, Healy and Wahlen (1999) provide another definition of earnings management. In their opinion, the actions in which "managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some shareholders about the underlying economic performance of the company, or to influence contractual outcomes that depend on reported accounting numbers" are viewed as earnings management.

[2] Sloan (1996) indicates that earnings performance attributing to the accrual component of earnings exhibits lower persistence than the cash flow component of earnings, but stock price fails to fully reflect the information content embedded in the accrual and cash flow components of earnings. Moreover, Sloan (1996) shows that there exist positive abnormal returns for trading strategies taking long positions in the stocks of firms with relatively low accruals in their earnings and short positions in the stocks of firms with relatively high accruals in their earnings. The above results imply that managers can manage earnings using accrual accounting to influence the stock price.

[3] The reasons this study employs managers' tenure as the tenure within the company are as follow. First, the data of total tenure (tenure within and without the company) and TMT age are not publicly available. Second, prior studies mostly use tenure within the company as the proxy of tenure (Chemmanur et al., 2009; Chemmanur & Paeglis, 2005; Walters et al., 2007; Zhang, 2009).

management) than a short-tenured TMT. Consequently, a TMT with long tenure faces decreased incentives to manage earnings. The empirical results of this study support the incentive-reduction effect. Moreover, considering that founding-family firms may have greater power over the firms' reporting strategy, we find that the founding family firms attenuate the effects of TMT knowledge and average tenure on earnings management. The main results are robust to alternative specifications, including employing different earnings management measures, suspect firm analyses, and endogeneity issues. In sum, this study supports that TMT knowledge and average tenure have substantial effects on reducing managers' earnings management activities.

Our study contributes to both management and accounting studies in the following ways. First, previous management studies mainly address how TMT demographic characteristics affect the organizational performance. This study associates TMT characteristics with earnings management, suggesting that TMT knowledge and average tenure are important factors for determining a firm's earnings management level. Second, in contrast to previous accounting studies that mainly address the effect of CEOs'/CFOs' characteristics on earnings quality (Aier et al., 2005; Francis et al., 2008; Malmendier & Tate, 2009; Matsunaga & Yeung, 2008), this study investigates whether TMT characteristics influence earnings management. Although CEOs and CFOs are the key managers in an organization, it seems that the majority of studies explicitly or implicitly assume that they are the sole decision-makers for financial reporting quality. However, Cheng, Lee, and Shevlin (2016) propose that other subordinate executives have incentives to increase long-term firm value, and they also have the means to influence corporate decisions toward their preferences. This suggests that organizational decisions such as whether or not to manage earnings may be jointly determined by a group of executives; hence, it is important to discuss how the TMT affects earnings management behavior. However, prior studies seldom address this issue. Demerjian, Lev, Lewis, and McVay (2013) estimate MA-score to measure managerial ability and examine how TMT ability affects earning quality. The MA-score is a performance-based measure that captures how good the managers are at transforming inputs into outputs (measured by revenue). Another study by Cao, Myers, and Omer (2012) uses scores from Fortune's *World's Most Admired Companies List* to measure the TMT's reputation and examine how TMT ability affects financial restatement. Although Demerjian et al. (2013) and Cao et al. (2012) examine the effects of the whole management team, their measures may contain other noises and are more likely to present measurement errors (Demerjian et al., 2013). As a result, focusing on demographic features of a TMT could alleviate the measurement errors and discuss the TMT effect more specifically. Prior related studies such as Bamber, Jiang, and Wang (2010) employ TMT demographic features to discuss how a manager's style affects corporate voluntary disclosures. However, to our knowledge, studies that investigate how TMT-specific demographic features affect earnings management behavior are rare. This study tries to bridge this gap by investigating the relationship between TMT-specific demographic features and firms' earnings management.

Third, some databases such as BoardEx and ExecuComp provide data on executives' demographic features (e.g., biography and job title). However, only details of the top five most important executives are contained in the BoardEX and ExecuComp databases. In Taiwan, according to the reporting requirements of Taiwanese listed companies, companies must provide their consolidated annual reports and disclose the names, job titles, background, and work experience of their key managers including the general manager, assistant managers, deputy assistant managers, and the chiefs of all the company's divisions and branch units. It appears that the Taiwanese data are potentially different from the U.S. data and provide a more complete picture about TMT styles and characteristics. Therefore, our study, which examines this research question in a Taiwanese setting, could provide some incremental contributions and serve as a foundation for future studies.

In summary, we indicate that: (1) previous management studies mainly address the effects of TMT demographic characteristics on organizational performance; (2) prior related accounting research mostly addresses the role of CEO/CFO, while this study considers the characteristics of the TMT rather than those of CEO/CFO; (3) studies examining the effects of TMT usually look at TMT as a whole (e.g., efficiency), and their measures may include measurement errors; (4) studies that focus on the association between TMT demographic features and earnings management behavior are rare; and (5) the data used in this study are unique. Therefore, our study supplements the existing literature by investigating how TMT demographic features such as educational level, accounting expertise, and work experience associate with corporate earnings management behavior.

The remainder of this study proceeds as follows. Section 2 reviews the literature and develops the main hypotheses. Section 3 describes the empirical estimation. Section 4 presents the empirical results and sensitivity analyses. Section 5 provides conclusions and limitations based on our findings.

2. Literature review and hypotheses development

Previous financial reporting studies have extensively explored the determinants of earnings management. While most of the earnings management literature focuses on firm-specific characteristics (Carcello & Neal, 2000; Dechow & Dichev, 2002; Francis, Maydew, & Sparks, 1999; Klein, 2002), the effects of manager-specific characteristics on earnings management have drawn a lot of attention recently. However, most of these studies only address the role of CEOs/CFOs. Specifically, Aier et al. (2005) show that companies have higher earnings quality if their CEOs have had more years of work experience as CFOs. Francis et al. (2008) indicate that firms with reputable CEOs have lower earnings quality. Matsunaga and Yeung (2008) propose that firms run by ex-CFOs have high disclosure quality. Malmendier and Tate (2009) find that superstar-CEOs are more likely to inflate reported performance through earnings management to meet the market expectation of “superstar performance.” However, the importance of the TMT has been well documented in recent management research (Huoviene & Pasanen, 2010; McIntyre, 1998). It is widely recognized that the TMT not only takes care of the important issues concerning the organization but also affects organizational outcomes (Huoviene & Pasanen, 2010). Colbert, Barrick, and Bradley (2014) demonstrate that the characteristics of TMT members are associated with firm performance beyond the effects of the CEO, suggesting that a firm's operation is influenced not only by the CEO but also by a dominant coalition of leaders. Wiersema and Bantel (1992) suggest that TMT members' cognitive perspectives are linked to the team's propensity to change corporate strategy. Li (2014) indicates that TMT members do affect strategic planning processes, and intra-

group conflicts could impede their ambidexterity and therefore the firm's performance. Therefore, the TMT appears to have a significant impact on a firm's financial reporting strategies and the levels of the firm's earnings management. This study examines the impacts of TMT characteristics on earnings management from the perspectives of TMT knowledge and average tenure. Our main hypotheses are developed as follows.

2.1. The association between TMT knowledge and earnings management

In this subsection, we propose how a TMT with more knowledge (including education level, accounting expertise, and relevant work experience) affects the extent of earnings management. First, previous studies such as Chemmanur and Paeglis (2005) indicate that a knowledgeable TMT has better management quality. A TMT with better management quality is more likely to select better projects (having a larger net present value for any given investment scale) and implement them more ably. As a result, it improves the firm performance and decreases the manager's incentives to manipulate earnings. Second, more able managers have greater knowledge of their client base and macro-economic conditions, suggesting that they can estimate accruals more accurately (Demerjian et al., 2013). As a result, they may be less inclined to report opportunistically. Third, managers with more knowledge and expertise are expected to have higher status (e.g., Badolato et al., 2014), and hence are less likely to succumb to capital markets pressure to meet-or-beat earnings expectations. A similar argument, such as Ali and Zhang (2015), suggests that managers care a lot about the market's perception of their ability because it is associated with several long-term benefits such as higher future compensation, reappointments, and managerial autonomy. Given that the market would consider the reported earnings as well as the TMT's reputation when assessing the manager's ability, a reputed TMT is expected to face less pressure to boost earnings to influence the market's perception because the market has already acknowledged the TMT's reputation. As a result, a TMT with more knowledge is expected to be more reputed, which reduces managers' incentives to manage accrual earnings. Fourth, managers with more expertise are expected to be more knowledgeable of financial reporting standards. Therefore, they are more aware of the potential legal costs of earnings management and hence less likely to manipulate earnings. Given that financial reporting strategies are jointly determined by the whole management team, the firm with TMT members that have greater knowledge may be less likely to obtain joint approval for the earnings management strategy. For instance, TMT members with more education and executive experience may be less likely to go along with a decision to manage earnings. As more TMT members are CPAs, they would be more resistant to engage in accrual earnings management. Overall, these studies imply that more able managers are associated with higher earnings quality and therefore have lower levels of earnings management (*incentive-reduction effect*).

Although the previously mentioned arguments support that a TMT with more knowledge is associated with lower levels of earnings management, we propose that TMT knowledge may also represent a disadvantage. Managers with relevant expertise are frequently sought for their advice, implying that they can considerably influence a firm's operational strategies (Finkelstein, 1992). Managers with greater power over their firms are more likely to become entrenched and thus more likely to influence the firm in order to increase their private income (Combs & Skill, 2003). To conceal their entrenched behavior, managers may engage in further earnings management (Ding et al., 2007). As a result, managers with more knowledge might present managerial entrenchment, which increases the likelihood that managers go along with opportunistic financial reporting strategies (*entrenchment-enhancing effect*).

According to the preceding discussions, a firm's organizational performance and financial reporting strategies (earnings management) appear to be affected by the TMT's knowledge, including education level, accounting expertise, and relevant work experience, but the effects are ambiguous. The related hypotheses are developed as follows.

Hypothesis 1. TMT knowledge is associated with discretionary accruals through the incentive-reduction effect and the entrenchment-enhancing effect.

Hypothesis 1a. TMT knowledge is negatively associated with discretionary accruals when the incentive-reduction effect dominates the entrenchment-enhancing effect.

Hypothesis 1b. TMT knowledge is positively associated with discretionary accruals when the entrenchment-enhancing effect dominates the incentive-reduction effect

2.2. The association between TMT average tenure and earnings management

Previous studies have documented that new managers begin with a knowledge deficit about their jobs, organizations, and environments (Hambrick & Fukutomi, 1991; Miller, 1991; Musteen et al., 2006). In contrast, long-tenured TMT members could easily share their experience and reduce transaction costs and internal information asymmetry among team members. As a result, a TMT with longer tenure has higher operating performance (Haleblian & Finkelstein, 1993; Hambrick & D'Aveni, 1992; Michael & Hambrick, 1992). In addition, Chemmanur et al. (2009) show that a TMT with longer average tenure has better financial and investment policies that also leads to better performance. Firms with better performance have lower levels of earnings management (Aier et al., 2005; Matsunaga & Yeung, 2008). In addition, Zhang (2009) suggests that newly hired managers have more incentives to manage earnings than to report good performance (reputation formation). After establishing their leadership status, they are more concerned with their reputation. Any detection of aggressive reporting makes shareholders doubt the credibility of the managers' previously reported performance and impairs their reputation. As the average tenure of the TMT increases, it is expected that the perceived need to manage earnings for retaining investor confidence is reduced. This suggests that long-tenured managers have less

incentive to report earnings aggressively. Moreover, managers with longer tenure are expected to be more aware of the potential legal costs of earnings management and hence less likely to engage in it. In sum, this would reduce the likelihood that the TMT reaches a group consensus to engage in earnings manipulations. Based on the above arguments, this study proposes that managers with longer tenure are expected to be associated with a lower extent of earnings management (*incentive-reduction effect*).

On the other hand, although most studies support the argument that TMT's average tenure is associated with better performance and lower levels of earnings management, Liu, Li, Hesterly, and Cannella Jr. (2012) indicate that long-tenured managers often lack the knowledge for further development and commercialization, especially when the firm is experiencing radical changes regarding stakeholders, task, and internal organization. This indicates that a TMT's average tenure will be negatively associated with invention performance. In addition, long-tenured mangers might become overly committed to their experience and have conservative attitudes toward changes in running the company as the tenure becomes longer (Hambrick & Fukutomi, 1991; Liu et al., 2012; Miller, 1991; Musteen et al., 2006; Zhang, 2009). As a result, a TMT's average tenure may be negatively related to firm performance. Therefore, long-tenured managers have more incentives to manage earnings. In addition, managers with longer tenure may have greater influence on a firm's operation (Finkelstein, 1992) and become entrenched. This may make long-tenured managers engage in earnings management activities to increase their private income (Combs & Skill, 2003; Ding et al., 2007). In sum, lower firm performance and higher managerial entrenchment would make long-tenured mangers more likely to engage in earnings management (*entrenchment-enhancing effect*).

From the preceding discussions, firms with long-tenured TMT may either decrease or increase the levels of earnings management. Therefore, it is an empirical question whether and how TMT average tenure is associated with earnings management. We specify the following hypotheses.

Hypothesis 2. TMT average tenure is associated with discretionary accruals through the incentive-reduction effect and the entrenchment-enhancing effect.

Hypothesis 2a. TMT average tenure is negatively associated with discretionary accruals when the incentive-reduction effect dominates the entrenchment-enhancing effect.

Hypothesis 2b. TMT average tenure is positively associated with discretionary accruals when the entrenchment-enhancing effect dominates the incentive-reduction effect

3. Empirical estimation

3.1. Measuring earnings management

This section demonstrates the methods used to measure the level of earnings management. Following previous accounting studies, where earnings management is proxied by discretionary accruals, this study employs the modified Jones model (Dechow et al., 1995) and the performance matched Jones model (Kothari et al., 2005) to estimate discretionary accruals (balance sheet based) as the following Eqs. (1) and (2).

$$\frac{TA_{it}}{Asset_{it-1}} = \alpha_{0t} + \alpha_{1t}\frac{1}{Asset_{it-1}} + \alpha_{2t}\frac{\Delta Sales_{it} - \Delta AR_{it}}{Asset_{it-1}} + \alpha_{3t}\frac{PPE_{it}}{Asset_{it-1}} + \varepsilon_{it} \quad (1)$$

$$\frac{TA_{it}}{Asset_{it-1}} = \alpha_{0t} + \alpha_{1t}\frac{1}{Asset_{it-1}} + \alpha_{2t}\frac{\Delta Sales_{it} - \Delta AR_{it}}{Asset_{it-1}} + \alpha_{3t}\frac{PPE_{it}}{Asset_{it-1}} + \alpha_{4t}ROA_{it} + \varepsilon_{it} \quad (2)$$

where for firm i and fiscal year t:

TA_{it} = the total accruals of firm i in year t (balance sheet perspective), which are equal to the change in noncash current assets minus the change in current liabilities excluding the current portion of long-term debt, minus depreciation and amortization;

$Asset_{it-1}$ = the total assets of firm i in year t-1;

$\Delta Sales_{it}$ = the change in net sales of firm i in year t;

ΔAR_{it} = the change in accounts receivable of firm i in year t;

PPE_{it} = the net property, plant, and equipment of firm i in year t; and.

ROA_{it} = the return on assets of firm i in year t, defined by net income scaled by the lagged total assets.

According to Jones (1991), total accruals are categorized into nondiscretionary accruals and discretionary accruals. Nondiscretionary accruals are assumed to be affected by economic consequences, while discretionary accruals are determined by managers' preferences for reported earnings. Hence, the discretionary accruals are commonly used for capturing a firm's earnings manipulation activities. This study includes Asset, ΔSales, ΔAR, and PPE in Eq. (1), and additionally includes ROA in Eq. (2) to control for changes in the economic consequences (Dechow et al., 1995; Kothari et al., 2005). The predicted values of TA in Eqs. (1) and (2) capture the nondiscretionary accruals, whereas the estimated residuals of Eqs. (1) and (2) measure the discretionary accruals (DA_Jones and DA_Kothari), which are proxied for earnings management. In addition, since DA_Jones and DA_Kothari are measured from the balance sheet approach, this research also adopts the cash-flow-statement approach to measure the discretionary accruals (DA_EBXI), suggested by Cohen et al. (2008), in Eq. (3) for the robustness purpose:

$$\frac{TA\_EBIT_{it}}{Asset_{it-1}} = \alpha_{0t} + \alpha_{1t}\frac{1}{Asset_{it-1}} + \alpha_{2t}\frac{\Delta Sales_{it} - \Delta AR_{it}}{Asset_{it-1}} + \alpha_{3t}\frac{PPE_{it}}{Asset_{it-1}} + \alpha_{4t}ROA_{it} + \varepsilon_{it} \quad (3)$$

where TA_EBXI is equal to earnings before extraordinary items minus operating cash flows from continuing operations. The definitions of the other variables are the same as those for Eq. (2). Similarly, the estimated residuals of Eq. (3) represent the alternative earnings management proxy (DA_EBXI). Firms with higher DA_Jones, DA_Kothari, and DA_EBXI are suspected to be more likely to engage in income-increasing earnings management.

3.2. Measuring TMT knowledge and average tenure

Following Chemmanur et al. (2009), this study defines a firm's TMT as all management members disclosed in annual reports.[4] Therefore, this study employs PMS, PCPA, and PFTEAM to measure TMT knowledge from the perspectives of the TMT's education levels, accounting expertise, and relevant work experience, respectively. PMS is defined as the percentage of a firm's TMT with master's degrees. PCPA refers to the percentage of a firm's TMT who are certified public accountants. PFTEAM is the percentage of a firm's TMT who served as executive officers and/or vice presidents prior to joining the firm. The greater values of PMS, PCPA, and PFTEAM indicates a more knowledgeable TMT. Finally, TMT average tenure (TENURE) is defined as the average number of years that TMT members have been with the team. Higher average tenure may indicate cohesion, shared experience, and low interaction costs among TMT members. Based on our hypotheses, H1 and H2, we have no directional prediction for the coefficient of PMS, PCPA, PFTEAM, and TENURE.

3.3. Data and methodology

In this study, earnings management (DA_Jones, DA_Kothari, and DA_EBXI) is modeled as a function of TMT knowledge (PMA, PCPA, and PFTEAM), and TMT average tenure (TENURE) to examine the effects of a firm's TMT characteristics on earnings management. The data on TMT knowledge (PMS, PCPA, and PFTEAM) were hand-collected from annual reports and proxy statements from the Taiwan Stock Exchange website. The necessary financial data used to estimate dependent variables, discretionary accruals (DA_Jones, DA_Kothari, and DA_EBXI), was obtained from the Taiwan Economic Journal (TEJ) database.

In addition, following previous literature (Barua, Davidson, Rama, & Thiruvadi, 2010; Becker, DeFond, Jiambalvo, & Subramanyam, 1998; Bulter, Leone, & Willenborg, 2004; Dechow & Dichev, 2002; Haleblian & Finkelstein, 1993), this study adds ten relevant control variables (TSIZE, OPCY, A_DNI, N_NI, SIZE, SG_F, BM, LEV, CR, and BIG4). The definitions and potential effects on earnings management are detailed as follows. First, TSIZE is the number of members in a firm's TMT. Firms with larger TMTs have better performance (Haleblian & Finkelstein, 1993), which reduces managers' incentives to manage earnings. Second, based on Dechow and Dichev (2002), we include OPCY, A_DNI, N_NI, and SIZE to control for firm-specific characteristics. OPCY is the length of the operating cycle[5] of a firm. A positive coefficient is expected for OPCY because longer operating cycles indicate more uncertainty, which may induce higher earnings manipulations. A_DNI equals the absolute value of changes in net income from the prior year. N_NI is a dummy variable, which equals to 1 if the firm had two or more consecutive years of negative income and 0 otherwise. A firm with higher A_DNI or with past negative earnings may have more incentive to manage earnings; therefore, both A_DNI and N_NI are predicted to be positively related to discretionary accruals. SIZE refers to the natural log of the book value of assets. It is expected that larger firms have more stable and predictable operations and therefore have lower levels of earnings management. Third, following Barua et al. (2010), we include SG_F and BM to control for the firm growth. SG_F is the percentage change in sales from the prior year and is positively related to earnings management. BM refers to the book value of assets divided by the market value and is predicted to have a negative coefficient. Fourth, we use LEV and CR to control for leverage and liquidity, respectively. LEV refers to long-term debt plus debt in current liabilities divided by the average total assets and is predicted to have a positive coefficient (Becker et al., 1998). CR equals current assets divided by the current liability and is negatively related to discretionary accruals (Bulter et al., 2004). Fifth, BIG4 equals 1 if a firm hires Big 4 auditors and 0 otherwise. Firms hiring Big 4 auditors are expected to have lower earning management levels compared to firms not hiring Big 4 auditors (Becker et al., 1998). Finally, we also include a year dummy and an industry dummy in our regression model. The data for computing these control variables are also obtained from the TEJ database.

3.4. Sample selection

The sample selection process of this study is stated as follows. First, our sample is restricted to Taiwanese listed companies from 2006 to 2010. Second, we excluded firms in the financial industry from the sample. Third, firms whose TMT-related data are not available in annual reports and proxy statements are also excluded. Fourth, the current study excludes sample observations with invalid and missing data. After the above screening criteria, 4791 firm-year observations are left during the sample period (2006–2010). Table 1 summarizes the sample distribution.

[4] Companies in Taiwan are required to provide their consolidated annual reports and disclose names and main work experience of their main managers, including the general manager, assistant general managers, deputy assistant general managers, and the chiefs of all the company's divisions and branch units. Executive officers disclosed in the annual report are generally regarded as the individuals who have significant impacts on the company's outcome.

[5] In this study, the operating cycle is defined as the sum of inventory days and account receivable days minus account payable days.

Table 1
Sample distribution.

Industry (industry classification code)	Year					
	2006	2007	2008	2009	2010	Total
Cement (11)	6	7	5	7	7	32(0.7%)
Food (12)	19	21	20	20	20	100(2.1%)
Plastic (13)	25	25	24	23	24	121(2.5%)
Textile (14)	40	41	39	39	40	199(4.2%)
Electrical machinery (15)	46	47	52	48	53	246(5.1%)
Electrical cable (16)	11	13	13	13	14	64(1.3%)
Chemical and biotechnology (17)	50	58	60	60	65	293(6.1%)
Glass and ceramic (18)	4	4	4	4	4	20(0.4%)
Paper (19)	5	6	7	7	6	31(0.6%)
Iron and steel (20)	28	29	29	27	28	141(2.9%)
Rubber (21)	10	10	9	10	11	50(1.0%)
Automobile (22)	5	5	4	4	5	23(0.5%)
Electronics (23)	479	516	563	583	610	2751(57.4%)
Construction (25)	42	45	43	42	47	219(4.6%)
Shipping (26)	16	19	18	18	16	87(1.8%)
Tourism (27)	6	7	7	7	8	35(0.7%)
Trade and department store (29)	15	15	13	15	14	72(1.5%)
Petroleum (97)	11	8	9	9	9	46(1.0%)
Others (99)	49	52	50	56	54	261(5.4%)
Total	867(18%)	928(19%)	969(20%)	992(21%)	1035(22%)	4791(100%)

The sample period of this study is from 2006 to 2010. This table reports the numbers of pooled firm-year observations sorted by the industry classification code and sample years. During the sample period, the sample includes 4791 firm-year observations.

Table 1 shows that there are 18 major industries in Taiwan. Among these 4791 sample firms, most of them (57.4% of total observations) are in the electronics industry. The chemical and biotechnology industry is the second major industry, which contains 6.1% of the observations. This is because the electronics industry is the largest industry in Taiwan. It is also noted that the Taiwanese semiconductor industry is one of the major IC producers in the world. In addition, the sample observations gradually increase year by year, from 867 observations in 2006 to 1035 observations in 2010.

4. Empirical results

4.1. Descriptive statistics

The empirical predictions developed in Section 2 address the associations between TMT characteristics and earnings management. Therefore, the empirical analysis begins by providing descriptive statistics relating to earnings management (DA_Jones, DA_Kothari, and DA_EBXI), TMT knowledge, tenure (PMA, PCPA, PFTEAM, and TENURE), and other control variables (TSIZE, OPCY, A_DNI, N_NI, SIZE, SG_F, LEV, CR, BM, BIG4). Table 2 presents the descriptive statistics of all variables used in our analyses. Balance sheet-based discretionary accruals (DA_Jones and DA_Kothari) range from −0.7096 to 5.9120 and −1.2230 to 5.8112, with a mean (median) value 0.0008(−0.0013) and 0.0013(−0.0019), respectively. Cash flow statement-based discretionary accruals (DA_EBXI) vary from −1.9053 to 5.9019, with a mean (median) value −0.0000 (−0.0032).[6] The number of TMT members (TSIZE) varies from 1 to 77, with a mean (median) value 9.4505 (8.0000). For variables of TMT knowledge, about 13.46% of TMT members have master's degrees, 8.93% of TMT members have CPA licenses, and 42.37% of TMT members served as executive officers and/or vice presidents prior to joining the firm. This indicates that relevant work experience contributes a major portion of TMT knowledge. The TMT average tenure is 7.1087 years, with a minimum (maximum) value 0.0055 (35.0493) years. On average, the length of operating cycle (OPCY) is 0.5854 years. Absolute value of change in earnings (A_DNI) varies from 0.0000 to 72.3872, with a mean value 0.6927. About 10% of the observations have negative earnings (N_NI) in the prior year. The average firm size (SIZE) ranges from 10.7752 to 21.0457, with a mean (median) value 15.3044 (15.1249). Firm sales growth (SG_F) ranges from −0.9210 to 278.9637, with a mean (median) value 0.2079 (0.0684). The average leverage ratio (LEV) is 0.0928, with a minimum (maximum) value 0.0000 (0.9364) years. Current ratio (CR) ranges from 0.0487 to 94.4514, with a mean (median) value 2.3018 (1.7594). Market to book ratio (BM) varies from −3.5807 to 11.7100, with a mean (median) value 0.9958 (0.8017). About 74% of observations are audited by Big 4 auditors (BIG4). This implies that most firms listed in Taiwan are audited by Big 4 auditors.

[6] We employ all TEJ listed firms belonging to the same industry and year to estimate earnings management proxies (DA_Jones, DA_Kothari and DA_EBXI) and then limit our sample firms with available financial and TMT characteristics data when examining the association between TMT knowledge (PMS, PCPA, and PFTEAM) and average tenure (TENURE) and earnings management (DA_Jones, DA_Kothari, and DA_EBXI). As a result, the means of residuals of DA_Jones, DA_Kothari, and DA_EBXI for firms reported in Table 2 may not equal to zero.

Table 2
Summary statistics.

	Mean	Median	Standard deviation	Minimum	Maximum
DA_Jones	0.0008	−0.0013	0.1355	−0.7096	5.9120
DA_Kothari	0.0013	−0.0019	0.1339	−1.2230	5.8112
DA_EBXI	0.0000	−0.0032	0.1402	−1.9053	5.9019
TSIZE	9.4505	8.0000	6.2584	1.0000	77.0000
PMS	0.1346	0.0000	0.1910	0.0000	1.0000
PCPA	0.0893	0.0590	0.1106	0.0000	0.7500
PFTEAM	0.4237	0.4000	0.3361	0.0000	1.0000
TENURE	7.1087	5.5634	5.1434	0.0055	35.0493
OPCY	0.5854	0.3969	1.7775	0.0022	69.0634
A_DNI	0.6927	0.1121	3.1244	0.0000	72.3872
N_NI	0.1036	0.0000	0.3047	0.0000	1.0000
SIZE	15.3044	15.1249	1.4306	10.7752	21.0457
SG_F	0.2079	0.0684	3.9743	−0.9210	278.9637
LEV	0.0928	0.0537	0.1126	0.0000	0.9364
CR	2.3018	1.7594	2.2254	0.0487	94.4514
BM	0.9958	0.8017	0.7673	−3.5807	11.7100
BIG4	0.7432	1.0000	0.4369	0.0000	1.0000

This table presents descriptive statistics of all variables. *DA_Jones* is the modified Jones model (Dechow et al., 1995). *DA_Kothari* and *DA_EBXI* are respectively the balance sheet based and the cash flow statement-based discretionary accruals estimated from Kothari et al. (2005). *TSIZE* is the size of a firm's TMT, defined as the number of executive officers. *PMS* is the percentage of a firm's TMT with master's degrees. *PCPA* is the percentage of a firm's TMT who are Certified Public Accountants. *PFTEAM* is the percentage of a firm's TMT who served as executive officers and/or vice presidents prior to joining the firm. *TENURE* is the average number of years that TMT members have been with the team. The control variables include the length of operating cycle (*OPCY*) in years, firm sales growth (*SG_F*), absolute value of change in earnings (*A_DNI*) in trillions, past negative earnings (*N_NI*), the log of firm assets (*SIZE*), the book to market ratio (*BM*), the leverage ratio (*LEV*), current ratio (*CR*), and audit quality (*BIG4*).

4.2. The effects of TMT knowledge and average tenure on earnings management

4.2.1. Multivariate analyses

To investigate how TMT knowledge and average tenure affect a firm's earnings management level, this work adopts panel regressions to control for firm and year fixed effects, and the standard errors are clustered by firms, shown as Eq. (4).

$$DA_{it} = \alpha_0 + \alpha_1 TSIZE_{it} + \alpha_2 PMS_{it} + \alpha_3 PCPA_{it} + \alpha_4 PFTEAM_{it} + \alpha_5 TENURE_{it} + \alpha_6 OPCY_{it} + \alpha_7 A\_DNI_{it} + \alpha_8 N\_NI_{it} + \alpha_9 SIZE_{it} + \alpha_{10} SG\_F_{it} + \alpha_{11} LEV_{it} + \alpha_{12} CR_{it} + \alpha_{13} BM_{it} + \alpha_{14} BIG4_{it} + \varepsilon_{it} \quad (4)$$

where DA = DA_Jones, DA_Kothari, and DA_EBXI.

Table 3 shows the related empirical results of Eq. (4). The findings from column (1) demonstrate that TMT knowledge (PMS, PCPA, and PFTEAM) are all significantly and negatively related to discretionary accruals (DA_Jones). The coefficients (−0.0203, −0.1086, and −0.0181) show that discretionary accruals decrease 0.0039 units (−0.0203 × 0.1910), 0.0120 units (−0.1086 × 0.1106), and 0.0061 units (−0.0181 × 0.3361) for one standard deviation increase in PMS, PCPA, and PFTEAM, respectively. The results from columns (2) to (6) present similar results when the discretionary accruals are measured as DA_Kothari and DA_EBXI and/or controlling for the effect of TMT size. For the results of TENURE, column (4) shows that the TMT average tenure is significantly and negatively related to discretionary accruals (DA_Kathori). The coefficient (−0.0009) shows that discretionary accruals decrease 0.0046 units (−0.0009 × 5.1434) for one standard deviation increase in TENURE. The results of column (6) present similar results when the discretionary accruals are measured by DA_EBXI. Overall, the results of Table 3 show that both TMT knowledge (especially for education level and accounting expertise) and average tenure have significant effects on reducing a firm's earnings management. The result implies that TMT members with higher education level, greater accounting expertise, more relevant work experience, and longer average tenure may have better operating performance, be more reputable, and be more aware of litigation costs. This makes managers less likely to reach a consensus to manipulate earnings. Regarding the hypotheses H1 and H2, the results support the argument that the incentive-reduction effect outweighs the entrenchment-enhancing effect, causing TMT knowledge and average tenure to be negatively associated with discretionary accruals.[7]

4.2.2. Path analysis: Performance channel

In this subsection, we aim to discuss whether the TMT knowledge and average tenure affect the level of earnings management by the incentive-reduction effect. Given the difficulties of measuring the TMT status level, reputation, and litigation costs of earnings management, we focus on investigating whether the TMT knowledge and average tenure affect the firm performance and therefore

[7] Table 3 shows the results of regression analysis that jointly examine the effects of TMT characteristics on earnings management. As to the regression models that include only one of the TMT demographic characteristics and the control variables, the results demonstrate that all TMT demographic measures are still negatively and significantly related to the earnings management proxied by DA_Jones and DA_Kothari, and are available upon request.

Table 3
Regression of TMT characteristics against earning management when controlling for well-known variables.

	(1)	(2)	(3)	(4)	(5)	(6)
	DA_Jones	DA_Jones	DA_Kothari	DA_Kothari	DA_EBXI	DA_EBXI
Intercept	−0.0351	−0.0322	−0.0140	−0.0002	−0.0581**	−0.0502*
	(−1.3186)	(−1.1906)	(−0.5023)	(−0.0093)	(−2.1160)	(−1.8672)
TSIZE		−0.0002		−0.0001		−0.0007**
		(−0.4555)		(−0.3561)		(−2.0608)
PMS	−0.0203*	−0.0221*	−0.0265**	−0.0250**	−0.0263*	−0.0246*
	(−1.6743)	(−1.7678)	(−2.1580)	(−2.0330)	(−1.8079)	(−1.7413)
PCPA	−0.1086***	−0.1125***	−0.1087**	−0.0923***	−0.1206**	−0.1065***
	(−2.9169)	(−3.0017)	(−2.0414)	(−2.7717)	(−2.3319)	(−2.6444)
PFTEAM	−0.0181*	−0.0182*	−0.0167*	−0.0172*	−0.0094	−0.0098
	(−1.7954)	(−1.7923)	(−1.6651)	(−1.6958)	(−0.8943)	(−0.9159)
TENURE		−0.0005		−0.0009***		−0.0012***
		(−1.3036)		(−2.7793)		(−2.8945)
OPCY	−0.0001	−0.0001	0.0000	0.0000	0.0001	0.0001
	(−0.4394)	(−0.4652)	(0.2222)	(0.2481)	(0.3174)	(0.3669)
A_DNI	−0.0009**	−0.0009**	−0.0009**	−0.0008**	−0.0015***	−0.0016***
	(−2.2053)	(−2.2173)	(−2.2795)	(−2.3392)	(−3.5014)	(−3.6305)
N_NI	0.0254	0.0249	0.0401**	0.0401**	0.0258*	0.0229
	(1.5496)	(1.5296)	(2.5600)	(2.5723)	(1.6477)	(1.4676)
SIZE	0.0035**	0.0037**	0.0014	0.0011	0.0042**	0.0048***
	(2.1578)	(2.2305)	(0.8092)	(0.6850)	(2.5411)	(2.9959)
SG_F	0.0018	0.0018	0.0018	0.0018	0.0024	0.0022
	(0.8247)	(0.8224)	(0.8454)	(0.8365)	(1.1156)	(1.0913)
LEV	−0.0494***	−0.0511***	−0.0148	−0.0200	−0.0226	−0.0228
	(−2.9517)	(−3.0222)	(−0.8707)	(−1.1679)	(−1.0672)	(−1.0613)
CR	−0.0011	−0.0011	−0.0015	−0.0016	−0.0020	−0.0022
	(−1.2262)	(−1.2471)	(−1.4639)	(−1.5080)	(−1.3102)	(−1.3688)
BM	−0.0022	−0.0021	0.0034	0.0046	0.0010	0.0018
	(−0.4857)	(−0.4737)	(0.7605)	(0.9903)	(0.2598)	(0.4498)
BIG4	0.0038	0.0034	0.0025	0.0008	0.0052	0.0026
	(0.7318)	(0.6488)	(0.4722)	(0.1464)	(0.9226)	(0.4707)
Observations	3919	3919	3954	3919	3945	3910
R^2	0.0134	0.0137	0.0196	0.0216	0.0163	0.0178

This table shows the results of six regressions with *DA_Jones, DA_Kothari,* and *DA_EBXI* as the dependent variables against various variables of TMT characteristics using observations from 2006 to 2010. The fixed effects (industry and year) and cluster issues (Petersen, 2009) are considered in these results. TMT characteristics includes *TSIZE*, *PMS*, *PCPA*, *PFTEAM,* and *TENURE*. The control variables include the length of operating cycle (*OPCY*), firm sales growth (*SG_F*), absolute value of change in earnings (*A_DNI*), past negative earnings (*N_NI*), the log of firm assets (*SIZE*), the book to market ratio (*BM*), the leverage ratio (*LEV*), current ratio (*CR*), and variables related to bonus and audit quality (*BIG4*). The t-statistics are calculated by firm-level clustered standard errors for each coefficient and appears immediately underneath. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

the level of earnings management. The path analysis model is employed to address this issue. The regression model is shown in Eq. (5) and Eq. (6).

$$OCF_{it} = \alpha_0 + \alpha_1 MQ_{it} + \varepsilon_{it} \tag{5}$$

$$DA\_Jones_{it} = \beta_0 + \beta_1 MQ_{it} + \beta_2 OCF_{it} + \beta_3\ OPCY_{it} + \beta_4 A\_DNI_{it} + \beta_5 N\_NI_{it} + \beta_6 SIZE_{it} + \beta_7 SG\_F_{it} + \beta_8 LEV_{it} + \beta_9 CR_{it} + \beta_{10} BM_{it} + \beta_{11} BIG4_{it} + \varepsilon_{it} \tag{6}$$

where MQ = PMS, CPA, PFTEAM, and TENURE. The variable OCF refers to the performance channel and is computed as the ratio of operating cash flows to book value of assets.[8] According to the incentive-reduction argument, it is expected that PMS, CPA, PFTEAM, and TENURE positively associate with OCF, which is expected to be negatively associated with DA_Jones. Therefore, α_1 is expected to be positive and β_2 to be negative. Empirical results of columns (1) and (2) in Table 4-1 show that the TMT education level (PMS) significantly and positively relates to a firm's operating performance (OCF), which significantly and negatively relates to a firm's earnings management (DA_Jones). In addition, the result of column (2) also show that PMS significantly and negatively relates to a firm's earnings management level. The results indicate that the effects of TMT education levels on earnings management include a direct effect (path coefficient: −0.0219) and an indirect effect through the performance channel ($0.0451 \times -0.5777 = -0.0261$). The negative direct effect suggests that the negative associations between TMT characteristics and earnings management are driven

[8] This study employs DA_Jones to investigate the incentive-reduction argument since the estimation accrual models of DA_Kothari and DA_EBXI have controlled for the effect of ROA. Moreover, the performance channel is proxied by the cash flows from operations, which is a measure of firm performance, as Burgstahler and Dichev (1997) suggested.

Table 4-1
Path analysis for the effect of TMT Characteristics on earnings management: Performance channel.

	OCF	*DA_Jones*	*OCF*	*DA_Jones*	*OCF*	*DA_Jones*	*OCF*	*DA_Jones*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	−0.1306**	−0.1362**	−0.0736	−0.0713**	−0.0777***	−0.1336***	−0.0763***	−0.1277***
	(−2.048)	(−2.8905)	(−1.5197)	(−1.9953)	(−2.6478)	(−3.9161)	(−2.6401)	(−3.6918)
PMS	0.0451***	−0.0219*						
	(2.9796)	(−1.6610)						
PCPA			0.0049	−0.0248**				
			(0.3363)	(−1.9614)				
PFTEAM					0.0465***	−0.0363***		
					(3.2270)	(−2.7212)		
TENURE							0.0387***	0.0154
							(2.7245)	(1.2242)
OCF		−0.5777***		−0.5995***		−0.5745***		−0.5694***
		(−44.2491)		(−45.4345)		(−45.0550)		(−44.7498)
OPCY	−0.0398***	−0.0156	−0.0286	−0.0214	−0.0665***	−0.0160	−0.0667***	−0.0130
	(−2.5731)	(−1.1566)	(−1.5865)	(−1.3874)	(−4.4225)	(−1.2169)	(−4.4779)	(−0.9897)
A_DNI	0.0084	−0.0138	0.0210	−0.0130	0.0270*	−0.0152	0.0291**	−0.0180
	(0.5163)	(−0.9600)	(1.2491)	(−0.9018)	(1.6884)	(−1.0877)	(1.8386)	(−1.2981)
N_NI	−0.1207***	−0.0081	−0.1303***	−0.0209	−0.1114***	−0.0121	−0.1120***	−0.0061
	(−7.8666)	(−0.5997)	(−8.2408)	(−1.5284)	(−7.3809)	(−0.9152)	(−7.4969)	(−0.4631)
SIZE	0.1174***	0.1186***	0.1107***	0.1037***	0.1000***	0.1118***	0.1002***	0.1197***
	(6.7007)	(7.6904)	(6.1264)	(6.6335)	(5.9195)	(7.3633)	(6.0139)	(7.9369)
SG_F	−0.0368***	0.0317**	−0.0468***	0.0271**	−0.0409***	0.0321***	−0.0387***	0.0311**
	(−2.5649)	(2.5331)	(−3.1684)	(2.1450)	(−2.8925)	(2.6291)	(−2.7597)	(2.5541)
LEV	−0.0599***	−0.0849***	−0.0485***	−0.0687***	−0.0543***	−0.0832***	−0.0519***	−0.0814***
	(−3.7540)	(−6.0952)	(−3.0047)	(−4.9780)	(−3.5686)	(−6.1169)	(−3.4452)	(−6.0112)
CR	0.0611***	−0.0049	0.0712***	0.0069	0.0598***	−0.0080	0.0604***	−0.0083
	(3.9495)	(−0.3663)	(3.9215)	(0.4446)	(3.9298)	(−0.6103)	(4.0026)	(−0.6357)
BM	−0.0940***	−0.0724***	−0.1075***	−0.0758***	−0.1157***	−0.0795***	−0.1251***	−0.0786***
	(−5.4379)	(−4.7862)	(−6.0501)	(−4.9632)	(−7.0664)	(−5.3857)	(−7.7675)	(−5.3605)
BIG4		0.0094		0.0122		0.0113		0.0053
		(0.7271)		(0.9386)		(0.8965)		(0.4270)
Observations	4473	4473	4226	4226	4698	4698	4791	4791
R^2	0.0938	0.3144	0.0916	0.3372	0.0659	0.3114	0.0662	0.3036

This table shows the results of path analysis model for exploring whether the effect of TMT characteristics on earnings management (*DA_Jones, DA_Kothari, and DA_EBXI*) through performance channels (measured by operating cash flows deflated by total asset, *OCF*). The control variables include the length of operating cycle (*OPCY*), absolute value of change in earnings (*A_DNI*), the dummy variable of past negative earnings (*N_NI*), the natural log of firm assets (*SIZE*), firm sales growth (*SG_F*), the leverage ratio (*LEV*), current ratio (*CR*), the book to market ratio (*BM*), and audit quality (*BIG4*). The coefficients represent the standardized regression coefficients (path coefficients). ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

not only by the performance channel but also by other channels such as reputation protection, better accrual estimation ability, and more awareness of litigation costs of earnings management. Similarly, the empirical results of columns (5) and (6) in Table 4-1 show that a TMT's prior working experience (PFTEAM) significantly and positively relates to the operating performance (OCF), which significantly and negatively relates to a firm's earnings management level. The results reveal that the effects of PFTEAM on DA_Jones include the direct effect (path coefficient: −0.0363) and the indirect effect through the performance channel ($0.0465 \times -0.5745 = -0.0267$). Similarly, empirical results of columns (7) and (8) in Table 4-1 also provide similar results by using another TMT characteristic, (TENURE). As to the path analysis of the PCPA effect, the results of columns (3) and (4) indicate that TMT members with accounting expertise do not contribute to better operational performance. The negative association between PCPA and DA_Jones may contribute to factors other than firm performance. Overall, the above empirical results support the incentive-reduction effect that the TMT education level, prior working experience, and average tenure affect a firm's earnings management level through the performance channel. Moreover, the negative direct effect and indirect effect imply that the incentive-reduction effect includes both better performance and other factors such as reputation protection, better accrual estimation ability, and more awareness of litigation costs of earnings management.

4.2.3. Path analysis: Entrenchment channel

This study proposes that a firm's TMT with more knowledge or longer average tenure may increase the level of earnings management because of the entrenchment-enhancing effect. To examine this effect, this study employs the path analysis, and the regression model is shown in Eq. (7) and Eq. (8).

$$EX\_COMP_{it} = \alpha_0 + \alpha_1 MQ_{it} + \varepsilon_{it} \quad (7)$$

Table 4-2
Path analysis for the effect of TMT characteristics on earnings management: Entrenchment channel.

	EX_COMP	*DA_Jones*	*EX_COMP*	*DA_Jones*	*EX_COMP*	*DA_Jones*	*EX_COMP*	*DA_Jones*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	−0.1333***	0.0151	−0.1384***	0.0747	−0.1473***	0.0405	−0.1513	0.0235
							−0.1513082	
							0.1513082	
	(−21.9723)	(0.2523)	(−29.5139)	(1.6263)	(−33.0246)	(0.8826)	(−34.3406)	(0.7601)
PMS	0.0305**	−0.0489***						
	(2.4981)	(−3.0690)						
PCPA			−0.0042	−0.0263*				
			(−0.3489)	(−1.6845)				
PFTEAM					0.0241*	−0.0494***		
					(1.9418)	(−3.0567)		
TENURE							0.0854***	−0.0154
							(7.4183)	(−1.0386)
EX_COMP		0.0934***		0.0915***		0.0903***		0.0878***
		(4.7155)		(4.5049)		(4.6950)		(4.7163)
OPCY	0.0183	0.0057	0.009	−0.0055	0.0164	0.0059	0.0191	0.0041
	(1.4603)	(0.3499)	(0.6136)	(−0.2871)	(1.3476)	(0.3721)	(1.5858)	(0.2650)
A_DNI	−0.1710***	−0.0004	−0.1715***	−0.0075	−0.1659***	−0.0060	−0.1657***	−0.0059
	(−12.8376)	(−0.0210)	(−12.5326)	(−0.4110)	(−12.7809)	(−0.3476)	(−12.9844)	(−0.3511)
N_NI	−0.1895***	0.0815***	−0.1872***	0.0754***	−0.1890***	0.0740***	−0.1791***	0.0709***
	(−15.2643)	(4.8972)	(−14.6012)	(4.4050)	(−15.5332)	(4.5533)	(−14.9463)	(4.4955)
SIZE	0.6346***	−0.0051	0.6291***	−0.0155	0.6333***	−0.0115	0.6459***	−0.0050
	(44.6899)	(−0.2274)	(42.8219)	(−0.6741)	(45.3413)	(−0.5255)	(47.0774)	(−0.2410)
SG_F	−0.0023	0.0528***	−0.0026	0.0552***	−0.0022	0.0527***	0.0003	0.0493***
	(−0.1984)	(3.4885)	(−0.2159)	(3.5484)	(−0.1941)	(3.5779)	(0.0230)	(3.3847)
LEV	−0.0386***	−0.0444***	−0.0399***	−0.0337**	−0.0430***	−0.0430***	−0.0387***	−0.0438***
	(−2.9931)	(−2.6351)	(−3.0644)	(−1.9906)	(−3.4092)	(−2.6229)	(−3.1244)	(−2.8067)
CR	−0.0002	−0.0384**	0.0021	−0.0331*	0.0019	−0.0424***	0.0032	−0.0410***
	(−0.0141)	(−2.3489)	(0.1444)	(−1.7268)	(0.1550)	(−2.6697)	(0.2626)	(−2.6182)
BM	0.0014	−0.0196	0.0039	−0.0140	0.0049	−0.0259	−0.0017	−0.0118
	(0.0979)	(−1.0666)	(0.2693)	(−0.7403)	(0.3540)	(−1.4466)	(−0.1269)	(−0.7924)
BIG4		−0.0012		−0.0035		−0.0020		−0.0036
		(−0.0770)		(−0.2184)		(−0.1299)		(−0.2409)
Observations	4372	4372	4139	4139	4604	4604	4688	4688
R^2	0.4211	0.0170	0.4167	0.0157	0.4172	0.0166	0.4248	0.0131

This table shows the results of path analysis model for exploring whether the effect of TMT characteristics on earnings management (*DA_Jones, DA_Kothari, and DA_EBXI*) through entrenchment channels (measured by TMT excessive compensation, *EX_COMP*). *EX_COMP* is defined as the difference between a firm's TMT compensation and average TMT compensation of the industry where the firm belongs to (in per unit operating expense). The control variables include the length of operating cycle (*OPCY*), absolute value of change in earnings (*A_DNI*), the dummy variable of past negative earnings (*N_NI*), the natural log of firm assets (*SIZE*), firm sales growth (*SG_F*), the leverage ratio (*LEV*), current ratio (*CR*), the book to market ratio (*BM*), and audit quality (*BIG4*). The coefficients represent the standardized regression coefficients (path coefficients). ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

$$DA\_Jones_{it} = \beta_0 + \beta_1 MQ_{it} + \beta_2 EX\_COMP_{it} + \beta_3\, OPCY_{it} + \beta_4 A\_DNI_{it} + \beta_5 N\_NI_{it} + \beta_6 SIZE_{it} + \beta_7 SG\_F_{it} + \beta_8 LEV_{it} + \beta_9 CR_{it} + \beta_{10} BM_{it} + \beta_{11} BIG4_{it} + \varepsilon_{it} \quad (8)$$

where MQ = PMS, CPA, PFTEAM, and TENURE. EX_COMP stands for the proxy of managerial entrenchment and is measured by TMT excessive compensation, defined as the difference between a firm's TMT compensation and average TMT compensation of the industry that the firm belongs to (in per unit operating expense). According to the entrenchment-enhancing effect, it is expected that PMS, CPA, PFTEAM, and TENURE positively associate with EX_COMP, which is expected to be positively associated with DA_Jones. Therefore, α_1 is expected to be positive and β_2 is positive. Empirical results are presented in Table 4-2. Columns (1) and (2) show that TMT education level (PMS) significantly and positively relates to excess compensation (EX_COMP), which significantly and positively relates to a firm's earnings management (DA_Jones). In addition, the results of column (2) also show that PMS significantly and negatively relates to a firm's earnings management level. The results indicate that the effects of TMT education level on earnings management include the direct effect (path coefficient: −0.0489) and the indirect effect through the managerial entrenchment channel (0.0305 × 0.0934 = 0.0028). Similarly, empirical results of columns (5) and (6) in Table 4-2 show that the TMT prior working experience (PFTEAM) significantly and positively relates to the excess compensation (EX_COMP), which significantly and positively relates to the firm's earnings management level. The results reveal that the effects of PFTEAM on DA_Jones include the direct effect (path coefficient: −0.0494) and the indirect effect through the entrenchment-enhancing channel (0.0241 × 0.0903 = 0.0022). Similarly, empirical results of column (7) and (8) in Table 4-2 also provide similar results by using another TMT characteristic (TENURE). As to the path analysis of the PCPA effect, the results of columns (3) and (4) show that TMT members with accounting expertise do not contribute to higher excess compensation. This suggests that managers with accounting

Table 5
Regression of TMT characteristics against earning management for firms with earnings management incentives.

	(1)	(2)	(3)	(4)	(5)	(6)
	DA_Jones	DA_Jones	DA_Kothari	DA_Kothari	DA_EBXI	DA_EBXI
Intercept	−0.1623***	−0.1369**	0.0518	0.0606	0.0188	0.0285
	(−3.2881)	(−2.6414)	(1.1253)	(1.3393)	(0.3826)	(0.5793)
TSIZE		−0.0001		−0.0002		−0.0006
		(−0.1600)		(−0.4675)		(−1.4416)
PMS	−0.0183**	−0.0177**	−0.0177	−0.0208	−0.0134	−0.0198
	(−2.4695)	(−2.2224)	(−1.3626)	(−1.5357)	(−0.5578)	(−0.8005)
PCPA	−0.0900*	−0.1012*	−0.0975***	−0.1033***	−0.0609*	−0.0776**
	(−1.9957)	(−1.9317)	(−2.8220)	(−2.8725)	(−1.8283)	(−2.0772)
PFTEAM	−0.0042	−0.0014	−0.0324*	−0.0323*	−0.0268	−0.0275
	(−0.5843)	(−0.2268)	(−1.6732)	(−1.6528)	(−1.2988)	(−1.2993)
TENURE		−0.0008*		−0.0009**		−0.0015***
		(−1.7565)		(−1.9687)		(−2.6766)
OPCY	−0.0001	−0.0001	0.0007	0.0007	0.0034	0.0034
	(−0.5262)	(−0.5771)	(0.4839)	(0.4371)	(1.0168)	(1.0008)
A_DNI	−0.0031***	−0.0026***	0.0004	0.0004	−0.0004	−0.0004
	(−6.3698)	(−5.8497)	(0.6544)	(0.6478)	(−0.5400)	(−0.5536)
N_NI	0.0155*	0.0164*	0.0698*	0.0692*	0.0339	0.0331
	(1.8228)	(1.9398)	(1.8040)	(1.7946)	(0.8017)	(0.7844)
SIZE	0.0092***	0.0081**	−0.0023	−0.0022	−0.0002	0.0005
	(2.9598)	(2.3962)	(−1.0061)	(−1.0407)	(−0.0708)	(0.2172)
SG_F	0.0260*	0.0285*	0.0016	0.0015	0.0020	0.0020
	(1.7157)	(1.6758)	(0.7866)	(0.7822)	(1.0853)	(1.0812)
LEV	−0.0023	−0.0094	−0.0220	−0.0241	−0.0170	−0.0192
	(−0.0886)	(−0.3310)	(−1.0045)	(−1.1007)	(−0.6981)	(−0.7703)
CR	0.0008	0.0005	−0.0024	−0.0024	−0.0055	−0.0056
	(0.4419)	(0.2437)	(−1.3713)	(−1.3514)	(−1.4425)	(−1.4424)
BM	0.0075	0.0070	−0.0007	−0.0007	0.0020	0.0020
	(1.3109)	(1.2251)	(−0.0701)	(−0.0727)	(1.0853)	(1.0812)
BIG4	−0.0025	−0.0029	0.0026	0.0017	0.0062	0.0048
	(−0.5314)	(−0.6393)	(0.3801)	(0.2474)	(0.7895)	(0.6212)
Observations	954	946	954	946	954	946
R^2	0.0578	0.0540	0.0306	0.0314	0.0243	0.0267

This table shows the results of six regressions with *DA_Jones, DA_Kothari,* and *DA_EBXI* as the dependent variables against various variables of TMT characteristics using observations restricted to firms with earnings per share ranging from $0 to $1 per share. The fixed effects (industry and year) are considered in these results. TMT characteristics includes *TSIZE*, *PMS*, *PCPA*, *PFTEAM,* and *TENURE*. The control variables include the length of operating cycle (*OPCY*), firm sales growth (*SG_F*), absolute value of change in earnings (*A_DNI*), past negative earnings (*N_NI*), the log of firm assets (*SIZE*), the book to market ratio (*BM*), the leverage ratio (*LEV*), current ratio (*CR*), and variables related to bonus and audit quality (*BIG4*). The t-statistics are calculated by firm-level clustered standard errors for each coefficient and appears immediately underneath. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

expertise do not have greater power over a firm's operational strategies. Other types of management knowledge such as master's degrees and work experience (before and after joining the firm) are more important in determining the firm's strategies. Overall, the above empirical results support the entrenchment-enhancing effect that a TMT's education levels, prior working experience, and average tenures affect the firm's earnings management level through the channels of managerial entrenchment.

4.3. Additional analyses

4.3.1. Incentives to engage in earnings management (suspect firm analyses)

Prior researchers have demonstrated that when firm-year observations are grouped by earnings levels, the distribution usually presents discontinuity at zero earnings (Roychowdhury, 2006). This implies that managers are more likely to manage earnings to avoid reporting a loss. As a result, this study also identifies a sample of firms that are suspected to manage earnings, and re-examines the effects of TMT knowledge and average tenure on a firm's level of earnings management. This study classifies firms that manage to meet zero earnings as their earnings scaled by the number of shares outstanding (earnings per share) fall into the interval of [0, 1]. The results are shown in Table 5 using DA_Jones, DA_Kothari, and DA_EBXI as earnings management proxies. Table 5 presents consistent but somewhat weaker results. Specifically, the findings from columns (1) and (2) demonstrate that PMS is significantly and negatively associated with discretionary accruals, and results from columns (1) to (6) show that PCPA is significantly and negatively associated with discretionary accruals. Moreover, results of columns (3) and (4) present that PFTEAM is significantly and negatively associated with discretionary accruals, and findings from column (2), (4), and (6) demonstrate that TENURE is significantly and negatively associated with discretionary accruals. Therefore, both TMT knowledge and average tenure have substantial effects on constraining a firm's earnings management level.

Table 6
Regression of TMT characteristics against alternative earning management proxies.

	(1)	(2)	(3)	(4)	(5)	(6)
	DA_MDD	DA_MDD	DA_BB	DA_BB	DA_BS	DA_BS
Intercept	0.0115	0.0079	0.0115	0.0079	−0.0112	−0.0123
	(0.7558)	(0.4499)	(0.7558)	(0.4499)	(−1.2284)	(−1.5871)
TSIZE		−0.0002		−0.0002		−0.0001
		(−0.5460)		(−0.5460)		(−0.2824)
PMS	−0.0231***	−0.0229***	−0.0231***	−0.0229***	−0.0084*	−0.0084*
	(−5.0044)	(−4.6931)	(−5.0044)	(−4.6931)	(−1.7755)	(−1.7163)
PCPA	−0.0800***	−0.0810***	−0.0800***	−0.0810***	−0.0797***	−0.0804***
	(−3.2794)	(−3.4869)	(−3.2794)	(−3.4869)	(−3.9204)	(−4.0141)
PFTEAM	−0.0075***	−0.0076***	−0.0075***	−0.0076***	−0.0128***	−0.0128***
	(−2.9209)	(−2.9944)	(−2.9209)	(−2.9944)	(−3.1299)	(−3.1566)
TENURE		0.0000		0.0000		−0.0000
		(0.2354)		(0.2354)		(−0.0594)
OPCY	−0.0001*	−0.0001*	−0.0001*	−0.0001*	−0.0001	−0.0001
	(−1.7040)	(−1.6934)	(−1.7040)	(−1.6934)	(−0.6472)	(−0.6490)
A_DNI	−0.0014***	−0.0014***	−0.0014***	−0.0014***	−0.0005**	−0.0005**
	(−4.0422)	(−4.0974)	(−4.0422)	(−4.0974)	(−1.9937)	(−2.0139)
N_NI	−0.0120**	−0.0119**	−0.0120**	−0.0119**	−0.0003	−0.0003
	(−2.1156)	(−2.1297)	(−2.1156)	(−2.1297)	(−0.0507)	(−0.0501)
SIZE	0.0007	0.0010	0.0007	0.0010	0.0019**	0.0020***
	(0.7781)	(0.8090)	(0.7781)	(0.8090)	(2.5945)	(3.5321)
SG_F	0.0124	0.0124	0.0124	0.0124	0.0137	0.0137
	(1.1832)	(1.1728)	(1.1832)	(1.1728)	(1.2946)	(1.2865)
LEV	−0.0876***	−0.0878***	−0.0876***	−0.0878***	−0.0476**	−0.0479***
	(−3.2958)	(−3.4213)	(−3.2958)	(−3.4213)	(−2.5306)	(−2.6217)
CR	0.0000	0.0000	0.0000	0.0000	−0.0007	−0.0007
	(0.0420)	(0.0351)	(0.0420)	(0.0351)	(−0.9820)	(−0.9902)
BM	−0.0045***	−0.0046***	−0.0045***	−0.0046***	−0.0060***	−0.0060***
	(−2.8469)	(−2.6779)	(−2.8469)	(−2.6779)	(−4.2880)	(−4.1319)
BIG4	0.0031*	0.0032*	0.0031*	0.0032*	0.0007	0.0007
	(1.7061)	(1.6912)	(1.7061)	(1.6912)	(0.7122)	(0.6783)
Observations	3697	3697	3697	3697	3885	3885
R^2	0.0295	0.0296	0.0295	0.0296	0.0210	0.0210

This table shows the results of six regressions with *DA_MDD* (Allen et al., 2013), *DA_BB* (Basu & Byzalov, 2016), and *DA_BS* (Ball & Shivakumar, 2006) as the dependent variables against various variables of TMT characteristics. The random effects (industry and year) and cluster issues (Petersen, 2009) are considered in these results. TMT characteristics includes *TSIZE*, *PMS*, *PCPA*, *PFTEAM,* and *TENURE*. The control variables include the length of operating cycle (*OPCY*), firm sales growth (*SG_F*), absolute value of change in earnings (*A_DNI*), past negative earnings (*N_NI*), the log of firm assets (*SIZE*), the book to market ratio (*BM*), the leverage ratio (*LEV*), current ratio (*CR*), the book to market ratio (*BM*), and audit quality (*BIG4*). The t-statistics are calculated by firm-level clustered standard errors for each coefficient and appears immediately underneath. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

4.3.2. Alternative measure of earnings management

In our previous analyses, we employed DA_Jones, DA_Kothari, and DA_EBXI to measure a firm's earnings management level. In this section, we use three alternative measures of reporting quality for the robustness purpose. First, we estimate the MDD model suggested by Allen, Larson, and Sloan (2013), who decomposed accruals into "good accruals" and "accrual estimation errors." Good accruals refer to accruals related to growth and temporary fluctuations in working capital, while accrual estimation errors refers to the estimated residuals of Eq. (9), shown as follows:

$$\frac{TA_{it}}{Asset_{it}} = \alpha_{0t} + \alpha_{1t}\frac{\Delta Sales_{it}}{Sales_{it-1}} + \alpha_{2t}EGR_{it} + \alpha_{3t}\frac{CF_{it-1}}{Asset_{it-1}} + \alpha_{4t}\frac{CF_{it}}{Asset_{it}} + \alpha_{5t}\frac{CF_{it+1}}{Asset_{it+1}} + \varepsilon_t \quad (9)$$

where EGR equals year-over-year percentage change in employees, and CF is measured as the difference between earnings and accruals. Other variables are defined as for those in Eq. (2). We adopt the accrual estimation errors (DA_MDD) as an alternative earnings management proxy. The empirical results using DA_MDD as an alternative earnings management proxy are shown in columns (1) and (2) of Table 6. The coefficients of PMS, PCPA, and PFTEAM are significantly negative. Second, we use DA_BB as an alternative earnings management proxy which is estimated by the following Eq. (10) as Basu and Byzalov (2016) did. Basu and Byzalov (2016) added a summary measure of news in accrual models since they argue that bad news had greater impact on accruals:

$$\frac{TA_{it}}{Asset_{it}} = \alpha_{0t} + \alpha_{1t}\frac{\Delta Sales_{it}}{Sales_{it-1}} + \alpha_{2t}EGR_{it} + \alpha_{3t}\frac{CF_{it-1}}{Asset_{it-1}} + \alpha_{4t}\frac{CF_{it}}{Asset_{it}} + \alpha_{5t}\frac{CF_{it+1}}{Asset_{it+1}} + \beta_{1t}DS_{it} + \beta_{2t}DS_{it} * SGR_{it} + \beta_{3t}DE_{it} + \beta_{4t}DE_{it} * GR_{it} + \beta_{5t}DC_{it-1} + \beta_{6t}DC_{it-1} * \frac{CF_{it-1}}{Asset_{it-1}} + \beta_{7t}DC_{it} + \beta_{8t}DC_{it} * \frac{CF_{it}}{Asset_{it}} + \beta_{9t}DC_{it+1} + \beta_{10t}DC_{it+1} * \frac{CF_{it+1}}{Asset_{it+1}} + \varepsilon_t \quad (10)$$

Table 7
Regression of TMT characteristics against earning management: founding family perspective.

	(1)	(2)	(3)	(4)
Intercept	−0.0563**	−0.0500**	−0.0406	−0.0505*
	(−2.3089)	(−2.0014)	(−1.4250)	(−1.8673)
PMS	−0.0524*			
	(−1.8229)			
PCPA		−0.3044***		
		(−3.4143)		
PFTEAM			−0.0350***	
			(−2.5850)	
TENURE				−0.0006
				(−0.5139)
FF	−0.0166*	−0.0130*	−0.0254***	−0.0108
	(−1.6333)	(−1.6897)	(−3.0347)	(−1.0862)
PMS_FF	0.0289			
	(1.0289)			
PCPA_FF		0.2408**		
		(2.5007)		
PFTEAM_FF			0.0350**	
			(2.2888)	
TENURE_FF				0.0003
				(0.2445)
OPCY	0.0000	0.0001	0.0000	0.0000
	(0.2437)	(0.4684)	(0.2536)	(0.2518)
A_DNI	−0.0014***	−0.0016***	−0.0017**	−0.0016***
	(−3.1742)	(−3.4768)	(−2.1952)	(−3.5269)
N_NI	0.0227	0.0209	0.0191***	0.0186
	(1.5610)	(1.4339)	(2.6524)	(1.3695)
SIZE	0.0044***	0.0039***	0.0039**	0.0037**
	(2.9522)	(2.7085)	(2.1383)	(2.4991)
SG_F	0.0020	0.0022	0.0020***	0.0020
	(1.0912)	(1.0947)	(4.0820)	(1.0777)
LEV	−0.0089	−0.0172	−0.0087	−0.0103
	(−0.4652)	(−0.8091)	(−0.4159)	(−0.5561)
CR	−0.0016	−0.0022	−0.0017**	−0.0017
	(−1.3700)	(−1.3201)	(−3.0360)	(−1.3991)
BM	0.0012	0.0028	0.0008	0.0020
	(0.2837)	(0.7150)	(0.2217)	(0.5305)
BIG4	0.0057	0.0016	0.0048	0.0049
	(1.1746)	(0.3527)	(0.9988)	(1.0433)
Observations	4414	4174	4646	4730
R^2	0.0138	0.0152	0.0124	0.0109

This table shows the results of four regressions with *DA_EBXI* as the dependent variable against various variables of TMT characteristics using observations from 2006 to 2010. The fixed effects (industry and year) and cluster issues (Petersen, 2009) are considered in these results. TMT characteristics includes *TSIZE*, *PMS*, *PCPA*, *PFTEAM,* and *TENURE*. The control variables include the length of operating cycle (*OPCY*), firm sales growth (*SG_F*), absolute value of change in earnings (*A_DNI*), past negative earnings (*N_NI*), the log of firm assets (*SIZE*), the book to market ratio (*BM*), the leverage ratio (*LEV*), current ratio (*CR*), and variables related to bonus and audit quality (*BIG4*). FF variable is a binary variable that equals one when the founding family is present in the firm. *PMS_FF, PCPA_FF, PFTEAM_FF*, and *TENURE_FF* are interaction terms. The t-statistics are calculated by firm-level clustered standard errors for each coefficient and appears immediately underneath. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

where DS, DE, and DC are dummy variables for bad news, which are equal to 1 if ΔSales, EGR, and CF, respectively, are negative, and zero otherwise. The definitions of other variables are the same as for those in Eq. (2) and Eq. (10). The estimated residuals of Eq. (10) is the second alternative earnings management proxy (DA_BB). Table 6 shows the results of the relation between TMT characteristics and DA_BB. Results of columns (3) to (4) show that PMS, PCPA, and PFTEAM significantly negatively relate to earnings management level (DA_BB). Third, we adopt a measure of earnings management, DA_BS, as the residual from Ball and Shivakumar's (2006) nonlinear model as shown in Eq. (11). Instead of using working capital accruals, Ball and Shivakumar (2006) used total accruals taken from the statement of cash flows.

$$TotalAccrual_{it} = \alpha_{0t} + \alpha_{1t}\frac{\Delta Sales_{it}}{Asset_{it-1}} + \alpha_{2t}\frac{PPE_{it}}{Asset_{it-1}} + \alpha_{3t}\frac{CF_{it}}{Asset_{it}} + \alpha_{4t}DCF_{it} + \alpha_{5t}DCF_{it} * \frac{CF_{it}}{Asset_{it}} + \alpha_{6t}ABNRET_{it} + \alpha_{7t}DABNRET_{it} + \alpha_{8t}DABNRET_{it} * ABNRET_{it} + \varepsilon_{it} \quad (11)$$

where TotalAccruals is defined as earnings taken from the cash flow statement minus cash flow from operations; DCF is an indicator variable that equals one if CF is negative, and equals zero otherwise; ABNRET refers to an abnormal stock return during a year (based on the market index); and DABNRET is an indicator variable that equals one if ABNRET is negative, and equals zero otherwise. Other

Table 8-1
Endogeneity discussions in the relation between TMT characteristics and earning management (omitting variables issues): geography peers.

Dependent	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	*PMS*	*DA_Jones*	*PCPA*	*DA_Jones*	*PFTEAM*	*DA_Jones*	*TENURE*	*DA_Jones*
Intercept	−0.1189**	−0.0494**	0.0078	−0.0039	0.5596***	0.0483	15.1135***	−0.5821
	(−2.0717)	(−2.0425)	(0.6866)	(−0.2012)	(4.3823)	(0.8440)	(9.8152)	(−0.7379)
PMS		−0.0690***						
		(−2.8989)						
PCPA				−2.7143*				
				(−1.8739)				
PFTEAM						−0.1303**		
						(−2.3199)		
TENURE								0.0342
								(0.6757)
IV	0.8802***		−0.0426*		0.3947***		0.0518	
	(10.9171)		(−1.9087)		(3.4865)		(0.4909)	
OPCY	−0.0001	0.0001**	0.0001**	0.0005	−0.0001	0.0001	−0.0067***	0.0003
	(−0.7714)	(1.9926)	(2.6300)	(1.4499)	(−0.8431)	(1.5974)	(−6.5616)	(0.9366)
A_DNI	0.0064***	−0.0003	−0.0001	−0.0009**	0.0033	−0.0003	−0.0061	−0.0006
	(4.4581)	(−0.5052)	(−0.6518)	(−2.3764)	(1.2281)	(−0.5680)	(−0.3183)	(−1.0580)
N_NI	0.0019	0.0164*	−0.0016	0.0109	−0.0309	0.0077	−0.7873*	0.0389
	(0.1349)	(1.7091)	(−0.9851)	(1.4517)	(−1.3378)	(0.8038)	(−2.0817)	(0.8804)
SIZE	0.0089**	0.0047***	−0.0001	0.0024***	−0.0229***	0.0009	−0.4853***	0.0209
	(2.2516)	(2.8970)	(−0.0995)	(3.2494)	(−2.9812)	(0.3223)	(−4.9050)	(0.8424)
SG_F	0.0015***	0.0005	−0.0000	0.0004	0.0021***	0.0006	−0.0287**	0.0014
	(3.8387)	(1.0587)	(−1.0928)	(0.6605)	(6.7986)	(1.3050)	(−2.3470)	(0.8146)
LEV	−0.0301	−0.0436**	−0.0042	−0.0619**	0.0510	−0.0344**	−3.2094**	0.0683
	(−0.5539)	(−2.4143)	(−0.7880)	(−2.6620)	(0.5664)	(−2.1829)	(−2.1343)	(0.4386)
CR	0.0019	−0.0013**	−0.0003***	−0.0026	0.0003	−0.0014*	−0.0019	−0.0014*
	(1.0308)	(−2.0075)	(−2.9248)	(−1.6764)	(0.3238)	(−1.7805)	(−0.2204)	(−1.7920)
BM	−0.0205***	−0.0032	0.0010	0.0010	−0.0255**	−0.0061*	0.3000	−0.0125
	(−3.6428)	(−1.0040)	(0.9917)	(0.4132)	(−2.3930)	(−1.6916)	(2.0395)	(−0.7998)
BIG4	0.0157	−0.0010	−0.0019	−0.0088**	0.0522**	0.0042	−0.6357	0.0194
	(1.3379)	(−0.2376)	(−0.6426)	(−2.6754)	(2.4649)	(0.8948)	(−1.2470)	(0.5942)
Observations	3382	3382	3222	3222	3584	3584	3665	3665
R^2	0.2794	0.0110	0.0133	0.0160	0.1758	0.0100	0.0370	0.0087

This table shows the results of four two-stage regressions with earning management (*DA_Jones*) as the dependent variable against various variables of TMT characteristics using data observations from 2006 to 2010 to run regression models with the fixed effects (industry and year). TMT characteristics includes *TSIZE*, *PMS*, *PCPA*, *PFTEAM,* and *TENURE*. The instrumental variables of *PMS*, *PCPA*, *PFTEAM*, and *TENURE* are the average of prior *PMS*, prior *PCPA*, prior *PFTEAM*, and prior *TENURE* of other firms with the same city, respectively. The control variables include the length of operating cycle (*OPCY*), firm sales growth (*SG_F*), absolute value of change in earnings (*A_DNI*), past negative earnings (*N_NI*), the log of firm assets (*SIZE*), the book to market ratio (*BM*), the leverage ratio (*LEV*), current ratio (*CR*), and variables related to bonus and audit quality (*BIG4*). The t-statistics are calculated by firm-level clustered standard errors for each coefficient and appears immediately underneath. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

variables are defined as for those in Eq. (2). The estimated residuals of Eq. (11) is the third earnings management proxy (DA_BS), and the related empirical results are shown in columns (5) and (6) of Table 6. The results present that the coefficients of PMS, PCPA, and PFTEAM are still significantly negative.

Overall, our results in Table 6 also draw a consistent conclusion. That is, a TMT with more knowledge available is less likely to engage in earnings management.

4.3.3. The role of founding-family firms

It is well known that family-controlled firms are common and play an important role in the global economy (Prencipe, Bar-Yosef, & Dekker, 2014), and Taiwan is no exception. According to Yen, Lin, Chen, and Huang (2015), about 80% of Taiwanese listed firms are classified as founding-family firms. Since family-controlled firms are prevalent worldwide, academia has drawn attention to the impacts of family firms, with a significant growth in interest over time. In general, family firms differ from non-family firms in several ways. The pursued interests and goals of family firms are typically different from those of non-family firms. For example, family affairs and family emotions tend to permeate the business affairs in family firms (Prencipe et al., 2014). As a result, these firms care not only for financial performance but also non-financial factors (Gomez-Mejia, Cruz, Berrone, & De Castro, 2011; Miller & Le Breton-Miller, 2006) such as preservation of family control over the business, the firm's survival, and sustaining a competitive advantage that cannot be replaced by non-family firms (Prencipe et al., 2014). In addition, family control over a firm typically has sufficient power to guarantee that the firm pursues the family's own interests and goals (Anderson & Reeb, 2003, 2004). Family executives can potentially use their positions and superior information to exploit less-influential and less-well-informed owners. This gives rise to a more severe entrenchment effect (Ali, Chen, & Radhakrishnan, 2007; Prencipe et al., 2014; Wang, 2006). Given the above features of family firms, this study proposes that the negative relationship between TMT characteristics and earnings management may be

Table 8-2
Endogeneity discussions in the relation between TMT characteristics and earning management (omitting variables issues): industry peers.

Dependent	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	*PMS*	*DA_Jones*	*PCPA*	*DA_Jones*	*PFTEAM*	*DA_Jones*	*TENURE*	*DA_Jones*
Intercept	−0.1720***	−0.0633***	0.0140	−0.0373***	0.3833***	−0.0342	14.6481***	0.0360
	(−2.7165)	(−3.0246)	(1.3802)	(−3.1454)	(2.8765)	(−1.6680)	(13.2788)	(0.4191)
PMS		−0.0630**						
		(−2.2668)						
PCPA				−0.4902*				
				(−1.8763)				
PFTEAM						−0.0335**		
						(−2.1355)		
TENURE								−0.0052
								(−1.0002)
IV	0.7984***		−1.2295***		0.9171***		0.2277***	
	(7.6065)		(−3.0309)		(5.6384)		(5.1051)	
OPCY	−0.0003	0.0000	0.0000	−0.0000	−0.0002	0.0000	−0.0015	0.0001
	(−1.4376)	(0.1418)	(0.7226)	(−0.1835)	(−0.8279)	(0.3603)	(−0.2732)	(0.5158)
A_DNI	0.0052***	−0.0004	−0.0001	−0.0007*	0.0021	−0.0008*	−0.0148	−0.0010
	(3.1539)	(−0.9603)	(−1.2923)	(−1.9986)	(0.8246)	(−1.9220)	(−0.5328)	(−1.2915)
N_NI	0.0145	0.0119*	−0.0030*	0.0062	−0.0352	0.0078	−0.8904***	0.0210**
	(1.0796)	(1.7212)	(−1.7113)	(1.1180)	(−1.5278)	(0.9441)	(−3.1109)	(2.3875)
SIZE	0.0124***	0.0046***	0.0000	0.0025***	−0.0239***	0.0032***	−0.4697***	0.0003
	(2.9702)	(3.2000)	(0.0622)	(3.6019)	(−3.0435)	(3.2880)	(−6.5564)	(0.1011)
SG_F	0.0045	0.0051	0.0001	0.0121**	−0.0018	0.0048	−0.1866**	0.0292***
	(0.7110)	(1.2481)	(0.3380)	(2.2151)	(−0.3801)	(1.1328)	(−2.3311)	(12.6246)
LEV	−0.0470	−0.0335**	−0.0001	−0.0358***	0.0485	−0.0321***	−3.3380***	−0.0407
	(−0.8626)	(−2.2365)	(−0.0139)	(−3.0282)	(0.5685)	(−3.8814)	(−4.0558)	(−1.4388)
CR	0.0021	−0.0011	−0.0003	−0.0011	0.0001	−0.0014	−0.0273	−0.0019***
	(1.1046)	(−1.3828)	(−1.2970)	(−1.2374)	(0.0534)	(−1.3904)	(−1.0760)	(−2.7624)
BM	−0.0137**	0.0024	0.0014	0.0053**	−0.0090	0.0030	0.2382*	0.0024
	(−2.5237)	(0.9370)	(1.1488)	(2.4746)	(−1.0804)	(1.5541)	(1.8646)	(0.7427)
BIG4	0.0214*	0.0025	−0.0010	0.0001	0.0478**	0.0023	−0.6632***	−0.0003
	(1.7990)	(0.7135)	(−0.3253)	(0.0430)	(2.2144)	(1.2997)	(−3.3530)	(−0.0455)
Observations	3398	3412	3227	3227	3597	3666	3666	3666
R^2	0.2047	0.0169	0.0307	0.0322	0.1755	0.0156	0.0415	0.0585

This table shows the results of four two-stage regressions with earning management (*DA_Jones*) as the dependent variable against various variables of TMT characteristics using data observations from 2006 to 2010 to run regression models with the fixed effects (industry and year). TMT characteristics includes *TSIZE*, *PMS*, *PCPA*, *PFTEAM,* and *TENURE*. The instrumental variables of *PMS*, *PCPA*, *PFTEAM*, and *TENURE* are the average of prior *PMS*, prior *PCPA*, prior *PFTEAM*, and prior *TENURE* of other firms with the same industry and year, respectively. The control variables include the length of operating cycle (*OPCY*), firm sales growth (*SG_F*), absolute value of change in earnings (*A_DNI*), past negative earnings (*N_NI*), the log of firm assets (*SIZE*), the book to market ratio (*BM*), the leverage ratio (*LEV*), current ratio (*CR*), and variables related to bonus and audit quality (*BIG4*). The t-statistics are calculated by firm-level clustered standard errors for each coefficient and appears immediately underneath. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

different for family-controlled firms. First, the family members within the firm have greater power over the firm's decisions, and therefore the impacts of managers' knowledge and experience seem less important in determining the firm's financial strategies. Second, since family firms put more emphasis on non-financial factors, the managers may care less about the financial performance. This reduces managers' incentives to manipulate earnings to boost earnings. Third, since firm managers are often also family members, the typical motivations related to the executive job market are less important (Prencipe et al., 2014). As a result, the effects of reducing earnings manipulation via reputation protection may be attenuated. In sum, the *incentive-reduction effect* of TMT knowledge and average tenure would seem to be weaker for family firms. Therefore, the negative relationship between TMT characteristics and earnings management are attenuated for family-controlled firms. To empirically investigate the moderating effect of family firms on the association between TMT characteristics (knowledge and average tenure) and earnings management, this study adds a founding-family dummy variable (FF) to indicate whether a founding family is present in the firms. Then, we employ the interaction terms between TMT characteristics and founding family (PMS_FF, PCPA_FF, PFTEAM_FF, and TENURE_FF) to address the issue. Table 7 shows that coefficients of the interaction terms of PCPA_FF and PFTEAM_FF are significantly positive. This suggests that the association between TMT characteristics and earnings management becomes weaker when a founding family is present in a firm. This is consistent with the argument that in family firms the family members have a higher level of control over the firm's decision-making and care more about non-financial factors but less about outsiders' perceptions. As a result, the influences of TMT knowledge and average tenure on constraining earnings management are attenuated in founding-family firms.

4.3.4. Endogeneity issues

When investigating the effects of TMT characteristics on a firm's level of earnings management, TMT knowledge and average tenure are assumed to be exogenous. However, companies make their decisions to hire TMT members, so firm-specific characteristics

Table 8-3
Endogeneity discussions in the relation between TMT characteristics and earning management (omitting variables issues): prior tmt characteristics.

Dependent	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Variable	*PMS*	*DA_Kothari*	*PCPA*	*DA_Kothari*	*PFTEAM*	*DA_Kothari*	*TENURE*	*DA_Kothari*
Intercept	−0.0198	−0.0301	0.0095*	−0.0045	0.0409	−0.0122	0.4184	−0.0094
	(−1.0302)	(−0.9772)	(1.9456)	(−0.1204)	(1.6055)	(−0.3780)	(1.2446)	(−0.4415)
PMS		−0.0359**						
		(−2.0703)						
PCPA				−0.0240				
				(−0.5265)				
PFTEAM						−0.0221**		
						(−2.4506)		
TENURE								−0.0009*
								(−1.8123)
IV	0.8924***		0.9040***		0.9116***		0.0476***	
	(72.7328)		(21.7182)		(131.1331)		(7.6438)	
OPCY	0.0000	0.0002	0.0000	0.00002	0.0002*	0.0002	−0.0018	0.0001
	(−0.2037)	(0.9608)	(0.7349)	(0.8841)	(1.8399)	(0.9840)	(−0.7966)	(1.2736)
A_DNI	0.0005	−0.0008*	0.0000	−0.0009*	−0.0005	−0.0010**	0.0047	−0.0010***
	(1.2483)	(−1.8421)	(0.0831)	(−1.9349)	(−0.7577)	(−2.3123)	(0.8285)	(−2.7795)
N_NI	0.0077	0.0366***	−0.0018	0.0299***	−0.0155**	0.0327***	0.0114	0.0409***
	(1.5847)	(2.7034)	(−1.4584)	(2.9455)	(−2.1269)	(2.6449)	(0.1113)	(2.8917)
SIZE	0.0025*	0.0020	−0.0005*	−0.0001	−0.0003	0.0012	−0.0354*	0.0012
	(1.8738)	(1.0442)	(−1.7819)	(−0.0299)	(−0.1662)	(0.6361)	(−1.6465)	(0.8728)
SG_F	0.0005	0.0278	0.0002	0.0537	0.0028	0.0277	−0.0021	0.0016
	(0.7011)	(1.1115)	(1.1764)	(1.3165)	(1.0032)	(1.1103)	(−0.0878)	(0.8025)
LEV	0.0036	−0.0035	0.0029	0.0037	−0.0067	−0.0062	0.0122	−0.0233
	(0.2097)	(−0.1708)	(0.7619)	(0.1650)	(−0.3260)	(−0.3094)	(0.0434)	(−1.3905)
CR	0.0002	−0.0019*	−0.0001	−0.0021	−0.0003	−0.0021*	0.0026	−0.0019*
	(0.6713)	(−1.8433)	(−1.0812)	(−1.6234)	(−0.8308)	(−1.7789)	(0.4056)	(−1.9020)
BM	−0.0042**	0.0037	−0.0003	0.0067*	−0.0013	0.0033	0.0054	0.0035
	(−2.1634)	(0.8332)	(−0.5063)	(1.8949)	(−0.3455)	(0.7961)	(0.0694)	(0.8740)
BIG4	0.0019	0.0029	−0.0011	0.0006	0.0001	0.0031	0.0219	−0.0037
	(0.6802)	(0.5012)	(−0.7774)	(0.1116)	(0.0156)	(0.5543)	(0.3728)	(−0.8139)
Observations	3621	3621	3429	3429	3800	3800	4660	4660
R^2	0.8357	0.0611	0.6138	0.1124	0.8568	0.0608	0.9231	0.0179

This table shows the results of four two-stage regressions with earning management (*DA_Jones*) as the dependent variable against various variables of TMT characteristics using data observations from 2006 to 2010 to run regression models with the fixed effects (industry and year). TMT characteristics includes *TSIZE*, *PMS*, *PCPA*, *PFTEAM,* and *TENURE*. The instrumental variables of *PMS*, *PCPA*, *PFTEAM*, and *TENURE* are prior *PMS,* prior *PCPA,* prior *PFTEAM,* and *CEO* tenure, respectively. The control variables include the length of operating cycle (*OPCY*), firm sales growth (*SG_F*), absolute value of change in earnings (*A_DNI*), past negative earnings (*N_NI*), the log of firm assets (*SIZE*), the book to market ratio (*BM*), the leverage ratio (*LEV*), current ratio (*CR*), and variables related to bonus and audit quality (*BIG4*). The t-statistics are calculated by firm-level clustered standard errors for each coefficient and appears immediately underneath. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

such as a firm's reporting quality may affect the composition of the TMT. Hence, a firm's TMT characteristics and its extent of earnings management could be endogenously determined. We apply an instrumental variable technique to address this potential endogenous issue. One common issue with the instrumental variable technique is to identify the suitable instrumental variables. Jiraporn, Jiraporn, Boeprasert, and Chang (2014) indicate that geographic location is fixed and has been used as an instrumental variable in many prior studies since it is more likely to be exogenous. In addition, the geographic location may affect a firm's earnings management level because outsiders may have difficulty in detecting earnings manipulations for firms in remote areas. Therefore, this study employs geography peers as instrumental variables, which are defined as the average TMT variables (PMS, PCPA, PFTEAM, and TENURE) of surrounding firms in the same city. In addition, this study employs prior TMT characteristics[9] and industry peers[10] as alternative instrumental variables for robustness checks. Tables 8-1, 8-2, and 8-3 present the results of the two-stage regressions. Consistent with the main results in the previous section, the results of Tables 8-1, 8-2, and 8-3 indicate that TMT knowledge and average tenure still negatively relate to a firm's level of earnings management. Overall, our results are robust after controlling for the endogenous issue.

[9] Similar to the geography locations, the industry classification is also likely to be exogenous and may affect a firm's earnings management level. Therefore, the instrumental variables are defined as the average of prior PMS, prior PCPA, prior PFTEAM, and prior TENURE of other firms with the same industry and year.

[10] Following Sovey and Green (2011), this study uses lagged independent variables as the instrumental variables which are prior PMS, prior PCPA, prior PFTEAM, and prior CEO tenure.

Table 9
Regression of TMT characteristics against earning management: random effect model.

	(1)	(2)	(3)	(4)	(5)	(6)
	DA_Jones	DA_Jones	DA_Kothari	DA_Kothari	DA_EBXI	DA_EBXI
Intercept	−0.0356**	−0.0326**	−0.0046	0.0054	−0.0494**	−0.0491***
	(−2.2490)	(−2.4780)	(−0.3057)	(0.4193)	(−2.5039)	(−2.7105)
TSIZE		−0.0001		−0.0000		−0.0007***
		(−0.4693)		(−0.1811)		(−3.3393)
PMS	−0.0188***	−0.0201***	−0.0193***	−0.0223***	−0.0202**	−0.0234***
	(−3.5821)	(−3.5951)	(−3.6402)	(−3.7906)	(−2.3735)	(−2.6300)
PCPA	−0.1075***	−0.1105***	−0.0858***	−0.0910***	−0.0817***	−0.0926***
	(−4.3251)	(−4.4402)	(−5.1431)	(−5.8838)	(−2.7280)	(−3.0283)
PFTEAM	−0.0147*	−0.0146*	−0.0140*	−0.0137**	−0.0081	−0.0080
	(−1.9105)	(−1.9434)	(−1.9309)	(−2.0223)	(−1.1223)	(−1.1562)
TENURE		−0.0004*		−0.0008***		−0.0009***
		(−1.6439)		(−3.7127)		(−4.1422)
OPCY	−0.0001	−0.0001	0.0000	0.0000	0.0001	0.0001
	(−0.5026)	(−0.5069)	(0.1862)	(0.1911)	(0.4438)	(0.4381)
A_DNI	−0.0009**	−0.0009**	−0.0008**	−0.0009**	−0.0016***	−0.0016***
	(−2.2790)	(−2.2997)	(−2.3564)	(−2.3806)	(−5.9106)	(−6.1586)
N_NI	0.0244***	0.0242***	0.0403***	0.0397***	0.0247***	0.0241***
	(8.1734)	(8.3213)	(8.0288)	(8.6267)	(3.0432)	(3.0330)
SIZE	0.0032***	0.0033***	0.0007	0.0006	0.0038***	0.0047***
	(2.8289)	(3.4427)	(0.7025)	(0.6355)	(2.7711)	(3.3733)
SG_F	0.0018	0.0018	0.0018	0.0018	0.0023	0.0023
	(0.7314)	(0.7287)	(0.7555)	(0.7503)	(1.0464)	(1.0385)
LEV	−0.0461***	−0.0475***	−0.0150*	−0.0175**	−0.0209	−0.0254**
	(−2.9180)	(−2.9249)	(−1.9106)	(−2.1951)	(−1.6120)	(−1.9603)
CR	−0.0010	−0.0011	−0.0016	−0.0016	−0.0020	−0.0020
	(−0.9615)	(−0.9748)	(−1.1135)	(−1.1387)	(−1.0273)	(−1.0518)
BM	−0.0021***	−0.0021***	0.0025*	0.0026*	0.0009	0.0005
	(−3.6871)	(−4.0360)	(1.8662)	(1.7668)	(0.6190)	(0.3115)
BIG4	0.0033	0.0031	0.0011	0.0006	0.0028	0.0024
	(1.4277)	(1.3783)	(0.4906)	(0.2834)	(1.5281)	(1.1334)
Observations	3919	3919	3919	3919	3910	3910
R^2	0.0108	0.0110	0.0185	0.0194	0.0126	0.0142

This table shows the results of six regressions with *DA_Jones, DA_Kothari,* and *DA_EBXI* as the dependent variables against various variables of TMT characteristics. The random effects (industry and year) and cluster issues (Petersen, 2009) are considered in these results. TMT characteristics includes *TSIZE*, *PMS*, *PCPA*, *PFTEAM,* and *TENURE*. The control variables include the length of operating cycle (*OPCY*), firm sales growth (*SG_F*), absolute value of change in earnings (*A_DNI*), past negative earnings (*N_NI*), the log of firm assets (*SIZE*), the book to market ratio (*BM*), the leverage ratio (*LEV*), current ratio (*CR*), and variables related to bonus and audit quality (*BIG4*). The t-statistics are calculated by firm-level clustered standard errors for each coefficient and appears immediately underneath. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

4.3.5. Repeated data issue

This study uses panel data that pool the firm data over five years to investigate the empirical questions. It is argued that using panel data might cause repeated data giving certain characteristics more weight. To deal with this problem, we have used a fixed-effect model in our main regressions to control for unobservable fixed effects. In addition, the standard errors are clustered by firms to control for possible correlations between sample observations. In this section, we try to use a random-effect model to control for random unobservable effects. Table 9 shows the regression results estimated with the random-effect model. Columns (1) to (4) indicate that PMS, PCPA, PFTEAM, and TENURE are significantly and negatively related to earning management levels, which is consistent with our main results. That is, a TMT with more knowledge and longer average tenure is less likely to engage in earnings management.

4.3.6. Controlled for outliers

The maximum value of discretionary accruals shown in Table 2 may imply that there exist some extreme value problems.[11] Therefore, all dependent variables are winsorized at the top and bottom 0.1% in our empirical analyses for the robustness check. Table 10 shows the winsorized results. The results in columns (1) and (2) show that PMS, PCPA, PFTEAM, and TENURE are significantly negatively related to earning management level, which is consistent with our main results. The results in columns (3) to (6) present similar results. Therefore, the winsorized results indicate that a TMT with more knowledge and longer average tenure is less likely to engage in earnings management, supporting the incentive-reduction argument.

[11] Our data show only five observations whose value of DA_Jones are larger than one (about 0.1% of the total observations). The distribution of DA_Kothari and DA_EBXI also have the same pattern.

Table 10
Regression of TMT characteristics against earning management: winsorized result.

	(1)	(2)	(3)	(4)	(5)	(6)
	DA_Jones	DA_Jones	DA_Kothari	DA_Kothari	DA_EBXI	DA_EBXI
Intercept	−0.0452**	−0.0418**	−0.0200	−0.0098	−0.0641***	−0.0618***
	(−2.7383)	(−3.1264)	(−1.2665)	(−0.8120)	(−3.6659)	(−3.8633)
TSIZE		−0.0001		−0.0000		−0.0005**
		(−0.3447)		(−0.1784)		(−2.5333)
PMS	−0.0143**	−0.0157**	−0.0156***	−0.0186***	−0.0159***	−0.0196***
	(−2.6368)	(−2.8282)	(−2.9295)	(−3.3075)	(−3.2225)	(−3.4107)
PCPA	−0.1075***	−0.1103***	−0.0845***	−0.0898***	−0.0915***	−0.1006***
	(−4.2232)	(−4.3332)	(−4.3913)	(−4.8704)	(−3.5393)	(−3.9362)
PFTEAM	−0.0110*	−0.0110*	−0.0103*	−0.0102**	−0.0036	−0.0040
	(−1.8573)	(−1.9236)	(−2.0783)	(−2.2675)	(−0.6062)	(−0.6990)
TENURE		−0.0004*		−0.0009***		−0.0009**
		(−2.0870)		(−4.1362)		(−2.5398)
OPCY	−0.0001	−0.0001	0.0000	0.0000	−0.0000	−0.0000
	(−0.6383)	(−0.6603)	(0.0892)	(0.0561)	(−0.1617)	(−0.2043)
A_DNI	−0.0009**	−0.0009**	−0.0009**	−0.0009**	−0.0016***	−0.0016***
	(−2.2193)	(−2.2424)	(−2.2424)	(−2.2744)	(−4.8698)	(−5.0786)
N_NI	0.0143**	0.0139**	0.0301***	0.0293***	0.0161***	0.0151***
	(2.2747)	(2.1797)	(7.4996)	(7.5537)	(3.3906)	(3.1361)
SIZE	0.0039***	0.0039***	0.0015	0.0013	0.0042***	0.0050***
	(3.1396)	(3.9860)	(1.3208)	(1.6067)	(3.3577)	(4.1457)
SG_F	0.0007	0.0007	0.0007	0.0007	0.0012	0.0012
	(0.7813)	(0.7771)	(0.8172)	(0.8075)	(1.5973)	(1.5916)
LEV	−0.0492***	−0.0505***	−0.0165**	−0.0192**	−0.0181	−0.0219
	(−3.9277)	(−3.9281)	(−2.2454)	(−2.6265)	(−1.2563)	(−1.5017)
CR	−0.0008	−0.0009	−0.0014	−0.0014	−0.0012	−0.0013
	(−0.9302)	(−0.9558)	(−1.1244)	(−1.1733)	(−1.2158)	(−1.2932)
BM	0.0007	0.0008	0.0073***	0.0075***	0.0045**	0.0045**
	(0.4865)	(0.5164)	(3.3447)	(3.2702)	(2.5807)	(2.2887)
BIG4	0.0010	0.0007	−0.0011	−0.0019	0.0015	0.0007
	(0.5598)	(0.3421)	(−0.8364)	(−1.3050)	(0.6674)	(0.2517)
Observations	3919	3919	3919	3919	3910	3910
R^2	0.0127	0.0130	0.0218	0.0235	0.0155	0.0180

This table shows the winsorized results with *DA_Jones, DA_Kothari,* and *DA_EBXI* as the dependent variables against various variables of TMT characteristics. All dependent variables are winsorized at the top and bottom 0.1% to deal with extreme value issues. The fixed effects (industry and year) are considered in these results. TMT characteristics includes *TSIZE*, *PMS*, *PCPA*, *PFTEAM,* and *TENURE*. The control variables include the length of operating cycle (*OPCY*), firm sales growth (*SG_F*), absolute value of change in earnings (*A_DNI*), past negative earnings (*N_NI*), the log of firm assets (*SIZE*), the book to market ratio (*BM*), the leverage ratio (*LEV*), current ratio (*CR*), and variables related to bonus and audit quality (*BIG4*). The t-statistics are calculated by firm-level clustered standard errors for each coefficient and appears immediately underneath. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

5. Conclusions and limitations

In contrast to previous studies, this research uses a unique sample of handed-collected data from 2006 to 2010 to investigate how TMT characteristics, including TMT knowledge and TMT average tenure, influence the extent of earnings management. The findings show that TMT knowledge such as education level, accounting expertise, and related experience prior to joining a firm is significantly negatively related to a firm's level of earnings management. In addition, TMT average tenure is also significantly and negatively associated with earnings management. Moreover, these results are robust to alternative model specifications such as employing different earnings management measures, suspect firm analyses, and endogeneity issues. Finally, the study suggests that the effects of a TMT's knowledge and average tenure on earnings management are attenuated for founding-family firms.

The importance of TMT has been largely recognized in management research. Since the decisive work of Hambrick and Mason (1984), the effects of TMT demographic characteristics on organizational outcomes, including firm performance, firm growth, firm innovation, firm strategy, firm strategic change, and executive turnover, have been discussed for almost three decades. However, the role of TMT demographic characteristics in a firm's financial reporting strategies is rarely discussed. On the other hand, most accounting studies focus on discussing the characteristics of CEOs/CFOs on a firm's financial reporting and earnings quality rather than addressing the characteristics of the TMT. As a result, this study contributes to both management and accounting studies by showing that TMT characteristics have substantial effects on reducing a firm's level of earnings management. Finally, our study is subject to the limitation that there are many measures such as grade point average (GPA) and the possession of chartered financial analysts (CFAs) to capture the expertise of the TMT. Due to the difficulty of hand-collected data, we use only three measures (master's degrees, certified public accountants, and prior experience serving as executive officers and/or vice presidents) to measure TMT expertise. Future studies can explore other dimensions of TMT characteristics and discuss how these characteristics influence earnings management.

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