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The impact of pyramid ownership on earnings management
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# The impact of pyramid ownership on earnings management

## Abstract

**Purpose:** Unlike firms listed in the United States, many large firms in Canada belong to business groups organized as pyramids. A pyramidal structure refers to a business group that consists of a set of enterprises or other entities and displays a top-down chain of control. The purpose of this paper is to investigate the relationship between pyramid ownership and earnings management.

**Design/methodology/approach**: The paper is an empirical study using a sample of 165 Canadian listed firms from 2010 to 2015. The impact of pyramid ownership on both accrual-based and real earnings management is examined.

**Findings**: The findings show that pyramid-affiliated firms engage in less accrual-based and real earnings management than non-pyramid-affiliated firms. The results further show that the divergence between control rights and cash flow rights of the controlling shareholders in the pyramid-affiliated firms is positively related to real earnings management. Moreover, the results highlight that intra-group transactions (other than internal financing) among pyramid-affiliated firms lead to higher level of both accrual-based and real earnings management, but internal financing is negatively associated with real earnings management. Overall, this study provides evidence which indicates that pyramid ownership structure and earnings management are related to each other.

**Originality/value**: The paper contributes to the earnings management literature by studying the impact of pyramid ownership structure on earnings management, especially real earnings management.

**Keywords**: pyramid structure, accrual-based earnings management, real earnings management, related party transaction, control right, cash flow right

**Article Classification:** Research paper

## 1. Introduction

Earnings management is an important issue in accounting studies (Rangan 1998; Shivakumar 2000; Roychowdhury 2006; Ball and Shivakumar 2008; Cohen and Zarowin 2010; Banko et al. 2013; Wongsunwai 2013; to name a few). In particular, the effect of ownership structure on earnings management has attracted more and more studies (Warfield et al. 1995; Fan and Wong 2002; Francis et al. 2005; Wang 2006).

In Canada, many large firms belong to business groups, which are typically organized as pyramids (Attig et al. 2004; Morck et al. 2005; King and Santor 2008; and Zeng 2011). That is, an apex firm (alternatively named ultimate owner or controlling shareholder) holds controlling shares in a first tier of firms. Each of these firms then holds controlling blocks in a second tier of firms, and so on. La Porta et al. (1999) finds that many firms have controlling shareholders who control a group of firms through pyramidal structure around the world except in the U.S. and the U.K. A number of studies have examined the impact of pyramid ownership on firm performance and valuation (Fan and Wong 2002; La Porta et al. 2002; Attig et al. 2004; King and Santor 2008; Malan et al. 2012). However, few studies investigate whether pyramid ownership affects managers' earnings management activities.

Prior studies have examined the relationship between ownership and earnings management, and in particular, earnings management in family firms (Garcia Lara et al. 2005; Wang 2006; Ali et al. 2007; Tong 2007; Ahn and Kwon 2009; Bhaumik and Gregoriou 2010; Gomez-Mejia et al. 2014; Achleitner et al. 2014). Though a family pyramid is generally used by founding families to retain control over firms, it is merely a part of a pyramidal structure (Morck

et al. 2000; Bhaumik and Gregoriou 2010). Indeed, many pyramidal groups are not family pyramids in Canada. Hence, the results found in prior research on family pyramids may not be generalized to a general pyramidal structure.

In addition, studies which examine family pyramids tend to focus on the relationship between a family's large ownership and earnings management as well as the role that the family members play in managing earnings (e.g. Garcia Lara et al. 2005; Prencipe et al. 2008; Gomez-Mejia et al. 2014; Achleitner et al. 2014). Few studies examine a common feature in a pyramid - deviation of cash flow rights from control rights, and its impact on earnings management (Fan and Wong 2002). Divergence between control rights and cash flow rights exacerbates an agency problem as it allows the controlling shareholders to pursue private benefits, but avoid the related negative cash flow consequences (Shleifer and Vishny 1997; Claessens et al. 2002; Gugler and Yurtoglu 2003; Morck et al. 2005; Malan et al. 2012). This study adds to the extant literature by investigating the impact of the deviation of cash flow rights from control rights on earnings management.

While prior studies on earnings management in family firms focus on accrual-based earnings management, this study analyzes both accrual-based and real earnings management. Besides accrual-based earnings management, firms can manage earnings through manipulating real activities. For example, Roychowdhury (2006) finds that firms manage real earnings to avoid reporting losses. Cohen and Zarowin (2010) document that firms undertake both accrual-based and real earnings management around seasoned equity offerings. Indeed, Graham et al. (2005) and Cohen and Zarowin (2010) both find that managers generally prefer to use real earnings management because it is less likely to be detected or scrutinized by auditors and regulators. Zang (2012) further argues that firms could use accrual-based and real earnings

management as substitutes. Zeng (2014) finds that Chinese real estate firms manage both accrual-based earnings and real earnings when facing tax rate reduction. Therefore, real earnings management has important economic consequences and warrants investigation.

We contribute to the earnings management literature by studying the impact of pyramid ownership structure on earnings management, including both accrual-based and real earnings management among Canadian publicly listed firms. We hypothesize and find evidence that a pyramid ownership structure is associated with earnings management activities. Relying on measures of both real and accrual-based earnings management, we find that pyramid-affiliated firms engage in less real and accrual-based earnings management than non-pyramid-affiliated firms, a result not found in the prior literature. We further find that the deviation of cash flow rights from control rights in the pyramid-affiliated firms is positively related to real earnings management. In addition, we find that intra-group transactions (other than internal financing) among pyramid-affiliated firms lead to a higher level of both accrual-based and real earnings management, but internal financing is negatively associated with real earnings management.

The remainder of this paper is organized as follows. Section 2 reviews literature on pyramid ownership and earnings management, and develops the hypotheses. Section 3 describes the data and sample. Section 4 designs the regression models and variable measurements. Section 5 presents testing results. Finally, conclusions and discussions are presented in section 6.

## 2. Literature review and hypothesis development

### 2.1. Pyramid structure and earnings management

A pyramidal structure refers to a business group that is comprised of a set of public and private companies or other organizations and displays a top-down chain of control (Attig et al.

2004; Malan et al. 2012). In such a structure, the controlling shareholder is located at the "apex" with at least two successive layers of firms below. In Canada, a pyramid structure is a common way for firms to be grouped. For example, Morck et al. (2000) document that around one-half of firms were affiliated with a pyramid structure. Attig et al. (2004) report that a pyramid structure was used to gain control by ultimate owners in 35% of listed firms in the 1990s. Paligorova and Xu (2009) document that pyramids comprise about one-third of Canadian listed firms recently.

Studies on earnings management indicate that agency problems will lead to earnings management (for example see a review by Bhaumik and Gregoriou 2009). A conflict between managers and shareholders, i.e., Type I agency problem, predicts that managers will pursue their own benefits through management of accounting earnings, in particular this occurs when managers' compensation is based on accounting earnings or when firms are close to violating their debt covenants (Healy 1985; Watts and Zimmerman 1986; Dye and Verrecchia 1995; Hayn 1995; Evans and Sridhar 1996; to name a few).

The presence of large shareholders and concentrated ownership leads to close monitoring of managers, and thus mitigates the conflict between shareholders and managers (Kaplan and Minton 1994; Kang and Shivdasani 1995). In such cases, managers have fewer chances to pursue private benefits and manage earnings (Demsetz and Lehn 1985; Shleifer and Vishny 1997). One way that large shareholdings and concentrated ownership can be achieved is through a pyramid structure, which allows the controlling shareholders at the apex to control the firms located on the successive tiers of the structure. Hence, the agency perspective implies that pyramid ownership mitigates Type I agency problem and reduces earnings management.

However, the controlling shareholders would have incentives and opportunities to seek their own benefits at the expense of minority shareholders, i.e., Type II agency problem. Type II

agency problem implies hiding or providing misleading information about the firm's underlying economic performance from minority shareholders (Fama and Jensen 1983; Shleifer and Vishny 1997). This may also lead to earnings management and a lower quality of earnings (Fan and Wong 2002; Bae and Jeong 2007). For example, Fan and Wong (2002) document that the existence of controlling owners in Asian countries causes accounting earnings to lose credibility. Garcia Lara et al. (2005) find that managers in Germany manipulate discretionary accruals in family firms with high ownership concentration. Bae and Jeong (2007) report that Korean firms in Chaebol groups with controlling shareholders have poor quality of earnings.

In summary, because agency theory provides competing and alternative perspectives about the relationship between pyramid ownership and earnings management, we develop the following non-directional hypothesis.

*H1: Firms affiliated with a pyramid group engage in earnings management in a different way from non-pyramid-affiliated firms.*

Both types of agency problems can lead to earnings management, but the purposes and vehicles used for earnings management are different. As argued by Bhaumik and Gregoriou (2010), Aharony et al. (2010), and Chen et al. (2011), under Type I agency problem, earnings management allows managers to maximize compensation or avoid a violation of debt covenants, and the vehicle often used for earnings management is manipulating discretionary accruals; under Type II agency problem, the purpose of managing earnings is to allow controlling shareholders to attract outside shareholders at a low cost of capital and to expropriate benefits from minority shareholders. The vehicle used for earnings management is manipulating transactions such as deferring/accelerating revenue. Therefore, we examine both accrual-based and real earnings management.

*2.2. Divergence between control rights and cash flow rights and earnings management*

Earnings management can be used by controlling shareholders to pursue private benefits, which can be risky and they may face an adverse consequence - a discounted share price by other shareholders as a penalty for the self-interest behavior.

A pyramid structure can lead to a material difference between control rights and cash flow rights (Fan and Wong 2002; Francis et al. 2005; Ahn and Kwon 2009; etc). Given the large divergence between control rights and cash flow rights, the discount in the share price of the affiliated firms may not have a significant effect on the controlling shareholders. Therefore, controlling shareholders in the pyramid can make decisions that provide them with private benefits, while avoiding the proportional cash flow consequences they would bear if their control rights were equal to cash flow rights. In other words, divergence between control rights and cash flow rights encourages the controlling shareholders to extract private benefits (Shleifer and Vishny 1997; Claessens et al. 2002; Gugler and Yurtoglu 2003; Morck et al. 2005; Malan et al. 2012). It is then logical to predict that firms over which the controlling shareholders have a larger divergence between control rights and cash flow rights are likely to engage in higher levels of earnings management.

Overall, since the deviation of cash flow rights from control rights in the pyramidal structure magnifies the conflict between controlling and non-controlling shareholders, we develop the second hypothesis.

*H2: In a pyramid structure, firms over which the apex firm has a larger deviation of cash flow rights from control rights engage in more earnings management than other firms.*

## 2.3. Related party transactions and earnings management

As argued by Bhaumik and Gregoriou (2010), Aharony et al. (2010), and Chen et al. (2011), the vehicle used for earnings management in firms with controlling shareholders is manipulating transactions with related firms. A firm's related parties include executives and directors, owners and controlling stakeholders, subsidiaries, joint venture partners, as well as companies and associates owned by or affiliated with any of the related entities. For example, affiliated firms in a pyramidal group are related parties.

Related party transactions are related to earnings management. Aharony et al. (2010) find that earnings management resulted from transactions with parent companies during the IPO process. Jian and Wong (2010) document that Chinese listed firms increase earnings using abnormal sales to their controlling owners. Chen et al. (2011) conclude that the conflicts of interests between the controlling shareholders and the minority shareholders are the root of related party transaction-based earnings management around IPOs in China. Hence we expect that the intra-group transactions such as buying and selling of assets in the pyramidal group will be positively associated with earnings management.

While borrowers of internal financing would increase earnings management in order for them to easily obtain future financing (Gordon and Henry 2005), internal financing may also reduce earnings management. This is because a pyramid structure can create an internal capital market. The affiliated firms can borrow or loan through the internal market and thus avoid excessive reliance on external investors. Compared with outside financing, internal financing generally has weak enforcement of payments, soft terms, and lower interest rates (Khanna and Rivkin 2001; Khanna 2002; Attig et al. 2004; Buchuk et al. 2014). For example, Buchuk et al. (2014) examine intra-group loans for Chilean pyramidal groups and argue that such loans are

easy to renegotiate and are used to substitute external debts. Since one motivation for managers to manage earnings is to mitigate pressure from financing outside and the risk of violating debt covenants, firms with access to an internal financial market face less pressure and hence will engage in less earnings management.

The above argument provides two competing views about the relationship between internal financing and earnings management. Therefore, we separate internal financing activities from other intra-group transactions and specify the third hypothesis.

*H3: Pyramid-affiliated firms with more intra-group transactions (other than internal financing) engage in more earnings management; pyramid-affiliated firms with internal financing activities engage in more/less earnings management.*

In the next section, we describe the sample and data collection.

## 3. Data and sample

The financial data was collected from the Compustat database. Information about pyramid ownership was collected from the Inter-corporate Ownership database (ICO). Information about firms' related party transactions and corporate governance was collected from the SEDAR website.[1]

The empirical analysis covers the time periods of 2010-2015. The firms used for this study are Canadian listed non-financial firms that meet the following conditions: (1) financial statements are available from Compustat Fundamentals Annual from 2008 to 2015 (data in 2008 and 2009 are used to estimate earnings management and some control variables); (2) inter-

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[1] SEDAR is a free online system used for electronically filing securities-related and financial information with Canadian securities regulatory authorities.

corporate ownership structure is available from the ICO database from 2010 to 2015; and (3) management information circulars (or annual information form) and footnotes to audited financial statements are available on SEDAR from 2010 to 2015. Totally 165 firms meet these conditions. Table 1 reports the industry distribution of these firms. It shows that a large percentage of firms are in the mining (31.52%) and manufacturing industries (23.03%); while a small proportion of firms are from construction (1.21%) and wholesales trade (5.45%).

## 4. Models and variables

### 4.1. Empirical design for testing H1

To determine the relationship between pyramid structure and earnings management, and to test H1, we design the following regression model.

$$EM_{it} = \alpha_0 + \alpha_1 PYRA_{it} + \sum_k \pi_k CONTROL_{it} + Industry~\&~Year~dummies + \varepsilon_{it} ~~(1)$$

Where

*EM*: earnings management, measured as either accruals-based (*DA*) or real earnings management (*RM*)

*PYRA*: an indicator variable, equal to 1 if the firm is affiliated to a business group which is a pyramid group, and 0 otherwise

*CONTROL*: a set of control variables

A pyramid structure is measured as a dummy variable, equal to 1 if the firm is affiliated to a business group which has a pyramid structure, and 0 otherwise. A pyramid structure is defined as a business group comprising of a group of companies whose ownership structure displays a top-down chain of control. By control, it means more than 50% of voting shares. In such a structure, the apex is located at the top with at least two successive layers of firms below.

*CONTROL* variables are factors found by prior studies to be associated with earnings management (Rangan 1998; Shivakumar 2000; Roychowdhury 2006; Ball and Shivakumar 2008; Cohen and Zarowin 2010; Choi et al. 2012; Banko et al. 2013; Wongsunwai 2013; Achleitner et al. 2014). They include firm-level characteristics and corporate governance measures to control for firm size, profitability, variation of profit, leverage, intangible assets, growth, and governance structure. Firm size (*SIZE*) is measured as the log of total assets; return on asset *(ROA)*, measured as net earnings over total assets; variation of profit (*XROA*), measured as the standard deviation of *ROA* over the prior three-year time periods; leverage (*LEV*), measured as the sum of short-term and long-term debts over total assets; intangible asset (*INT*), measured as total intangible assets over total assets; tax loss carry forward (*LOSS*), measured as tax loss-carry-over over total assets; Tobin's q ratio (*TQ*), measured as total assets plus the difference between market value and book value of equity, deflated by total assets; and change in sales (Δ*SALE*), measured as change in revenue over total assets. Corporate governance variables include board size (*BOD*), measured as the log of number of board members; independent director (*INDE*), the percentage of board directors who are independent; female director (*FEM*), measured as the percentage of board directors who are female; variable (*CEOC*), equal to 1 if the CEO is not the board chair and 0 otherwise; and management shareholding (*CEOS*), measured as the percentage of shares held by the CEOs.

Information on corporate governance is manually collected from firms' management information circular or annual information form, which is disclosed on SEDAR.

Industry and year dummies are included in the models to control for potential industry and year fixed effects.

## 4.2. Accrual-based earnings management

We measure the accrual-based earnings management based on the modified Jones model, adjusted by performance (Dechow et al. 1995; Kothari et al. 2005).

$$\frac{TA_{it}}{ASSET_{it-1}} = \gamma_0 \frac{1}{ASSET_{it-1}} + \gamma_1 \frac{\Delta SALE_{it} - \Delta A/R_{it}}{ASSET_{it-1}} + \gamma_2 \frac{PPE_{it}}{ASSET_{it-1}} + \gamma_3 ROA_{it} + \varepsilon_{it} \qquad (2)$$

Where

t: 2010-2015

$TA$ : total accruals, defined as earnings before extraordinary items net of cash flows from operation

$\Delta SALE$ : change in revenues

$\Delta A/R$ : change in account receivables

$PPE$ : gross fixed assets

$ASSET$: total assets

The coefficients in Eq. (2) are used to measure discretionary accruals ($DA$).

$$DA_{it} = \frac{TA_{it}}{ASSET_{it-1}} - (\hat{\gamma}_0 \frac{1}{ASSET_{it-1}} + \hat{\gamma}_1 \frac{\Delta SALE_{it} - \Delta A/R_{it}}{ASSET_{it-1}} + \hat{\gamma}_2 \frac{PPE_{it}}{ASSET_{it-1}} + \hat{\gamma}_3 ROA_{it}) \qquad (3)$$

The absolute value of the residuals is the proxy for accrual-based earnings management. We use the absolute value since earnings can be managed upwards and downwards. A higher value indicates a larger magnitude of earnings management.

## 4.3. Real earnings management

We follow Roychowdhury (2006) and Cohen and Zarowin (2010) to measure real earnings management by using the abnormal production costs, cash flow, and discretionary expenses.

$$\frac{CF_{it}}{ASSET_{it-1}} = \mu_0 \frac{1}{ASSET_{it-1}} + \mu_1 \frac{SALE_{it}}{ASSET_{it-1}} + \mu_2 \frac{\Delta SALE_{it}}{ASSET_{it-1}} + \varepsilon_{it} \qquad (4)$$

$$\frac{PROD_{it}}{ASSET_{it-1}} = \eta_0 \frac{1}{ASSET_{it-1}} + \eta_1 \frac{SALE_{it}}{ASSET_{it-1}} + \mu_2 \frac{\Delta SALE_{it}}{ASSET_{it-1}} + \eta_3 \frac{\Delta SALE_{it-1}}{ASSET_{it-1}} + \varepsilon_{it} \qquad (5)$$

$$\frac{EXP_{it}}{ASSET_{it-1}} = \lambda_0 \frac{1}{ASSET_{it-1}} + \lambda_1 \frac{SALE_{it-1}}{ASSET_{it-1}} + \varepsilon_{it} \qquad (6)$$

where

t: 2010-2015

*CF*: cash flows from operation

*PROD*: production costs, measured as the sum of cost of goods sold and change in inventory during the year

*EXP*: discretionary expenses, including advertisement expenses, R&D, and selling, general and administrative expenses (*SG&A*)

The coefficients in Eq. (4) – Eq. (6) are used to measure the abnormal production costs, cash flow, and discretionary expenses.

Real earnings management (*RM*) is calculated as the abnormal production costs net of the sum of abnormal cash flow and abnormal discretionary expenses. The absolute value is used as the proxy for real earnings management and a higher value indicates a larger magnitude of earnings management.

## 4.4. Empirical design for testing H2

To determine the relationship between the deviation of cash flow rights from control rights and earnings management and to test H2, we design the following regression model.

$$EM_{it} = \theta_0 + \theta_1 CR_{it} + \sum_k \rho_k CONTROL_{it} + Industry\ \&\ Year\ dummies + \varepsilon_{it} \quad (7)$$

Where

*CR*: the difference between control rights and cash flow rights

*CONTROL*: a set of control variables (same as in Model (1))

*CR* is defined as the difference between control rights and cash flow rights. Control right is based on the weakest ownership along the chain of control, and equal to one if the ownership is over 50%. Cash flow right is the products of the ownership along the chain of control.

## 4.5. Empirical design for testing H3

To determine the effect of pyramid-affiliated firms' intra-group transactions on earnings management and to test H3, we design the following regression model.

$$EM_{it} = \beta_0 + \beta_1 RPT_{it} + \beta_2 INTF_{it} + \sum_k \delta_k CONTROL_{it} + Industry\ \&\ Year\ dummies + \varepsilon_{it} \quad (8)$$

Where

*RPT*: intra-group transactions other than financing, measured as the sum of purchases, sales, and services between the firm and related parties, over total assets.

*INTF*: internal financing, measured as the sum of borrowing, lending, accounts payable, and accounts receivable between the firm and related parties, over total assets.

*CONTROL*: a set of control variables (same as in Model (1))

Since transactions between the parent company and subsidiaries as well as other related entities are eliminated on the consolidated financial statements through the consolidation process,

we manually collect the information about intra-group transactions in the footnote titled related party transactions. In Canada, listed companies are required to disclose, in the footnote, the details regarding any material transactions between them and their related parties, which are not eliminated on consolidation. For example, the transactions between an affiliated firm and its controlling shareholder are not eliminated in the affiliated firm's financial statements and are disclosed in the affiliated firm's footnote. These transactions include the purchases, sales, and services, as well as borrowing, lending, accounts payable and accounts receivable between the firm and its related parties. A firm's related parties include its executives, board directors, major shareholders, associates, and affiliates, and other related organizations. Firms in the same business group are also related parties. Since we examine the transactions between pyramidal group members, *RPT* and *INTF* do not include any transactions between the firm and executives and board members or entities related to executives and board members.

## 5. Testing results

### 5.1. Data statistics and preliminary results

Table 2 presents the descriptive statistics of the major variables. Panel A presents the descriptive statistics of earnings management variables. The mean (median) of absolute values of discretionary accruals are 0.055 (0.035), and the mean (median) of absolute values of real earnings management are 0.254 (0.172). It implies that, on average, firms have higher real earnings management than accrual-based earnings management for the sample firms used in the analysis.

Panel B in Table 2 documents the descriptive statistics of the independent variables used in the analysis. It shows that, on average, firms' total assets are $5,242 million; profitability

(*ROA*) is -0.019, implying that, on average, firms incurred a loss in the sample time periods. There is a standard deviation in the variation of profitability (*XROA*), and the median value for this variation is 0.021. The average leverage (*LEV*) is 0.238, and the median value shows that more than 50% of the sample observations have less than 23% debt. The average and median values of intangible assets are 0.139 and 0.056, respectively. The average market-to-book (*TQ*) ratio is 1.348, which is higher than the median value of 1.196. Loss-carry-over (*LOSS*) has a significant variation and the average value is 0.116. Its median value is zero, implying that more than 50% of the observations have no loss-carry-over. The average change in sales is 0.066, implying that revenue was increased over the sample time periods.

The median value of a board size is 9. The average independent director (*INDE*) is 0.748, i.e., about three-quarters of board members are independent; the average female director (*FEM*) is 0.106, i.e., on average, about 10% of board members are female. CEOs, on average, hold about 2.6% of shares.

Panel B in Table 2 reports the frequencies of the indicator variables (*CEOC* and *PYRA*). It shows that over 80% of CEOs are not board chairs. It also shows that about 75% of sample firms are affiliated to a pyramidal structure. This is higher than those found in the 1980s and 1990s (Morck et al. 2000; Attig et al. 2004).

Table 3 presents the correlations between major variables. The maximum absolute value of the correlations is 0.842, between *ROA* and *XROA*. The correlations indicate that the discretionary accrual is significantly negatively associated with *SIZE* and *ROA*, but positively associated with *XROA*. These results suggest that the accrual-based earnings management is low when firm size is large and profit is high. They also show that the accrual-based earnings management is high when the variation of *ROA* is high.

The correlations in Table 3 also reveal that the real earnings management is significantly negatively associated with *CEOC*, suggesting that the real earnings management is low when CEOs are not board chairs.

Table 3 also shows that *PYRA* is negatively associated with both discretionary accruals and real earnings management. However, these correlations are not statistically significant.

### 5.2. Primary results

Table 4 shows the results of regression analysis for the impact of pyramidal structure on earnings management as stated in H1. The results are from the ordinary least squares regressions. Columns 2 and 3 present the results for accrual-based earnings management. Columns 4 and 5 present the results for real earnings management. The adjusted $R^2$ values are 0.20 or higher. Throughout this paper, the t-tests are based on two-tailed tests.

Table 4 shows that, the coefficient on *PYRA* is negative and statistically significant at 0.05 levels for real earnings management and discretionary accruals, respectively. It is consistent with the notion that firms affiliated with a pyramidal group manage less earnings than non-pyramid-affiliated firms.

Table 4 also shows that some control variables are significant. For example, the coefficient on *SIZE* is negative and significant, consistent with Watts and Zimmerman (1986), Wang (2006), Achleitner et al. (2014), and Chan et al. (2015), suggesting that large firms face political costs and manage less earnings. The coefficients on *ROA, INT, TQ,* and *XROA* are positive, suggesting that firms with more profit, intangible assets, growth, and profit variation manage more earnings. The coefficient on *LEV* is negative, consistent with Jaggi et al. (2009), suggesting that firms with higher debt ratios manage less real earnings. The coefficient on *LOSS*

is negative and significant, suggesting that firms with loss-carry-over from prior years manage less earnings. The coefficient on $\Delta SALE$ is negative for real earnings management, suggesting that firms with higher change in sales manage more real earnings. On the other hand, the coefficients on *FEM*, and *CEOC* are negative for real earnings management, suggesting that firms more female directors and CEOs are not chairs manage less real earnings. However, other control variables, including board size (*BOD*), percent of independent directors (*INDE*), as well as CEO ownership (*CEOS*), are not significantly associated with either accrual-based or real earnings management.

We test the second hypothesis restricting the sample to the subset of firms exhibiting pyramidal ownership structure and examine if the deviation of control rights from cash flow rights in the pyramid firms (*CR*) is associated with earnings management. There are 744 observations. The results are presented in Table 5. Columns 2 and 3 present the results for accrual-based earnings management. Columns 4 and 5 present the results for real earnings management. The adjusted $R^2$ values are 0.18 or higher.

We find that the coefficient on *CR* is positive and statistically significant at 0.01 level for real earnings management, but not significant for discretionary accruals, which suggest that firms over which the apex firms have larger divergence of control rights and cash flow rights engage in more real earnings management but not accrual-based earnings management. The results in Table 5 partially support H2.

Table 5 also shows that some control variables are significant in the sample of pyramidal structure. For example, the coefficient on *INT* and *XROA* are positive while the coefficients on *SIZE* and *LEV* are negative, similar to the findings in Table 4. The coefficient on *CEOS* is negative for real earnings management, suggesting that firms with higher CEO ownership

engage in less real earnings management. However, the coefficients on *BOD* and *INDE* are positive for real earnings management, suggesting that firms with larger board size and more non-executive directors engage in more real earnings management.

Table 6 reports the results of regression analysis for the impact of intra-group transactions (*RPT*) and internal financing (*INTF*) on earnings management, as stated in Hypothesis 3. Columns 2 and 3 present the results for accrual-based earnings management. Columns 4 and 5 present the results for real earnings management. The adjusted $R^2$ values are 0.18 or higher.

Table 6 shows that the coefficients on *RPT* are positive and statistically significant for both accrual-based and real earnings management, which is consistent with H3 and implies that firms with more intra-group transactions tend to manage higher levels of earnings. The coefficient on *INTF* is negative and significant for real earnings management but not significant for discretionary accruals, which suggests that firms with access to internal financing manage less real earnings but not accrual-based earnings. The coefficient on *CR* is positive and significant for real earnings but not significant for discretionary accruals, which is consistent with our earlier report in Table 6 and confirms that the wedge between control rights and cash flow rights is positively related to real earnings management. The coefficient on the interaction of *CR* and *RPT* is significantly negative for real earnings management, suggesting that the divergence between control rights and cash flow rights decreases the effect of the intra-group transactions on real earnings management. However, the coefficient on the interaction of *CR* and *INTF* is significantly positive for real earnings management, suggesting that the divergence between control rights and cash flow rights increases the effect of the internal financing activities on real earnings management. Finally, the coefficients on the interaction of *CR* and *RPT* and the

interaction of *CR* and *INTF* are not significant for discretionary accruals, which suggests that the impact of intra-group transactions and internal financing activities on accrual-based earnings management are not affected by the deviation of cash flow rights from control rights.

*5.3. Additional tests*

Though it might be reasonable to assume that pyramid ownership is exogenous, given the fact that ownership structure is historically determined and related to the specific institutional and regulatory environment, as well as political and ideological factors (La Porta et al. 1999; Roe 2003; Attig and Gadhoum 2003), we still attempt to address the issue of a potential endogeneity problem related to this ownership structure. Two-stage least square regressions (2SLS) are used with instrumental variables, including firm size, leverage, Tobin's q ratio, change in sales, board size, free cash flow (cash flow from operation over total assets), capital expenditure (gross fixed assets over total assets), inventory intensity (total inventory over total assets), R&D (R&D expenditure over total assets), and the lagged pyramid ownership. Table 7 presents the results from 2SLS. It shows that, similar to those presented in Table 4, pyramid ownership structure is negatively associated with both accrual-based and real earnings management.

# 6. Conclusion and summary

This paper contributes to the earnings management literature by examining the relationship between pyramid ownership and earnings management. Relying on measures of both accrual-based and real earnings management, we find that pyramid-affiliated firms engage in less accrual-based and real earnings management than non-pyramid-affiliated firms. We further find

that the divergence between control rights and cash flow rights of the controlling shareholders in pyramid-affiliated firms is positively related to real earnings management. In addition, the results highlight that intra-group transactions (other than internal financing) among pyramid-affiliated firms lead to a higher level of both accrual-based and real earnings management, but internal financing is negatively associated with real earnings management. Overall, the findings provide evidence that there are important relationships between a pyramid ownership structure and earnings management.

These findings are subject to a limitation - the inferences apply only to listed firms in Canada, and caution should be exercised in generalizing the findings in this study to other countries. In spite of the limitation, this study has some implications for policy makers, corporate managers, and academics. Findings in this study show that, in Canada, firms in pyramidal group manage less earnings than other firms, which implies that a pyramid structure creates greater monitoring of managers by controlling shareholders. This is in contrast to the results found in some Asian and European countries, which show that large shareholders expropiate benefits from minority shareholders by reporting low quality of earnings (Fan and Wong 2002; Garcia Lara et al. 2005; Bae and Jeong 2007). Future research might explore explanations for why the relationships between large shareholders and earnings management are inconsistent across countries; for example, whether the inconsistent results are linked to the specific legal and institutional environment in each country. A broader understanding of the relationship between the pyramidal structure and earnings management can be pursued by extending this study to include firms in other countries, where pyramid groups are prevalent but legal and institutional environments differ from those in the Canadian context.

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**Table 1 Industry distribution**

| Industry (SIC code) | No. of firms | % of firms |
|---|---|---|
| Mining (10-14) | 52 | 31.52 |
| Construction (15-17) | 2 | 1.21 |
| Manufacturing (20-39) | 38 | 23.03 |
| Transportation & Public Utilities (40-49) | 35 | 21.21 |
| Wholesale trade (50-51) | 9 | 5.45 |
| Retailed trade (52-59) | 17 | 10.31 |
| Services (70-89) | 12 | 7.27 |
| **Total** | **165** | **100** |

**Table 2. Descriptive statistics**

**Panel A: Descriptive statistics of earnings management variables**

| Variables | Mean | Median | Stdev | 1st Qua | 3rd Qua |
|---|---|---|---|---|---|
| *DA* | 0.051 | 0.035 | 0.057 | 0.016 | 0.067 |
| *RM* | 0.229 | 0.165 | 0.237 | 0.084 | 0.285 |

**Panel B: Descriptive statistics of firm characteristics variables**

| Variable | Mean | Median | Stdev | 1st Qua | 3rd Qua |
|---|---|---|---|---|---|
| *Total asset (M$)* | 5,241 | 1,356 | 10,191 | 507.9 | 3,871 |
| *ROA* | -0.019 | 0.029 | 0.595 | -0.004 | 0.057 |
| *LEV* | 0.238 | 0.229 | 0.168 | 0.117 | 0.350 |
| *XROA* | 0.069 | 0.021 | 0.395 | 0.010 | 0.051 |
| *INT* | 0.139 | 0.056 | 0.176 | 0.006 | 0.201 |
| *T-Q* | 1.348 | 1.196 | 0.691 | 0.951 | 1.555 |
| *LOSS* | 0.116 | 0.000 | 1.038 | 0.000 | 0.059 |
| *∆SALE* | 0.066 | 0.032 | 0.221 | -0.007 | 0.110 |
| *BOD* | 8.911 | 9 | 2.718 | 7 | 10 |
| *INDE* | 0.748 | 0.778 | 0.141 | 0.667 | 0.857 |
| *FEM* | 0.106 | 0.100 | 0.112 | 0.000 | 0.167 |
| *CEOS* | 0.026 | 0.002 | 0.072 | 0.000 | 0.011 |
| *CR* | 0.096 | 0.000 | 0.200 | 0.000 | 0.000 |
| *RPT* | 0.010 | 0.000 | 0.044 | 0.000 | 0.003 |
| *INTF* | -0.004 | 0.000 | 0.088 | 0.000 | 0.000 |

| *Dichotomous variable* | **0** | **1** | | | |
|---|---|---|---|---|---|
| *CEOC* | 159 (16.1%) | 831 (83.9%) | | | |
| *PYRA* | 246 (24.9%) | 744 (75.1%) | | | |

## Table 3. Pearson correlation matrix

| | PYRA | SIZE | LEV | INT | LOSS | ROA | XROA | CSALE | TQ | BOD | INDE | FEM | CEOC | CEOS | DA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PYRA | 1 | | | | | | | | | | | | | | |
| SIZE | 0.196* | 1 | | | | | | | | | | | | | |
| LEV | 0.228* | 0.29** | 1 | | | | | | | | | | | | |
| INT | 0.247* | 0.137 | 0.227* | 1 | | | | | | | | | | | |
| LOSS | -0.102 | -0.171 | -0.028 | -0.064 | 1 | | | | | | | | | | |
| ROA | 0.099 | 0.149 | -0.076 | 0.073 | -0.32** | 1 | | | | | | | | | |
| XROA | -0.124 | -0.203* | 0.024 | -0.075 | 0.72** | -0.84** | 1 | | | | | | | | |
| CSALE | 0.066 | 0.015 | 0.023 | 0.130 | -0.050 | 0.078 | -0.069 | 1 | | | | | | | |
| TQ | -0.085 | 0.011 | -0.048 | 0.152 | 0.322** | -0.053 | 0.232* | 0.156 | 1 | | | | | | |
| DOB | 0.255** | 0.572** | 0.140 | 0.180 | -0.078 | 0.058 | -0.078 | -0.027 | 0.016 | 1 | | | | | |
| INDE | 0.105 | 0.165 | 0.108 | 0.057 | -0.015 | -0.001 | -0.004 | -0.080 | -0.032 | 0.103 | 1 | | | | |
| FEM | 0.115 | 0.392** | 0.106 | 0.146 | -0.065 | 0.071 | -0.075 | -0.046 | 0.027 | 0.404** | 0.128 | 1 | | | |
| CEOC | 0.044 | 0.056 | 0.001 | -0.053 | -0.107 | 0.044 | -0.077 | 0.011 | -0.167 | 0.055 | 0.227* | 0.120 | 1 | | |
| CEOS | -0.11 | -0.126 | -0.058 | 0.021 | -0.004 | 0.019 | -0.006 | 0.064 | 0.109 | -0.116 | -0.157 | -0.106 | 0.303** | 1 | |
| DA | -0.156 | 0.294** | -0.149 | 0.019 | 0.171 | -0.236* | 0.302** | 0.033 | 0.191 | -0.172 | -0.050 | -0.093 | -0.077 | 0.051 | 1 |
| RM | -0.047 | -0.190 | -0.152 | 0.124 | 0.065 | -0.075 | 0.118 | 0.140 | 0.169 | -0.02 | -0.109 | -0.069 | -0.216* | 0.119 | 0.305** |

* Correlation is significant at the 0.05 level (two-tailed); ** Correlation is significant at the 0.01 level (two-tailed)

**Table 4. Primary testing results for Hypothesis 1**

| VARIABLE | DA | | RM | |
|---|---|---|---|---|
| | Est value | t student | Est value | t student |
| *INTERCEPT* | 0.212*** | 7.07 | 0.867*** | 7.24 |
| *PYRA* | -0.010** | -2.40 | -0.038** | -2.26 |
| *SIZE* | -0.016*** | -4.97 | -0.065*** | -4.94 |
| *ROA* | 0.029*** | 3.63 | 0.081*** | 2.57 |
| *LEV* | -0.041*** | -3.61 | -0.158*** | -3.46 |
| *INT* | 0.024** | 2.21 | 0.167*** | 3.90 |
| *LOSS* | -0.019*** | -5.33 | -0.051*** | -3.61 |
| *TQ* | 0.008*** | 3.19 | 0.036*** | 3.40 |
| *ΔSALE* | 0.012 | 1.61 | 0.064** | 2.07 |
| *XROA* | 0.105*** | 6.45 | 0.244*** | 3.75 |
| *BOD* | -0.006 | -0.34 | 0.096 | 1.48 |
| *INDE* | -0.005 | -0.39 | -0.007 | -0.15 |
| *FEM* | 0.007 | 0.38 | -0.140** | -2.02 |
| *CEOS* | -0.002 | -0.09 | -0.066 | -0.68 |
| *CEOC* | -0.007 | -1.30 | -0.073*** | -3.58 |
| *INDUSTRY DUMMY* | yes | | yes | |
| *YEAR DUMMY* | yes | | yes | |
| *OBS* | 990 | | 990 | |
| *R2(adj)* | 0.20 | | 0.27 | |

*** significant at 0.01 level; ** significant at 0.05 level, * significant at 0.1 level based on two-tailed t-test

## Table 5. Testing results for Hypothesis 2

| VARIABLE | DA | | RM | |
|---|---|---|---|---|
| | Est value | t student | Est value | t student |
| INTERCEPT | 0.151*** | 5.03 | 0.692*** | 5.57 |
| CR | 0.015 | 1.48 | 0.125*** | 2.93 |
| SIZE | -0.012*** | -3.36 | -0.062*** | -4.35 |
| ROA | 0.047*** | 2.51 | 0.103 | 1.33 |
| LEV | -0.043*** | -3.41 | -0.131** | -2.53 |
| INT | 0.025** | 2.52 | 0.211*** | 5.14 |
| LOSS | -0.012 | -1.01 | -0.025 | -0.51 |
| TQ | 0.009*** | 2.96 | 0.018 | 1.39 |
| ΔSALE | 0.009 | 1.24 | 0.066** | 2.13 |
| XROA | 0.188*** | 7.53 | 0.239** | 2.32 |
| BOD | -0.003 | -0.18 | 0.171** | 2.35 |
| INDE | 0.001 | 0.07 | 0.101* | 1.90 |
| FEM | -0.007 | -0.38 | -0.129* | -1.78 |
| CEOS | -0.021 | -0.83 | -0.589*** | -5.51 |
| CEOC | -0.009* | -1.78 | -0.115*** | -5.22 |
| INDUSTRY DUMMY | Yes | | Yes | |
| YEAR DUMMY | Yes | | Yes | |
| OBS | 744 | | 744 | |
| R2(adj) | 0.18 | | 0.33 | |

*** significant at 0.01 level; ** significant at 0.05 level, * significant at 0.1 level based on two-tailed t-test

**Table 6. Testing results for Hypothesis 3**

| VARIABLE | DA | | RM | |
|---|---|---|---|---|
| | Est value | t student | Est value | t student |
| INTERCEPT | 0.142*** | 4.63 | 0.623*** | 4.93 |
| CR | 0.018 | 1.59 | 0.163*** | 3.55 |
| RPT | 0.163* | 1.72 | 0.721* | 1.84 |
| INTF | -0.003 | -0.05 | -0.582* | -1.94 |
| CR×RPT | -0.301 | -0.75 | -2.89* | -1.73 |
| CR×INTF | 0.056 | 0.12 | 4.47** | 2.40 |
| SIZE | -0.011*** | -3.15 | -0.056*** | -3.86 |
| ROA | 0.048*** | 2.57 | 0.099 | 1.28 |
| LEV | -0.043*** | -3.39 | -0.133** | -2.56 |
| INT | 0.024** | 2.43 | 0.205*** | 4.99 |
| LOSS | -0.012 | -1.02 | -0.013 | -0.26 |
| TQ | 0.010*** | 3.11 | 0.018 | 1.43 |
| ∆SALE | 0.019 | 1.32 | 0.069** | 2.23 |
| XROA | 0.191*** | 7.62 | 0.274*** | 2.64 |
| BOD | -0.002 | -0.13 | 0.168** | 2.30 |
| INDE | 0.002 | 0.19 | 0.116** | 2.17 |
| FEM | -0.009 | -0.50 | -0.130* | -1.81 |
| CEOS | -0.021 | -0.80 | -0.609*** | -5.66 |
| CEOC | -0.010* | -1.83 | -0.124*** | -5.56 |
| INDUSTRY DUMMY | yes | | yes | |
| YEAR DUMMY | yes | | yes | |
| OBS | 744 | | 744 | |
| R2(adj) | 0.18 | | 0.33 | |

*** significant at 0.01 level; ** significant at 0.05 level, * significant at 0.1 level based on two-tailed t-test

**Table 7. Testing results for Hypothesis 1 using 2OLS**

**First stage (Logistic regression):**

| VARIABLE | Est value | z student |
|---|---|---|
| *INTERCEPT* | -4.073* | -1.78 |
| *LAGPYRA* | 5.593*** | 17.24 |
| *SIZE* | -0.124 | -0.42 |
| *LEV* | 1.930** | 2.10 |
| *INV* | -0.911 | -0.88 |
| *FIX* | -0.107 | -0.46 |
| *TQ* | -0.554** | -2.32 |
| *CASH* | 1.357 | 0.64 |
| *R&D* | 5.722 | 0.54 |
| *ΔSALE* | 1.726** | 2.50 |
| *BOD* | 3.464** | 2.35 |
| *OBS* | 990 | |
| *R2(Pseudo)* | 0.68 | |

**Second stage:**

| | DA | | RM | |
|---|---|---|---|---|
| VARIABLE | Est value | t student | Est value | t student |
| *INTERCEPT* | 0.204*** | 6.78 | 0.829*** | 6.92 |
| *PYRA* | -0.002** | -2.43 | -0.009*** | -2.98 |
| *SIZE* | -0.016*** | -4.97 | -0.065*** | -4.95 |
| *ROA* | 0.029*** | 3.65 | 0.082*** | 2.59 |
| *LEV* | -0.038*** | -3.30 | -0.141*** | -3.05 |
| *INT* | 0.024** | 2.25 | 0.172*** | 4.02 |
| *LOSS* | -0.019*** | -5.37 | -0.051*** | -3.65 |
| *TQ* | 0.008*** | 2.88 | 0.032*** | 2.96 |
| *ΔSALE* | 0.015* | 1.89 | 0.077** | 2.46 |
| *XROA* | 0.105*** | 6.45 | 0.244*** | 3.76 |
| *BOD* | -0.000 | -0.01 | 0.129* | 1.94 |
| *INDE* | -0.005 | -0.40 | -0.006 | -0.12 |
| *FEM* | 0.007 | 0.41 | -0.141** | -2.04 |
| *CEOS* | -0.003 | -0.13 | -0.075 | -0.77 |
| *CEOC* | -0.007 | -1.34 | -0.074*** | -3.63 |
| *INDUSTRY DUMMY* | yes | | yes | |
| *YEAR DUMMY* | yes | | yes | |
| *OBS* | 990 | | 990 | |
| *R2(adj)* | 0.20 | | 0.28 | |

*** significant at 0.01 level; ** significant at 0.05 level, * significant at 0.1 level based on two-tailed t-test