



# Institutional ownership, product market competition, and earnings management: Some evidence from international data

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## ABSTRACT

We examine the impact of institutional ownership and product market competition on earnings management (both accrual-based and real) using data from non-financial firms in 41 countries around the world for the period 1995–2016. Overall all, we document an asymmetry in the role institutional ownership and product market competition play in curbing accrual vis-à-vis real earnings management. After controlling for firm-level determinants of earnings management documented by prior research, industry and country indicator variables, we find robust evidence (no evidence) that accrual (real) earnings management increases (is associated) with percentage of institutional ownership. While institutional ownership appears to have no effect on real earnings management, it significantly accentuates accrual earnings management. We also find that product market competition is positively associated with accrual earnings management, though statistically significantly only when the Herfindahl-Hirschman Index (HHI) proxy is used. Lastly, product market competition is significantly negatively associated with real earnings management, using two of the three proxies of product market competition. Only when we use the inverse of number of firms in an industry (NUMB) do we find a positive association between product market competition and real earnings management. Product market competition appears to accentuate accrual but attenuate real earnings management.

## 1. Introduction

Whether institutional ownership and product market competition do influence and how much influence they have on firm decisions, corporate governance and earnings management has been a subject of intense debate and a focus of many prior studies. Prior earnings management studies which investigate the role of institutional ownership and product market competition, unlike research in other areas such as capital structure, dividend payout, executive compensation, etc., have been single-country focused. However, both the degree of institutional ownership and product market competition as well as their relative effectiveness in monitoring and disciplining managers likely differ across countries (Çelik & Isaksson, 2013; Haw, Ho, Li, & Zhang, 2015).

Consistent with this, prior single-country studies find mixed results. While some single-country studies report a negative association between institutional ownership and earnings management (see for example, Chung, Firth, and Kim (2002) for the U.S; Park and Shin (2004) for Canada; or Ajay and Madhumathi (2015) for India), others document either a non-linear association (see for example, Koh (2003) for

Australia) or no association (see Shayan-Nia, Sinnadurai, Mohd-Sanusi, and Hermawan (2017) for India) between the two variables. Similarly, prior single-country studies on the impact of product market competition on earnings management report varied results. Whereas some studies (see Datta, Iskandar-Datta, and Singh (2013) for the U.S.; Yamaguchi (2016) for Japan) find a positive association between product market competition and earnings management, others document either a negative association (see Young (2015) and Lakshmana and Yang (2014) for the U.S.) or no association (see Wang, Li, and Chen (2015) for China) between the two variables. These divergent empirical results suggest that further insights could be gleaned from a multi-country study that examines the association between institutional ownership and product market competition, on one hand, and earnings management, on the other. Thus, the primary objective of this paper is to extend prior research by investigating the roles of institutional ownership and product market competition in accentuating or attenuating earnings management to a cross-country setting.

The sample includes 139,906 firm-year observations pertaining to non-financial, publicly listed firms drawn from 41 countries. Our

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multivariate earnings management models (both accrual-based and real) include, as explanatory variables, the variables of interest (institutional ownership and product market competition), multiple firm-level control variables that prior research documents to be associated with earnings management, and industry and country indicator variables. We estimate the empirical models using the three-stage least squares (3SLS) estimation procedure, which is effective in handling problems associated with the presence of missing or unknown control variables, numerous indicator variables and endogeneity.

Because firms may use different techniques of earnings management to mask economic performance and it is difficult to *ex ante* determine which techniques they actually use (Leuz, Nanda, & Wysocki, 2003), we first measure both accrual and real earnings management using three alternative individual proxies each. Next, we rank firms by each accrual and real earnings management proxy such that higher rank-scores represent higher levels of earnings management. Because the ranks are related to the number of firms in a country, there is a concern that the row rank measure can introduce potential bias related to the size of a country.<sup>1</sup> To mitigate this potential bias related to the size of countries, we scale the rank-scores in each country by the number of firms per country per year. Finally, we develop an overall measure of accrual (A\_EM) and real earnings management (R\_EM), using an average of the scaled rank-scores for each of the three accrual and real earnings management proxies. We use these overall measures of accrual and real earnings management in all our empirical analyses. The models are generally well specified and the control variables have signs and significances closely comparable to what prior single-country studies document. Overall, we document an asymmetry in the effectiveness of institutional ownership and product market competition in curbing accrual vis-à-vis real earnings management. Our main findings are summarized below.

First, we find significant positive (no) association between accrual (real) earnings management and institutional ownership. Though we find no evidence suggesting institutional ownership has an impact on real earnings management, we document a robust evidence that it accentuates accrual earnings management. The positive association between accrual earnings management and institutional ownership corroborates the prediction that institutional investors tend to focus on short-term profit goals, and hence, pressure managers to engage in earnings management (Graves & Waddock, 1990; Lang & McNichols, 1997; Porter, 1992).

Second, we find significant positive association between accrual earnings management and industry competition, when using the market concentration (HHI) proxy. Managers of companies in highly competitive industries, threatened by heightened career concerns and facing a constant pressure to match or beat the earnings performance of their industry peers appear to engage in higher levels of accrual earnings management (DeFond & Park, 1999; Hermalin & Weisbach, 2012). Alternatively, firms in industries with higher competition are opting for more earnings management to avoid the revelation of strategic information to competitors (Datta et al., 2013; Gertner, Gibbons, & Scharfstein, 1988; Verrecchia, 1983).

Third, we find a negative significant association between real earnings management and product market competition, using two of the three proxies: market concentration (HHI) and market power (INDUSTRY LI). The only exception is the result from the model that uses NUMB as the proxy for product market competition; in this model, real earnings management is positively associated with product market competition. Overall, these results suggest, despite the lower demand for earnings management, firms in less competitive industries appear to engage in higher levels of real earnings management perhaps due to the weak disciplining environment in such industries. Alternatively, industrial competition is an effective disciplining mechanism in curbing

real earnings management by firms. The exception, the positive association between product market competition and real earnings management when using NUMB, is perhaps due to NUMB capturing a different facet of industrial competition than the other two proxies. It also further underscores the importance of checking the robustness of empirical findings, using alternative proxies.

The study has several contributions. First, to our knowledge, this is the first cross-country study investigating the influence of institutional ownership and product market competition on firm level earnings management; all prior studies that examine the influence of these variables on earnings management are exclusively single-country focused. Second, in addition to using data from a broad cross section of 41 countries and extending earnings management studies to a cross-country setting, the study uses multiple alternative proxies for earnings management (both accrual-based and real) with a view to triangulate and assess the robustness of results. Furthermore, the study uses the three-stage least squares (3SLS) estimation procedure which effectively addresses econometric issues related to missing or unknown control variables, endogeneity and the presence of numerous indicator variables in a model. Overall, the study extends, in a meaningful way, prior research that examines the impact of institutional investors and product market competition in limiting managers' myopic behavior to engage in earnings management. The rest of the paper is organized as follows. Section 2 presents a review of the background literature and development of hypotheses. Section 3 outlines the empirical framework including issues of sample selection, variable identification and definition, model specification, and econometric procedures. Section 4 presents the results and discussions and Section 5 concludes.

## 2. Background literature and hypotheses development

Separation of ownership and control is the hallmark of the Berle and Means' image of the modern corporation (Berle & Means, 1932) and a number of agency problems stem from such separation (Jensen & Meckling, 1976). The divorce of control from ownership, among other things, may lead to situations where management will have incentives to manage earnings (Cheng & Reitenga, 2009; Davis, 2002). The principal-agent problem is more pronounced when ownership is atomistic and/or diffused as such ownership structure does not provide sufficient incentives for shareholders to closely monitor myopic managerial tendencies to engage in earnings management (Jensen & Meckling, 1976; Koh, 2003; Ramsay & Blair, 1993; Shleifer & Vishny, 1986). Furthermore, information asymmetry theory contends that managers do possess private information, external stakeholders do not, about the firm and its earnings stream, which offers them additional opportunities and incentives to engage in earnings management activities (Beatty & Harris, 1998; Dye, 1988; Richardson, 2000; Schipper, 1989; Trueman & Titman, 1988; Yet & Imm, 2010).

The primary objective of the study is to empirically investigate whether institutional ownership and product market competition attenuate (accentuate) earnings management (both accrual and real) by managers. In what follows, we provide a brief summary of the background literature and present the two primary hypotheses of the study.

### 2.1. Institutional ownership and earnings management

The ability of executives to myopically engage in earnings management activities is strongly influenced by the effectiveness of monitoring exercised by institutional investors. Institutional investors have the opportunities, resources, and ability to monitor, discipline, and influence managers of firms (Chung et al., 2002). The presence of institutional investors with large share ownership, having the opportunity to benefit from economies of scale in information gathering, can have a direct bearing on the agency costs resulting from separation of ownership and control (Koh, 2003). There are two opposing views, namely hands-off passivity and active monitoring, regarding the manner in

<sup>1</sup> We are grateful to an anonymous reviewer for this insight.

which institutional investors may influence earnings management activities of companies (Bhide, 1993; Bushee, 2001; Majumdar & Nagarajan, 1997; Porter, 1992). Which one of these two contrasting views actually explains the nexus between institutional ownership and earnings management in a cross-country setting is an interesting empirical question.

The first view holds that the ever-increasing share of ownership by institutional investors in publicly traded firms makes exit from poorly performing portfolio (i.e., investee) firms expensive, since large block sales generally entail large discounts (Black & Coffee, 1994; Rajgopal & Venkatachalam, 1997). The costliness of the exit option incentivizes institutional investors with larger ownership interests to be informed about the firm and be actively involved in closely monitoring management decisions. Thus, large institutional shareholdings help reduce the information asymmetry between management and outside stakeholders (Lev, 1988; Shiller & Pound, 1989). In addition, institutional investors, with large share ownership, have higher incentives to actively monitor myopic managerial behavior because they have much more to lose from being passive or less informed (Pound, 1992) and the incremental benefits they attain from increased monitoring are likely to outweigh the incremental costs of monitoring (Jensen & Meckling, 1976; Ramsay & Blair, 1993; Shleifer & Vishny, 1986). Lastly, institutional investors do also have a higher ability to curb opportunistic earnings management because they are capable of analyzing financial statements more thoroughly and proficiently than individual investors. In sum, institutional investors which tend to have substantial financial sophistication, material sums at stake, and no contractual friction to inhibit their behaviors are likely candidates for undoing earnings management (Schipper, 1989; Velury & Jenkins, 2006). Collectively, the foregoing arguments suggest institutional investors with larger ownership interests have the incentives to hold on to their shares in investee companies and the incentive and power to actively monitor and discipline myopic managerial behavior (Velury & Jenkins, 2006).

Several empirical studies find evidence consistent with the above view that firms with higher institutional ownership are less likely to manage earnings (see for example, Bushee, 2001; Jiambalvo, Rajgopal, & Venkatachalam, 2002; Majumdar & Nagarajan, 1997; Rajgopal & Venkatachalam, 1997). Chung et al. (2002) hypothesize and find that the presence of large institutional shareholdings inhibits managers from fully pursuing opportunistic earnings management through discretionary accruals because these institutions will either put pressure on the firms to adopt better accounting policies or are able to unravel the earnings management ruse so it will not benefit the managers. Balsam, Steven, Bartov, and Marquardt (2002) and Hand (1990) document that institutional investors are more capable of discerning earnings management than individual investors because they have access to timely and valuable sources of firm-specific information. Along the same line, Bushee (1998) concludes that because institutional investors are sophisticated investors who focus on long-term value (rather than short-term profits), their presence as shareholders in a firm reduces the incentive to engage in myopic earnings management. Similarly, Bange and De Bondt (1998) find that earnings management related to research and development expenses (R&D) is lower when institutional shareholdings are high. More recently, Mitra and Cready (2005) report results consistent with the view that institutional monitoring allays myopic reporting behavior of corporate executives.

The second view contends that institutional investors tend to be short-term oriented, myopic, or transient with excessive focus on current rather than long-term earnings in determining stock prices (Chung et al., 2002; Koh, 2003; Pound, 1988). Pozen (1994) points out that institutional investors are at best neutral and mostly prefer selling their holdings, should a portfolio firm perform poorly, rather than bearing monitoring costs. The literature identifies two reasons for this short-term focus by institutional investors. First, regular performance assessments and industry performance rankings of institutional investors create incentives for institutional investors to adopt short investment

horizons (Black & Coffee, 1994; Stapledon, 1996). Such short investment horizon deters institutional investors from incurring monitoring costs because the benefits of governing the portfolio firms are unlikely to accrue to short-term investors (Black & Coffee, 1994; Porter, 1992; Stapledon, 1996). Second, the need to actively rebalance their portfolio holdings to maintain or improve their short-term performances leaves institutional investors with limited or no time and resources necessary to effectively monitor firms beyond the performance assessment cycle. Overall, the foregoing arguments suggest that institutional investors, focused on achieving short-term profit goals at the expense of long-term value maximization, may pressure managers to engage in earnings management activities (Graves & Waddock, 1990; Lang & McNichols, 1997; Porter, 1992).

Findings in several prior studies provide evidence consistent with the view that the presence of institutional investors is likely to increase managers' incentives to engage in earnings management. For instance, Bushee (1998) finds that transient institutional investors exhibit a strong preference for near-term earnings, which also translates into misevaluation of stock prices where the near-term (long-term) earnings are over- (under-) weighted. Other empirical evidence also indicate that managers have incentives to avoid earnings decreases or losses, especially when there is an established pattern of earnings growth/positive earnings (Burgstahler & Dichev, 1997; Myers, Myers, & Skinner, 2007), and the market rewards earnings growth (Barth, Elliott, & Finn, 1997). Taken together, these results suggest that trading by institutional investors is sensitive to current earnings news, and large institutional investors tend to pressure managers into managing earnings aggressively.

Given these opposing predictions and findings regarding the association between institutional ownership and earnings management by firms, we state our hypothesis in the null form as follows:

**H1.** There is no association between institutional ownership and earnings management.

## 2.2. Industry competition and earnings management

Recent literature suggests that product market competition is one of the many determinants of managers' propensity to engage in earnings management (see for example, Datta et al., 2013; Laksmana & Yang, 2014; Markarian & Santalo, 2014). However, the nexus between product market competition and managerial behavior is complex and two contrasting views prevail.

The first view contends increased product market competition is associated with increased earnings management by managers. Using agency theoretic reasoning, several studies suggest an increase in product market competition increases the information available to principals for more accurately monitoring and evaluating managers relative to their peers (see for example, DeFond & Park, 1999; Holmstrom, 1982; Nalebuff & Stiglitz, 1983). The wide use of relative performance measures in the evaluation of managers, in highly competitive markets, DeFond and Park (1999) posit, places constant pressure on managers to meet or beat accounting earnings reported by other firms in the industry. Similarly, Hermalin and Weisbach (2012) contend heightened career concerns, stemming from exogenous shocks that result in increased availability of information to owners, provide managers of firms in high product market competition industries the incentives to manipulate earnings, to make them look better than they actually are. Markarian and Santalo (2014) argue “competition increases executive incentive to manipulate earnings because it induces higher punishment (rewards) in the stock market when accounting earnings indicate the existence of a competitive disadvantage (advantage).” Likewise, Shleifer (2004) conjectures the pressure stemming from an intensely competitive environment may provide executives with greater incentives to manipulate earnings to influence stock prices. Firms in industries characterized by intense competition are also likely to opt for

more opaque disclosure policies to avoid revelation of strategic information to competitors (Gertner et al., 1988; Verrecchia, 1983). In this connection, Datta et al. (2013) state “competition can induce more opaqueness in earnings in order to restrict the information revealed to rivals. For instance, firms with higher demand may strategically determine that it is best to withhold such information through earnings management because by doing so they hold back the signal of good prospects from rival firms.” Overall, the above arguments and findings suggest product market competition is likely to be associated with more earnings management.

The second view argues firms compete for limited funds from the capital markets and increased disclosure enhances firms' chance of securing funds and reduces the cost of capital. In a theoretical paper, Diamond and Verrecchia (1991) show increased disclosure will reduce information asymmetry, and thus, lower the firms' cost of capital. This argument suggests that as the number of firms in an industry that compete for limited funds increases, the quality of information provided by firms in the industry increases and the degree of earnings management decreases. In a similar vein, Hoberg and Phillips (2010) underscore firms' incentives to reduce information asymmetry to obtain financing at more favorable rates.

Given the contradictory predictions and findings regarding the association between product market competition and earnings management in prior literature, our hypothesis, in the null form, is:

**H2.** There is no association between product market competition and earnings management.

### 3. Empirical framework

#### 3.1. Sample selection

We started with all firms in the OSIRIS database during the period 1995–2016. In line with Gupta, Khurana, and Pereira (2008), we excluded financial sector companies (US SIC code 6000~) because the earnings management techniques used by firms in this sector are not comparable to those in other industries. We also excluded all firms from countries which did not have at least ten listed companies in any given year, as in Gaio (2010). To ensure uniformity in the identification of fiscal years, we made the following adjustments. If the fiscal year end of a firm is on or before June 30, the fiscal year is set at the year prior to the year of the fiscal year end; otherwise, the fiscal year is set at the year of the fiscal year end (Lemma, 2015; Lemma & Negash, 2013). To reduce the impact of outlier observations on the results, we winsorized all continuous variables at the first percentile (at the bottom) and ninety-ninth percentile (at the top).

We used a modified version of Kenneth French's 12-industry portfolios. As indicated above, the financial industry (6000~) is dropped from the sample in line with Burgstahler and Eames (2003), Gupta et al. (2008), and others. The mining industry (1000, 1400) is added to the industries of energy, oil, gas, and coal extraction and products (Oil\_Gas). The communication industry, the utility industry, the transportation industry including water and gas supplies (4000, 4400, 4500, and 4600) are merged into the regulated industry and the chemical and construction industries are combined. Standard Industrial Classification (SIC) codes (1500, 1600, and 1700) are added to the construction industry. The final dataset is comprised of 139,906 firm-year observations drawn from 41 countries around the world.<sup>2</sup>

#### 3.2. Dependent variables

Earnings management involves managing the level and variability

<sup>2</sup> The sample size drops to 139,879 in the regression analysis due to missing information for dependent and/or independent variables.

of reported earnings using financial reporting and/or real operating decisions (Leuz et al., 2003). We construct three alternative proxies to capture the extent to which firms use financial reporting choices to mask their firms' economic performance, as in Leuz et al. (2003). We also construct three alternative proxies to measure the extent to which firms use operating decisions to obfuscate their firms' economic performance, as in Roychowdhury (2006), Cohen, Dey, and Lys (2008) and Cohen and Zarowin (2010).

#### 3.2.1. Accrual earnings management proxies

The first accrual earnings management proxy, A\_EM1, measures the degree to which firms smooth reported earnings using accruals and is defined as the ratio of the standard deviation of accruals to the standard deviation of cash flows, as in Leuz et al. (2003).<sup>3</sup> Firms engaged in income smoothing earnings management exhibit a lower standard deviation of earnings relative to the standard deviation of cash flows; a higher value of A\_EM1 indicates a lower degree of earnings management. The second proxy, A\_EM2, measures the extent to which firms conceal shocks to their operating performances using accruals and is defined as the correlation between change in accruals and change in operating cash flows, consistent with Leuz et al. (2003). A negative correlation results when firms engage in income smoothing and a larger negative correlation indicates a higher level of earnings management. Thus, a higher value of A\_EM2 (smaller negative correlation) indicates a lower level of earnings management. The third proxy, A\_EM3, measures the extent to which firms mask their economic performance using accruals and is defined as the ratio of the absolute value of accruals to the absolute value of operating cash flows, as in Leuz et al. (2003). In firms engaged in this form of earnings management, accruals account for a larger portion of reported earnings. Thus, larger A\_EM3 indicates a higher level of earnings management.

Because “it is difficult to specify *ex ante* which earnings management technique firms use to obfuscate economic performance” and to mitigate potential measurement errors in the individual proxies, Leuz et al. (2003) suggest the use of an overall measure of earnings management. We follow the steps below to develop an overall measure of earnings management. First, we rank firms in each country, every year, from 1 to N (where N is the number of unique firms per country per year), by the level of each accrual earnings management proxy (A\_EM1, A\_EM2, A\_EM3) such that higher rank-score represents a higher level of earnings management. Second, since the raw ranks in the first step are highly influenced by the number of firms in a country (i.e., larger countries have more high-ranked firms than smaller countries), we scale the raw rank-scores of each accrual earnings management proxy per country per year by N. This scaling neutralizes the effect of country size on the aggregate measure of accrual earnings management.<sup>4</sup> Third, we compute the aggregate accrual earnings management score, A\_EM, by averaging a firm's scaled rank-scores for the three individual accrual earnings management measures.<sup>5</sup>

#### 3.2.2. Real earnings management proxies

Firms may engage in real earnings management, including sales manipulation, overproduction and reduction in discretionary expenses in order to increase reported earnings (Roychowdhury, 2006). Sales manipulation involves accelerating sales through generous

<sup>3</sup> The scaling by the standard deviation of cash flow, Leuz, Nanda, and Wysocki (2003) argue, controls for variations in firm performance.

<sup>4</sup> We are very grateful to an anonymous reviewer for suggesting this to us.

<sup>5</sup> To avoid loss of significant number of observations due to missing data for each of the three alternative A\_EM and R\_EM proxies, we kept firms in the sample, in the computation of the overall earnings management rank, as long as at least one of the three alternative proxies for accrual and real earnings management is available. In a sensitivity analysis, we kept only firms which have no missing data in all the three proxies for accrual and real earnings management. The results, untabulated, are generally consistent with the result we report in the paper.



discounts or lenient credit terms and typically results in lower cash flows due to the abnormal lowering of margins. Overproduction results in increased production costs, and thus, lowers operating cash flows while a decrease in discretionary expenses leads to increase in operating cash flows. As in Roychowdhury (2006), we use abnormal cash flows (R\_EM1), abnormal production costs (R\_EM2) and abnormal discretionary expenses (R\_EM3) as proxies for real earnings management by companies. Abnormal cash flows is defined as actual minus expected cash flows and abnormal production costs is defined as actual minus expected production costs. Likewise, abnormal discretionary expense is defined as actual minus expected discretionary expenses.

To develop the overall measure of real earnings management, R\_EM, we first rank firms in each country, every year, from 1 to N (where N is the number of unique firms per country per year) by the level of each individual real earnings management proxy (R\_EM1, R\_EM2, R\_EM3), such that a higher rank-score represents more real earnings management. Second, since the raw ranks in the first step are highly influenced by the number of firms in a country (i.e., larger countries have more high-ranked firms than smaller countries), we scale the raw rank-scores of each real earnings management proxy per country per year by N. This scaling neutralizes the effect of country size on the aggregate measure of real earnings management. Third, we compute the aggregate real earnings management score, R\_EM, by averaging a firm's scaled rank-scores for the three individual real earnings management measures. Further details on the definition and computation of the dependent variables are provided in Appendix I (Panel A).

### 3.3. The research variables

Institutional ownership and product market competition are the variables of interest in the study. As mentioned elsewhere, the literature suggests that free-rider problem may inhibit institutional investors, with insignificant stake in the ownership of a firm, from engaging in monitoring management because the cost of monitoring outweighs its benefits (see for example, Wang, 2014). Along the same line, both Maug (1998) and Shleifer and Vishny (1986) contend that institutional investors' ability to influence firm management is a function of the size of their ownership stake. We use the percentage of direct institutional ownership, I\_OWN, as a proxy for institutional ownership.

Prior research used various proxies, each with its strengths and weaknesses, to measure the degree of product market competition.<sup>6</sup> In the interest of ensuring the robustness of results, we use multiple alternative proxies for product market competition, including the Herfindahl-Hirschman Index (HHI), Industry Lerner Index (INDUSTRY LI), and the inverse of the number of firms in an industry (NUMB) in line with Datta et al. (2013), Laksmana and Yang (2014), Markarian and Santalo (2014), and many others. We log transform HHI, as in Akdoğan and MacKay (2008) because the distribution of HHI is skewed. Higher (lower) values of HHI indicate lower (higher) levels of competition.

As in Datta et al. (2013), we compute the Lerner Index at the industry level, using the industry median price-cost margin [i.e., (sales – cost of goods sold – selling and administrative expenses) / sales]. Higher price-cost margin values indicate higher market power, less competition in the industry, and firms operating in such industries with higher market power have lower incentives to engage in earnings management. Higher (lower) values of Lerner Index indicate lower (higher) level of competitiveness in the industry. Our last proxy for product market competition is the inverse of number of firms in an industry (NUMB), as in Datta et al. (2013). On one hand, the larger the

number of firms in an industry, the higher the quality of information provided and hence the lower the earnings management. On the other hand, the higher the number of firms in an industry, the more severe the competition for external funding, and thus, the higher the incentive for firms to engage in more earnings management. Thus, earnings management may be higher (lower) in industries with larger number of firms.

### 3.4. Control variables

We control for firm-level factors that prior literature identified as antecedents of firms' earnings management activity. These factors include firm-size (SIZE), growth opportunities (GROWTH), capital structure (LEV) and debt maturity structure (D\_STR), as controls for reputational and political costs, visibility and information asymmetry, agency and incentives alignment, signaling, and market pressure (see for example, Becker, DeFond, Jiambalvo, & Subramanyam, 1998; Bhushan, 1989; DeFond & Jiambalvo, 1994; Koh, 2003; Lee & Choi, 2002; Press & Weintrop, 1990; Sweeney, 1994; Watts & Zimmerman, 1986).

Zang (2006) provides evidence that managers treat real manipulations and accrual earnings manipulation as substitutes. Likewise, Laksmana and Yang (2014) suggest firms may have an overall earnings management strategy; i.e., firms use a mix of real activity manipulation and accrual-based earnings management to reach target earnings. Pursuant to Fields, Lys, and Vincent (2001), examining only one earnings management technique at a time, we posit, will not allow a full understanding of the overall effect of earnings management activities. Thus, we include A\_EM as an additional explanatory variable in the R\_EM model, and vice versa.

Prior literature attributes part of the inter-firm disparity in the extent of earnings management to factors associated with the industry environment (Datta et al., 2013; Dichev, Graham, Harvey, & Rajgopal, 2013; Guadalupe & Perez-Gonzalez, 2006; Marciukaityte & Park, 2009; Markarian & Santalo, 2014; Ronen & Yaari, 2008; Watts & Zimmerman, 1986). Warfield, Wild, and Wild (1995) argue that firms in regulated industries are likely to experience reduced agency costs due to increased monitoring from regulators and are likely to have different incentives and opportunities to manage earnings (Burgstahler & Eames, 2003). In this paper, we use industry indicator variables to parsimoniously capture the effect of industry characteristics on firm level earnings management.

Likewise, recent cross-country earnings management studies argue that differences in country-level characteristics such as disparities in institutional structures, socio-economic environments, and extent of market pressure (see for example, Burgstahler, Hail, & Leuz, 2006; Daske, Hail, Leuz, & Verdi, 2013; Enomoto, Kimura, & Yamaguchi, 2012; Gaio, 2010; Houque, van Zijl, Dunstan, & Karim, 2012; Leuz et al., 2003; Othman & Zeghal, 2006; Renders & Vandenbogaerde, 2008) can impact the extent of firm level earnings management. However, different studies use different proxies for country level factors and most of these proxies are correlated with each other. Entering these highly correlated proxies all at once in a model is likely to result in multicollinearity problems (Gujarati, 2003). Thus, we use country indicator variables in order to parsimoniously capture the effect of country-level variables on firm level earnings management. Further details with respect to the definition and computation of the research and control variables are provided in Appendix I (Panel B).

### 3.5. Model specification

Empirically testing the influence of institutional ownership and product market competition on firm-level earnings management is the primary objective of the study. To this end, we use the following model which links earnings management to the two variables of interest, institutional ownership (I\_OWN) and product market competition (HHI,

<sup>6</sup> An extended discussion about the strengths and weaknesses of each of the three alternative measures of product market competition can be found in Datta et al. (2013).

INDUSTRY LI, or NUMB), while controlling for firm-level characteristics as well as industry and country indicator variables:

$$EM_{i,t} = \beta_0 + \sum X_{i,t}\beta_i + \mu_{i,t}$$

where  $EM_{i,t}$  represents either accrual-based earnings management (A\_EM) or real earnings manipulation (R\_EM);  $X_{i,t}$  is a vector of the experimental variables (I\_OWN and HHI, INDUSTRY LI, or NUMB) and the control variables including firms size (SIZE), firm growth opportunities (GROWTH), capital structure (LEV), debt maturity (D\_STR) as well as industry and country indicator variables; and  $\beta_i$  is a column vector containing the corresponding coefficients.

In a study of this nature, it is customary to use econometric procedures, which not only mitigate the problem of missing or unknown control variables but also address endogeneity issues. One such method is the System Generalized Method of Moments (sys-GMM). However, sys-GMM does not do well in the presence of numerous indicator independent variables, as in this study. Hence, we utilize the three-stage least squares (3SLS) regression with the seemingly unrelated regression option to estimate the models. This estimation procedure, a special case of Instrumental Variable (IV) methods, is capable of not only mitigating problems of missing or unknown control variables but also addressing endogeneity issues (Angrist & Pischke, 2009).

## 4. Results and discussions

### 4.1. Descriptive statistics and univariate results

Table 1 provides summary statistics of the dependent and independent variables. It reports the mean (median in the second row) values of all the variables included in the study, for each country. The percentage of institutional ownership varies greatly across countries; Chile has the highest mean (median) institutional ownership percentage of 56.0 (63.1) and Vietnam has the lowest with mean (median) institutional ownership of 4.2 (0). The overall mean (median) percentage of institutional ownership is 16.5 (9.6). The product market competition proxies, HHI, INDUSTRY LI and NUMB do also vary across countries. Industry competition as proxied by HHI is the highest in Pakistan and the lowest in Cyprus. Industry competition, measured by the industry median price-cost margin (INDUSTRY LI), is the highest in Australia and the lowest in Luxemburg. Lastly, industry competition, when proxied by the inverse of the number of firms in an industry, is the highest in Germany and the lowest in Mexico.

Table 2 presents the correlations among all variables used in the models. There is a negative, albeit small (1.3%), correlation between the overall accrual and real earnings management proxies, suggesting that, on average, firms use accrual and real earnings management as substitute mechanisms to mask economic performance. Accrual (real) earnings management is positively (negatively) significantly correlated with institutional ownership. These results are consistent with the view that higher institutional ownership, while curbing real earnings management (the more-costly of the two earnings management mechanisms), exacerbates accrual earnings management, perhaps because institutional investors tend to focus on short-term profit goals, and hence, pressure managers to engage in earnings management.

Accrual earnings management is significantly negatively correlated with two of the three proxies of industrial competition (i.e., HHI and INDUSTRY LI). Also, real earnings management is positively correlated with two of the three proxies of industrial competition (i.e., HHI and INDUSTRY LI) albeit only INDUSTRY LI is significant.

These results are consistent with the view that firms in industries with higher market power have less demand for engaging in accrual earnings management on one hand and exploit their opportunity to engage in real earnings management without serious repercussions, on the other. NUMB is significantly positively (is not) associated with accrual (real) earnings management. These results suggest that industry competition attenuates accrual earnings management, perhaps due to the increased incentive for transparency and enhanced disclosure triggered by the fierce competition for financing in more competitive industries.

Next, we examine whether these univariate correlations persist after we control for firm level, industry and country level determinants of earnings management.

### 4.2. Regression results

As indicated earlier, we argue that the incentive to and the ability of executives to myopically engage in earnings management activities is strongly influenced by the effectiveness of monitoring exercised by institutional investors and the degree of product market competition in an industry. We present the results from the accrual (real) earnings management models in Table 3 (Table 4).

Table 3 presents the results from models estimating overall accrual-based earnings management (A\_EM) as a function of overall real earnings management (R\_EM), institutional ownership (I\_OWN), product market competition (HHI, INDUSTRY LI, or NUMB), a set of firm-level control variables, discussed earlier, as well as industry and country indicator variables. Table 3 has three columns. The first column presents results using the Herfindahl-Hirschman Index (HHI) as proxy for industrial competition. The second and third columns respectively present results using the industry median price-cost margin (INDUSTRY LI) and the inverse of number of firms in an industry (NUMB), as alternative proxies for product market competition.

The models are well specified and most of the control variables have signs and significances generally comparable to findings in prior research. Accrual and real earnings management are significantly negatively associated; firms appear to use accrual and real earnings management as substitute mechanisms to obfuscate economic performance. Smaller, higher growth, higher leverage firms and firms with higher proportion of current liabilities appear to engage less in accrual-based earnings management. Institutional ownership (I\_OWN) is significantly positively associated with accrual earnings management; institutional ownership accentuates accrual-based earnings management. This result corroborates the view that institutional investors tend to focus on short-term profit goals, and hence, pressure managers to engage in earnings management (Graves & Waddock, 1990; Lang & McNichols, 1997; Porter, 1992). In terms of economic significance, a one standard deviation change in the percentage of direct institutional ownership increases the A\_EM scaled rank of the median firm by 1.4%.

We also find a negative association between accrual earnings management and all three proxies for industrial competition (HHI, INDUSTRY LI and NUMB), albeit only the HHI coefficient is statistically significant. Accrual earnings management declines as industry concentration goes up, consistent with the view that firms in industries with higher market power have less demand for accrual earnings management because they have less variable cash flows due to their ability to pass input cost shocks to their customers (Datta et al., 2013). In other words, industrial competition appears to exacerbate accrual-based earnings management by firms. This result suggests that managers of companies in highly competitive industries, threatened by heightened career concerns and facing a constant

**Table 1**

Descriptive statistics. The table presents the mean (median in second row) values of variables for each country used in the study including A\_EM, R\_EM, SIZE, GROWTH, LEV, D\_STR, I\_OWN, HHI, Industry LI, and NUMB. N denotes the number of firm-year observations.

Country	A_EM	R_EM	SIZE	GROWTH	LEV	D_STR	I_OWN	HHI	Ind. LI	NUMB	N
Australia	0.505	0.510	10.175	0.094	0.399	0.678	0.394	-7.422	-0.033	0.017	6386
	0.501	0.490	10.388	0.071	0.397	0.722	0.358	-7.226	0.027	0.018	
Belgium	0.516	0.508	12.444	0.041	0.569	0.616	0.157	-8.137	0.050	0.089	493
	0.520	0.489	12.591	0.034	0.578	0.646	0.084	-8.079	0.044	0.091	
Brazil	0.500	0.504	13.758	0.060	0.582	0.458	0.212	-7.421	0.086	0.046	745
	0.495	0.496	13.807	0.083	0.586	0.451	0.136	-7.269	0.073	0.040	
Canada	0.506	0.505	10.873	0.110	0.432	0.572	0.070	-7.107	0.030	0.017	6022
	0.507	0.496	11.133	0.071	0.426	0.567	0.000	-7.144	0.048	0.015	
Chile	0.512	0.508	9.984	0.060	0.466	0.455	0.560	-7.667	0.105	0.058	821
	0.509	0.508	10.251	0.085	0.471	0.434	0.631	-7.636	0.083	0.063	
China	0.506	0.499	12.437	0.140	0.496	0.785	0.199	-7.040	0.077	0.024	5241
	0.508	0.493	12.239	0.130	0.499	0.837	0.122	-7.084	0.064	0.015	
Cyprus	0.494	0.472	10.605	-0.092	0.487	0.457	0.053	-9.112	0.019	0.075	67
	0.547	0.497	10.308	-0.033	0.459	0.386	0.000	-9.112	0.014	0.067	
Denmark	0.521	0.526	11.946	0.044	0.517	0.612	0.206	-8.225	0.058	0.075	358
	0.524	0.492	11.922	0.061	0.533	0.587	0.150	-7.973	0.052	0.067	
Egypt	0.504	0.509	10.751	0.101	0.416	0.777	0.173	-6.371	0.131	0.013	1132
	0.511	0.497	10.780	0.099	0.408	0.868	0.010	-6.396	0.136	0.011	
Finland	0.509	0.514	12.860	0.031	0.547	0.636	0.274	-7.812	0.046	0.060	816
	0.512	0.494	12.780	0.039	0.565	0.655	0.201	-7.372	0.049	0.056	
France	0.503	0.513	12.651	0.064	0.592	0.687	0.211	-6.298	0.055	0.006	4243
	0.501	0.500	12.363	0.052	0.605	0.714	0.108	-6.306	0.052	0.003	
Germany	0.503	0.505	12.744	0.054	0.549	0.584	0.117	-6.059	0.034	0.004	3181
	0.506	0.495	12.523	0.053	0.569	0.577	0.050	-6.104	0.035	0.003	
Greece	0.502	0.507	11.398	-0.009	0.591	0.620	0.070	-6.569	0.021	0.007	1622
	0.511	0.495	11.247	0.012	0.612	0.631	0.000	-6.519	0.020	0.007	
India	0.501	0.501	10.429	0.095	0.533	0.591	0.158	-6.433	0.064	0.008	16,882
	0.508	0.498	10.613	0.111	0.566	0.602	0.074	-6.155	0.061	0.004	
Indonesia	0.505	0.503	9.827	0.104	0.521	0.635	0.163	-6.245	0.068	0.005	2381
	0.508	0.496	10.927	0.103	0.533	0.664	0.000	-6.237	0.073	0.005	
Ireland	0.513	0.512	14.153	0.082	0.535	0.556	0.144	-6.767	0.067	0.030	438
	0.518	0.509	14.571	0.081	0.539	0.479	0.094	-6.688	0.057	0.026	
Israel	0.511	0.510	10.615	0.071	0.547	0.652	0.136	-6.200	0.054	0.006	2396
	0.512	0.531	10.741	0.065	0.568	0.691	0.057	-6.193	0.053	0.005	
Italy	0.508	0.503	12.924	-0.014	0.618	0.607	0.244	-7.279	0.038	0.009	231
	0.525	0.507	12.869	0.028	0.615	0.637	0.100	-7.132	0.035	0.008	
Japan	0.500	0.501	15.313	0.037	0.567	0.652	0.264	-5.910	0.048	0.023	5093
	0.511	0.484	15.098	0.038	0.573	0.661	0.249	-5.837	0.042	0.016	
Kenya	0.533	0.527	11.578	0.086	0.486	0.615	0.260	-7.151	0.106	0.050	242
	0.552	0.499	11.500	0.089	0.467	0.626	0.214	-7.097	0.128	0.043	
Kuwait	0.503	0.496	11.469	0.082	0.424	0.696	0.169	-8.226	0.055	0.068	311
	0.512	0.482	11.265	0.061	0.378	0.754	0.060	-8.346	0.042	0.053	
Luxembourg	0.522	0.536	13.790	0.073	0.541	0.485	0.222	-8.431	0.138	0.050	241
	0.529	0.518	13.729	0.061	0.557	0.449	0.034	-8.448	0.138	0.045	

  

Country	A_EM	R_EM	SIZE	GRW	LEV	D_STR	I_OWN	HHI	Ind. LI	NUMB	N
Malaysia	0.507	0.502	10.814	0.057	0.394	0.711	0.096	-6.479	0.057	0.016	7733
	0.508	0.505	10.752	0.054	0.384	0.758	0.000	-6.212	0.057	0.010	
Netherlands	0.493	0.509	13.136	0.076	0.553	0.680	0.215	-7.542	0.043	0.056	431
	0.500	0.487	13.698	0.052	0.564	0.709	0.150	-7.452	0.042	0.053	
Nigeria	0.550	0.518	11.005	0.083	0.553	0.695	0.112	-7.806	0.125	0.082	281
	0.549	0.518	10.939	0.086	0.557	0.729	0.000	-7.506	0.123	0.083	
Norway	0.505	0.508	11.716	0.114	0.553	0.528	0.374	-7.888	0.052	0.015	839
	0.516	0.483	11.873	0.079	0.587	0.472	0.322	-7.866	0.044	0.014	
Pakistan	0.507	0.507	10.888	0.115	0.575	0.689	0.057	-5.751	0.080	0.009	2074
	0.510	0.496	10.710	0.117	0.600	0.704	0.000	-5.588	0.081	0.006	
Poland	0.467	0.485	12.240	0.046	0.484	0.724	0.261	-7.756	0.048	0.078	167
	0.476	0.454	12.388	0.053	0.472	0.803	0.105	-7.826	0.048	0.071	
Russia	0.503	0.495	13.042	0.093	0.537	0.641	0.224	-7.562	0.062	0.042	1005
	0.508	0.475	12.913	0.098	0.539	0.627	0.051	-7.405	0.048	0.034	
Singapore	0.503	0.502	11.311	0.048	0.444	0.764	0.296	-8.182	0.044	0.022	4756
	0.503	0.498	11.144	0.049	0.448	0.829	0.217	-8.338	0.043	0.015	
South Africa	0.505	0.507	12.530	0.094	0.499	0.664	0.395	-7.133	0.065	0.042	1250
	0.507	0.499	12.725	0.103	0.492	0.701	0.409	-7.067	0.064	0.042	
Spain	0.531	0.567	12.664	-0.010	0.550	0.567	0.293	-7.275	0.056	0.071	28
	0.566	0.557	13.160	-0.010	0.547	0.598	0.309	-7.313	0.061	0.067	
Sweden	0.497	0.508	11.489	0.100	0.493	0.696	0.268	-7.796	0.032	0.033	1901
	0.496	0.493	11.639	0.077	0.525	0.731	0.260	-7.860	0.047	0.028	
Switzerland	0.505	0.510	13.179	0.032	0.469	0.625	0.235	-7.817	0.070	0.058	1078
	0.515	0.507	12.981	0.025	0.468	0.638	0.183	-7.638	0.063	0.056	
Taiwan	0.505	0.507	15.292	0.031	0.436	0.738	0.082	-7.540	0.052	0.036	1886

(continued on next page)

Table 1 (continued)

Country	A_EM	R_EM	SIZE	GRW	LEV	D_STR	I_OWN	HHI	Ind. LI	NUMB	N
Thailand	0.506	0.503	15.233	0.037	0.434	0.807	0.045	-7.477	0.050	0.029	4557
	0.502	0.504	11.129	0.063	0.436	0.739	0.070	-7.344	0.058	0.024	
	0.508	0.498	11.033	0.062	0.442	0.804	0.000	-7.330	0.050	0.015	
Turkey	0.512	0.497	12.092	0.084	0.451	0.700	0.120	-7.232	0.054	0.039	1329
	0.511	0.502	12.026	0.096	0.441	0.731	0.000	-6.955	0.053	0.029	
U.A.E	0.531	0.509	12.081	0.075	0.338	0.653	0.189	-7.456	0.111	0.088	170
	0.547	0.477	12.035	0.053	0.276	0.689	0.169	-7.395	0.111	0.083	
U. K.	0.498	0.511	11.995	0.080	0.488	0.641	0.223	-6.960	0.053	0.016	6982
	0.501	0.490	12.021	0.061	0.493	0.653	0.187	-6.863	0.059	0.014	
U.S.A.	0.502	0.500	12.202	0.109	0.479	0.568	0.119	-6.037	0.048	0.005	42,439
	0.504	0.510	12.428	0.076	0.484	0.553	0.081	-6.080	0.057	0.004	
Vietnam	0.504	0.500	9.893	0.098	0.496	0.818	0.042	-6.386	0.065	0.029	1658
	0.504	0.485	9.867	0.108	0.530	0.916	0.000	-6.323	0.065	0.021	
Total	0.503	0.503	11.750	0.088	0.488	0.632	0.165	-6.607	0.050	0.015	139,906
	0.506	0.500	11.749	0.073	0.498	0.660	0.095	-6.397	0.055	0.008	

pressure to match or beat the earnings performance of their industry peers tend to engage in higher levels of accrual earnings management (DeFond & Park, 1999; Hermalin & Weisbach, 2012). Alternatively, firms in industries with higher competition are opting for more earnings management to avoid the revelation of strategic information to competitors (Datta et al., 2013; Gertner et al., 1988; Verrecchia, 1983). The results have modest economic significance as well. A one standard deviation increase in HHI leads to a 0.7% decrease in the scaled rank of the median ranked firm.

Table 4 presents the results from models estimating overall real earnings management (R\_EM) as a function of overall accrual earnings management proxy (A\_EM), the research variables (I\_OWN and HHI, INDUSTRY LI, or NUMB), a set of firm control variables, and industry and country indicator variables. Like Table 3, Table 4 has 3 columns, one for each alternative proxy of product market competition. The first column present results using HHI as proxy for product market competition and the second and third columns respectively present results using the industry median price-cost margin (INDUSTRY LI) and the inverse of number of firms in an industry (NUMB), as alternative proxies for product market competition. All the models are well specified and the control variables have signs and significances generally comparable to findings in prior research.

Real and accrual earnings management are significantly negatively associated; firms appear to use real and accrual earnings management as substitute mechanisms to mask economic performance. Smaller, higher growth, higher leverage firms and firms with higher proportion of current liabilities appear to use real operating decisions more in managing earnings. Institutional ownership (I\_OWN) is not significantly associated with real earnings management; institutional ownership seems to have no impact on real earnings management by firms.

We find a significant positive association between real earnings

Table 3

Institutional ownership, product market competition & accrual-based earnings management. The table presents results of 3SLS [SUR] regression estimates for the overall measure of accrual-based earnings management (A\_EM) on institutional ownership (I\_OWN) and the different proxies of product market competition (HHI, Industry LI, or NUMB) along with all the control variables. All variables are winsorized at 1% at each end. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with \*, \*\*, and \*\*\*, respectively.

	Model_1	Model_2	Model_3
R_EM	-0.010 (3.16)***	-0.010 (3.26)***	-0.010 (3.33)***
SIZE	0.001 (2.61)***	0.001 (2.66)***	0.001 (2.61)***
GROWTH	-0.010 (6.97)***	-0.010 (6.89)***	-0.010 (6.97)***
LEV	-0.102 (32.75)***	-0.103 (32.80)***	-0.103 (32.80)***
D_STR	-0.074 (28.23)***	-0.074 (28.25)***	-0.074 (28.22)***
I_OWN	0.035 (10.42)***	0.035 (10.51)***	0.035 (10.52)***
HHI	-0.004 (3.00)***		
INDUSTRY LI		-0.014 (1.22)	
NUMB			-0.049 (0.83)
Constant	0.542 (52.04)***	0.568 (109.38)***	0.569 (109.01)***
Industry dummy	Included	Included	Included
Country dummy	Included	Included	Included
N	139,879	139,879	139,879
chi-sq.	2977.43***	2969.74***	2968.91***

Table 2

Correlation matrix. The table presents correlation coefficients between variables. Correlation coefficients that are significantly different from zero at the 1%, 5%, and 10% level are marked with \*\*\*, \*\*, and \*, respectively.

	A_EM	R_EM	SIZE	GROWTH	LEV	D_STR	I_OWN	HHI	Ind. LI	NUMB
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
[1]	1.000									
[2]	-0.013*	1.000								
[3]	-0.015*	-0.059*	1.000							
[4]	-0.018*	0.052*	0.064*	1.000						
[5]	-0.077*	-0.005*	0.317*	0.022*	1.000					
[6]	-0.049*	0.084*	-0.235*	-0.012*	-0.319*	1.000				
[7]	0.026*	-0.011*	0.098*	0.006*	0.034*	-0.027*	1.000			
[8]	-0.021*	0.000	0.064*	0.012*	0.079*	-0.101*	-0.153*	1.000		
[9]	-0.018*	0.049*	0.136*	0.040*	0.112*	-0.091*	-0.041*	0.108*	1.000	
[10]	0.012*	-0.002	0.070*	-0.018*	-0.015*	0.054*	0.111*	-0.573*	0.057*	1.000



**Table 4**

Institutional ownership, product market competition and real earnings manipulations. The table presents results of 3SLS [SUR] regression estimates for the overall measure of real earnings manipulations (REM) on institutional ownership (I\_OWN) and the different proxies of product market competition (HHI, Industry LI, or NUMB) along with all the control variables. All variables are winsorized at 1% at each end. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with \*, \*\*, and \*\*\*, respectively.

	Model_1	Model_2	Model_3
A_EM	−0.007 (3.16)***	−0.008 (3.26)***	−0.008 (3.33)***
SIZE	−0.006 (25.25)***	−0.006 (25.67)***	−0.006 (25.01)***
GROWTH	0.029 (22.73)***	0.029 (22.21)***	0.029 (22.73)***
LEV	0.032 (11.88)***	0.033 (12.21)***	0.033 (12.04)***
D_STR	0.083 (36.71)***	0.084 (36.98)***	0.083 (36.56)***
I_OWN	0.001 (0.31)	−0.001 (0.18)	−0.000 (0.08)
HHI	0.019 (17.13)***		
INDUSTRY LI		0.095 (9.50)***	
NUMB			−0.735 (14.50)***
Constant	0.615 (68.87)***	0.485 (107.85)***	0.490 (108.47)***
Industry dummy	Included	Included	Included
Country dummy	Included	Included	Included
N	139,879	139,879	139,879
chi-sq.	9306.57***	9090.35***	9218.09***

management and two of the three proxies for industry competition: industry concentration (HHI) and market power (INDUSTRY LI); only the third proxy, NUMB, is significantly negatively associated with real earnings management. The HHI and INDUSTRY LI results suggest that the opportunity to engage in earnings management at no or little consequence by firms in industries with stronger market power dominates the reduced demand for earnings management by such firms. Alternatively, industrial competition is an effective discipling mechanism in curbing real earnings management by firms. The exception, the positive association between product market competition and real earnings management when using NUMB, is perhaps due to NUMB capturing a different facet of industrial competition than the other two proxies. It also further underscores the importance of checking the robustness of empirical findings, using alternative proxies.

Our results are economically significant too; a one standard deviation increase in HHI, INDUSTRY LI and NUMB leads to a 3.5% increase, a 1.2% increase and a 2.8% decrease in R\_EM scaled rank of the median ranked firm, respectively.

#### 4.3. Additional analyses

In Table 5, we present the results from the accrual and real earnings management models estimated by subsample, U.S.A. vis-a-vis other countries in the world, to address concerns that the results may be primarily driven by USA firms. The results from the two subsamples are generally similar. The only exceptions are: (1) the sign of the coefficient of SIZE variable switches from positive for the entire sample and the rest of the world to negative for USA in the accrual earnings management models; (2) more importantly, the negative association we find between accrual and real earnings management in the overall sample

persists only for the non-U.S. subsample. While we observe complementarity between accrual and real earnings management among U.S firms, accrual and real earnings management appear to be substitute mechanisms to mask economic performance in the overall sample and the rest of the world subsample.

#### 4.4. Robustness checks

We test the robustness of the results to using alternative econometric procedures, including pooled OLS, random effects, fixed effects, and system GMM. The results, not tabulated, are qualitatively the same as the reported results, using a three-stage least square (3SLS) with the seemingly unrelated regression option.

## 5. Conclusions

Using a broad dataset drawn from 41 countries, we investigate the role institutional ownership and product market competition play in curbing earnings management (both accrual and real). Overall all, we document an asymmetry in the role institutional ownership and product market competition play in curbing accrual vis-à-vis real earnings management.

We find no statistically significant association between real earnings management and percentage of institutional ownership. In sync with predictions that institutional investors tend to focus on short-term profit goals, and thus, pressure managers to engage in earnings management, we find a positive significant association between accrual earnings management and percentage of institutional ownership; firms with higher percentage of institutional ownership use the financial reporting system (i.e., accrual earnings management) to obfuscate economic performance.

We also find that product market competition is significantly positively associated with accrual earnings management, when we proxy industry competition by HHI. Though positive, the association between accrual earnings management and product market competition is not statistically significant for the other two proxies of product market competition - INDUSTRY LI and NUMB. These results are consistent with the view that firms in industries with higher competition opt for more earnings management to avoid the revelation of strategic information to competitors. Alternatively, it's consistent with the view that managers of companies in highly competitive industries, threatened by heightened career concerns and facing a constant pressure to match or beat the earnings performance of their industry peers appear to engage in higher levels of accrual earnings management.

Lastly, we document a positive significant association between real earnings management and two of the three proxies for product market competition: HHI and INDUSTRY LI. The third proxy (NUMB), however, is significantly negative. Broadly, the results suggest that, despite the lower demand for earnings management, firms in less competitive industries appear to engage in higher levels of real earnings management perhaps due to the weak discipling environment in such industries. Stated differently, industrial competition appears to be an effective discipling mechanism in curbing real earnings management by firms. The exception, the positive association between product market competition and real earnings management when using NUMB, is perhaps due to NUMB capturing a different facet of industrial competition than the other two proxies. It also further underscores the importance of checking the robustness of empirical findings, using alternative proxies.

**Table 5**  
Institutional ownership, product market competition & earnings manipulations.

Panel A: The table presents a comparison of 3SLS [SUR] regression estimates, by subsample, for A\_EM on institutional ownership (I\_OWN) and the different proxies of product market competition (HHI, Industry LI, or NUMB) along with all the control variables. All variables are winsorized at 1% at each end. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with \*, \*\*, and \*\*\*, respectively.

	U.S. subsample			Non-U.S. subsample		
	Model_1	Model_2	Model_3	Model_1	Model_2	Model_3
R_EM	0.078 (11.81)***	0.079 (11.86)***	0.078 (11.76)***	−0.040 (10.86)***	−0.041 (10.96)***	−0.041 (10.97)***
SIZE	−0.003 (5.54)***	−0.003 (5.51)***	−0.003 (5.61)***	0.003 (8.30)***	0.003 (8.29)***	0.003 (8.32)***
GROWTH	−0.012 (4.17)***	−0.011 (3.83)***	−0.012 (4.15)***	−0.010 (5.72)***	−0.010 (5.73)***	−0.010 (5.72)***
LEV	−0.040 (7.00)***	−0.041 (7.01)***	−0.040 (6.98)***	−0.127 (33.76)***	−0.127 (33.80)***	−0.127 (33.81)***
D_STR	−0.051 (10.28)***	−0.051 (10.33)***	−0.051 (10.28)***	−0.087 (27.52)***	−0.087 (27.48)***	−0.087 (27.51)***
I_OWN	0.022 (2.69)***	0.022 (2.69)***	0.022 (2.69)***	0.034 (9.23)***	0.035 (9.29)***	0.035 (9.30)***
HHI	−0.010 (2.21)**			−0.002 (1.72)*		
INDUSTRY LI		−0.118 (3.32)***			0.004 (0.28)	
NUMB			0.030 (0.07)			−0.049 (0.79)
Constant	0.481 (19.08)***	0.540 (60.28)***	0.533 (60.34)***	0.566 (48.28)***	0.584 (99.47)***	0.584 (99.36)***
Industry dummy	Included	Included	Included	Included	Included	Included
Country dummy	Not included	Not included	Not included	Included	Included	Included
N	42,438	42,438	42,438	97,441	97,441	97,441
chi-sq.	931.38***	937.62***	926.39***	2638.27***	2635.30***	2635.86***

Panel B: The table presents a comparison of 3SLS [SUR] regression estimates, by subsample, for R\_EM on institutional ownership (I\_OWN) and the different proxies of product market competition (HHI, Industry LI, or NUMB) along with all the control variables. All variables are winsorized at 1% at each end. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with \*, \*\*, and \*\*\*, respectively.

	U.S. subsample			Non-U.S. subsample		
	Model_1	Model_2	Model_3	Model_1	Model_2	Model_3
A_EM	0.042 (11.81)***	0.042 (11.86)***	0.042 (11.76)***	−0.030 (10.86)***	−0.030 (10.96)***	−0.030 (10.97)***
SIZE	−0.002 (6.48)***	−0.002 (6.50)***	−0.002 (6.28)***	−0.007 (22.96)***	−0.007 (23.14)***	−0.007 (23.11)***
GROWTH	0.003 (1.22)	0.001 (0.51)	0.002 (1.16)	0.039 (25.76)***	0.040 (25.75)***	0.040 (25.83)***
LEV	0.025 (5.91)***	0.025 (5.93)***	0.025 (5.87)***	0.037 (11.33)***	0.038 (11.73)***	0.038 (11.73)***
D_STR	0.159 (44.68)***	0.159 (44.79)***	0.159 (44.71)***	0.066 (24.18)***	0.066 (23.95)***	0.065 (23.77)***
I_OWN	−0.009 (1.55)	−0.009 (1.56)	−0.009 (1.56)	0.006 (2.02)**	0.005 (1.56)	0.005 (1.63)
HHI	0.020 (5.96)***			0.019 (15.28)***		
INDUSTRY LI		0.183 (7.08)***			0.009 (0.80)	
NUMB			0.071 (0.23)			−0.346 (6.39)***
Constant	0.385 (20.91)***	0.271 (40.49)***	0.282 (42.79)***	0.677 (67.63)***	0.545 (108.34)***	0.547 (108.69)***
Industry dummy	Included	Included	Included	Included	Included	Included
Country dummy	Not included	Not included	Not included	Included	Included	Included
N	42,438	42,438	42,438	97,441	97,441	97,441
chi-sq.	26,084.79***	26,108.36***	26,027.50***	3433.56***	3193.08***	3234.63***

Appendix I. Variable definitions

No.	Label	Definition	Source
Panel A: dependent variables			
1.	<i>A_EM1</i>	The ratio of the standard deviation of ‘EBIT’ to that of ‘net cash flow from operating activities’ both scaled by <i>lagged</i> total assets.	Company financials.
2.	<i>A_EM2</i>	The Spearman correlation between the change in ‘accruals’ and the change in ‘net operating cash flows’ both scaled by <i>lagged</i> total assets. Following Leuz et al. (2003), we compute accruals using the formula below: $Accruals = (\Delta CA_{i,t} - \Delta Cash_{i,t})c - (\Delta CL_{i,t} - \Delta STD_{i,t} - \Delta TP_{i,t}) - Dep_{i,t}$ where $\Delta CA_{i,t}$ = change in total current assets, $\Delta Cash_{i,t}$ = change in cash or cash equivalents, $\Delta CL_{i,t}$ = change in total current liabilities, $\Delta STD_{i,t}$ = change in ‘loans’ included in current liabilities, $\Delta TP_{i,t}$ = change in income taxes payable, and $Dep_{i,t}$ = depreciation and amortization expense for firm <i>i</i> in year <i>t</i> .	Company financials
3.	<i>A_EM3</i>	The ratio of the absolute value of ‘accruals’ (see above) to the absolute value of ‘net operating cash flows’.	Company financials.
4.	<i>A_EM</i>	Following Leuz et al. (2003), we construct an overall summary measure of accruals-based earnings management for each firm. For each of the three earnings management measures, firms in a country are ranked each year such that a higher score suggests a higher level of earnings management. Next, we scale rankings based on each measure by the number of observations in each country, each year. We then compute the composite score by averaging the scaled firm rankings for each of the three individual measures of accrual-based earnings management.	Company financials
5.	<i>R_EM1</i>	This variable is computed ‘net operating cash flow’ minus the ‘estimated net operating cash flow’ for each firm (each year). We estimate the ‘net operating cash flow’ using the following model regressed for each industry: $\frac{CFO_{i,t}}{Assets_{i,t-1}} = \beta_1 \frac{1}{Assets_{i,t-1}} + \beta_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \epsilon_{i,t}$ where $CFO_{i,t}$ refers to ‘net operating cash flows’, $Assets_{i,t-1}$ refers to one period lagged value of ‘total assets’ of a firm, $Sales_{i,t}$ refers to the total ‘sales’ value of a firm at time <i>t</i> .	Company financials.
6.	<i>R_EM2</i>	We first estimate ‘production costs’ using the following model regressed for each industry: $\frac{PROD_{i,t}}{Assets_{i,t-1}} = \beta_1 \frac{1}{Assets_{i,t-1}} + \beta_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \beta_4 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \epsilon_{i,t}$ where $PROD_{i,t}$ refers to the sum of ‘cost of goods sold’ and change in ‘stocks’. Then, <i>R_EM2</i> is computed by the difference between the estimated value of ‘production costs’ from the sum of ‘cost of goods sold’ and change in ‘stock’ for each firm.	Company financials.
7.	<i>R_EM3</i>	We first estimate ‘discretionary expenses’ using the following model regressed for each industry: $\frac{DISX_{i,t}}{Assets_{i,t-1}} = \beta_1 \frac{1}{Assets_{i,t-1}} + \beta_2 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \epsilon_{i,t}$ where $DISX_{i,t}$ refers to ‘other operating items’ expense in the income statement. Then, <i>R_EM3</i> is set equal to the difference between the estimated value of ‘discretionary expense’ and the value of ‘other operating items’ expense.	Company financials.
8.	<i>R_EM</i>	We construct an overall summary measure of real earnings management for each firm. For each of the three real earnings management measures, firms in a country are ranked each year such that a higher score suggests a higher level of earnings management. Next, we scale rankings based on each measure by the number of observations in each country, each year. We then compute the composite score by averaging the scaled firm rankings for each of the three individual measures of real earnings management.	Company financials
Panel B: independent variables			
1.	<i>SIZE</i>	We first compute the dollar value of sales by multiplying sales revenue by year-end dollar exchange rate. Then, we compute the natural logarithm of the dollarized sales.	Company financials.
2.	<i>GROWTH</i>	The first difference of the natural logarithm of sales.	Company financials.
3.	<i>LEV</i>	The ratio of “total liabilities” to “total assets”.	Company financials.
4.	<i>D_STR</i>	The ratio of “total current liabilities” to “total liabilities”.	Company financials.
5.	<i>I_OWN</i>	The percentage of direct shares owned by institutional shareholders. We consider a shareholder as institutional shareholder if the shareholder “type” as reported in the OSIRIS database is F(financial company), A (insurance company), B (banks), E (mutual and pension fund/nominee/trust/trustee), P (private equity firm), or V (venture capital), Y (hedge fund).	Company financials.
6.	<i>HH Index</i>	The natural logarithm of Herfindahl index of sales revenue. That is, natural logarithm of the sum of the squares of percentage of sales revenue generated by each firm in an industry (for each year).	Company financials.

7. <b>Industry Lerner Index (Industry LI)</b>	Computed as the industry median price–cost margin to capture industry competitiveness. Thus, we compute the price–cost–margin for each company (each year) using the formula below and take the median value for each industry (each year).	Company financials.
	$LI = \frac{\text{Sales} - \text{CoGs} - \text{SG} \& \text{A}}{\text{Sales}}$	
8. <b>Number of firms in industry (NUMB)</b>	We compute the inverse of number of firms in an industry each year (1/n) as an alternative proxy for industry competitiveness.	Company financials.

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