

# Managers' Perception of Product Market Competition and Earnings Management: A Textual Analysis of Firms' 10K Reports

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## ABSTRACT

### **Purpose**

In this study we examine the effect of managers' perception of product market competition on accruals and real earnings management.

### **Design/methodology/approach**

We develop a new text-based measure of the emphasis managers place on product market competition by conducting a textual analysis of firms' 10-K filings. Using this measure, we conduct a battery of econometric analyses and robustness checks to investigate the impact of this measure of product market competition on measures of accruals and real earnings management.

### **Findings**

We find robust evidence that when management perceives more competitive threats, they are more likely to engage in accruals-based earnings manipulation but are less likely to engage in real earnings management activity. We argue that these findings are due to managers' career concerns enticing them to manage earnings via accrual when competition is high, but that greater product market competition discourages real earning management activity as it can diminish firms' competitiveness.

### **Implications**

The findings of this paper have important policy and practical implications since it signals that managers' perceptions of product market competition is able to affect accounting choices, information environments, and economic outcomes in firms.

### **Originality/value**

We develop a new text-based measure of managers' perception of product market competition with the aid of GPT-4. We then using this measure provide firm-level evidence on how this relates to earnings management.

*Keywords:* Accrual earnings management; Earnings management; Product market competition; Real earnings management.

JEL classifications: G30; G14; M41

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## 1 INTRODUCTION

Earnings manipulation has long been at the center of discussions among standard-setters, regulators, and researchers globally (see e.g., Healy, 1985; Burgstahler and Dichev, 1997; Healy and Wahlen, 1999; Bergstresser and Philippon, 2006; Kothari et al., 2015; Luippold et al., 2015; Francis et al., 2016; Shi et al., 2018; Lemma et al., 2018; Chang et al., 2019; Fan et al., 2019; Yung and Root 2019; El Diri et al., 2020; Jiang et al., 2020; Lara et al., 2020; Bertomeu et al., 2021; Barbar and Habib, 2021; Habib et al., 2022; Hasan et al., 2022; Harris, 2018, 2023; among others). This is in part due to the suggestion that the deliberate misrepresentation of reported financial performance results in earnings reflecting the desires of management as opposed to the financial performance of the firm and the danger this poses for the investing public. Undoubtedly, when earnings are being managed, managers actively plan the timing of revenues (gains) and expenses (losses) to smooth out bumps in earnings and this can lead to a misallocation of economic resources (Burgstahler and Dichev, 1997).

Over time, much of the earnings management literature has suggested that the greatest cause of earnings manipulation is the self-interest motivation of managers to achieve targets specified in their compensation contracts (Healy, 1985; Healy and Wahlen, 1999; Bergstresser and Philippon, 2006). This strand of literature foregrounds the role of individual managerial motives, particularly emphasizing the pursuit of personal gains through the adjustment of financial reports.

In this paper, we delve into whether managements' perception of product market competition serves to discipline their proclivity to engage in earnings manipulation or exacerbates it. Prior work suggest that product market competition can be an efficient disciplinary and monitoring mechanism that helps to curtail agency problems (see, e.g., Alchian, 1950; Friedman, 1953; Stigler, 1958; Leibenstein, 1966,

Machlup, 1967; Hart, 1983; Baiman, 1990; Shleifer and Vishny, 1997; Balakrishnan and Cohen, 2013; among others). Following this logic, a heightened perception of product market competition among managers should ideally curtail tendencies towards opportunistic earnings management, thus fostering a better alignment of managers' interests with those of shareholders. Thus, if earnings management is indeed driven by managerial opportunism (see, e.g., Healy and Wahlen, 1999), and if increase competition serves to discipline management, then an increase in managers' perception of product market competition should result in a decrease in earnings manipulation (see e.g., Laksmana and Yang, 2014).

Conversely, if earnings management is not driven by managerial opportunism but rather efficient contracting and/or managers' need to reveal information concerning the future cash flows of firms (i.e., information perspective), then increases in the perception of product market competition should not materially impact earnings management behavior (see, e.g., Healy and Wahlen, 1999). Moreover, if product market competition does not function to discipline management, then there is no reason to expect a negative relation between managers' perception of the firms' competitive environment and earnings manipulation.

What is more, it has been contended that escalating product market competition can compel managers to resort to earnings manipulation to mitigate risks associated with job termination, hostile takeovers, liquidation, or to alleviate the firm's contractual and financial restraints (e.g., Dechow et al., 1996; Teoh et al., 1998a, 1998b; Bergstresser and Philippon, 2006; Markari and Santalo, 2014; Lemma et al., 2018; Shi et al., 2018). If this is so, then we would expect to observe a positive relationship between product market competition and earnings management.

In this research, we meticulously construct our empirical strategy to scrutinize whether an augmentation in managers' perception of their firms' standing in the product market competition either mitigates or intensifies earnings management. Taking a cue from Li et al. (2013) and leveraging the profound statistical learning prowess of the GPT-4 language model — a tool highlighted for its effectiveness in text analysis in recent research (Harris, 2023) — we embark on the creation of a novel firm-level metric; namely, the “managers' perception of product market competition” based on textual analyses of firms' 10-K reports.

In so doing, we develop and propose an enriched “bag of words” for operationalizing product market competition and using this new word list, we determine at the firm-level managers' perception of product market competition for a large sample of US publicly listed non-financial firms for the years 1994 – 2021. This measure of managers' perception of product market competition is well suited to our analyses since it is likely to vary across firms in the same industry, relate to increases in firm-level output, and hence should reflect better-aligned interests between managers and shareholders. Armed with this measure, we can investigate whether and how managers' perception of product market competition relates to well-documented measures of earnings management that captures firms' tendency to engage in accruals and real earnings management activity.

We are motivated to undertake this research because the earnings management literature has tended to focus on compensation agreements ex ante giving rise to ex post earnings manipulation. We attempt to shed further light as to whether increased competition does indeed induce earnings management practices among firms. In addition, we attempt to reconcile some of the conflicting results regarding the nature of the relation between product market competition and earnings management (see, e.g.,

Balakrishnan and Cohen, 2013; Cheng et al., 2013; Datta et al., 2013; Lakshmana and Yang, 2014; Markarian and Santaló, 2014; Lemma et al., 2018; Shi et al., 2018; Babar and Habib, 2021; Hasan et al., 2022). Despite an extensive body of empirical work covering the topic, there is little convincing evidence concerning whether increase product market competition leads to managers engaging in earnings manipulation. What is more, some theorists have argued (See. e.g., Shleifer, 2004; Bagnoli and Watts, 2010) that competitive pressures could motivate managers to adopt more aggressive accounting practices and that this could be exacerbated if managers believe that rival companies are engaging in earnings manipulation. This should in fact lead to significant earnings management from all firms in the industry not less. Some have in fact argued that misreporting in competitive industries is indeed optimal to provide less useful information to current and future competitors (see, e.g., Verrecchia, 1983). On the other hand, others have relied on classical economic theory concerning the disciplinary effects of competition (see, e.g., Friedman, 1953), and game-theoretic arguments that misreporting could induce potential new market entrants (see, e.g., Darrough and Stoughton, 1990) to suggest that a negative relation between product market competition and earnings management should exist.

We add to the earnings management related accounting and finance literature by advancing in the following ways. Firstly, consistent with prior recent work in this area (see for example, Markarian and Santalo, 2014; Lemma et al., 2018; Shi et al., 2018; etc.), we argue that relative performance pressures propel managers to engage in discretionary accruals-based accounting manipulation when product market competition increases. We posit that managers are tempted to temporarily boost firm's earnings by employing more aggressive accounting practices to compete with rivals when the financial results of competitor firms are equally likely to be artificially

inflated. Specifically, we argue that the desire by managers to retain their positions when they perceive intensified product market competition and thereby declining profit margins (please see DeFond and Park, 1999) entices them to engage in earnings management via accruals manipulation. This view can be contrasted with the alternative perspective which suggests that when managers release financial information in a market that they perceive to be highly competitive, they should be incentivized to release undistorted reports. This can be argued to be the case since otherwise managers would run the risk that when existing market participants release their reports, then this will expose the distortion and/or that inflated financial results will encourage others to enter an already competitive market. This argument suggests that managers' perception of product market competition should serve to discipline financial reporting (please see e.g., Datta et al., 2013; Laksmana and Yang, 2014). However, this alternative point of view ignores the fact that without violating the generally accepted accounting principles (GAAP), managers can relatively easily and temporarily boost current period earnings by using accruals. Thus, there exists a latent potential for manipulation, even within the bounds of regulatory compliance.

Secondly, we argue that like with discretionary accruals, managers can manipulate real activities to influence reported earnings. For example, they can reduce the cost of goods sold through over-production and/or by cutting discretionary expenditures such as advertising expenses and research and development (R&D) expenses. We maintain, however, that when managers perceive product market competition to be high, real earnings management can be very costly for the firm and risky for managers. In this situation, managers may have incentives to use their judgment to manipulate accounting numbers and misrepresent firm performance. However, such choices involve taking operational decisions that would adversely affect

firms' competitive positions and long-term value. For instance, in competitive industries discretionary advertising and R&D expenses can be important investments to obtain and maintain firms' competitive positions. Similarly, over-production to reduce the cost of goods sold temporarily entails holding excessive level of inventory which represents a serious risk in competitive industries, due to increased risk of obsolescence.

Utilizing our novel metric, we furnish compelling evidence that managers' perception of product market competition is indeed positively related to accruals-based earnings management and negatively associated with real earnings management behavior. These finding suggests that product market competition increases the risk of earnings manipulation via accruals as managers seek to reduce the threats of dismissal but serves to reduce managers real earnings management behavior since such activity is not in the interest of managers or shareholders (see, e.g., Alchian, 1950; Friedman, 1953; among others). Additionally, based on analyses that control for firm specific characteristics and other potential confounds, our results provide a consistent picture wherein earnings management practices are largely prevalent among firms where managers perceive a less competitive product market environment. Hence, we conclude that when firms' management perceives that they face greater competitive threats, they exhibit much higher proclivity to engage in opportunistic earnings manipulation via accruals but are less likely to engage in real earnings manipulation.

What is more, our empirical approach is carefully crafted to tackle econometric problems, which often cloud the interpretation of results. For instance, we implement two-stage least squares (2SLS) instrumental variable regressions using firms' industry-year average product market competition and state-year average product market competition as instruments to further control for potential reverse-causality. In

addition, to preclude the possibility that our results suffer from a self-selection bias, we employ a Heckman two-stage self-selection model (Heckman, 1979). This rigorous approach not only safeguards against the potential biases but also underlines the consistency of our findings with our theorized expectations, hence instilling a heightened degree of confidence in the resultant outcomes which we find to be consistent with our expectations.

Thus, our empirical results allow us to provide a comprehensive depiction of the nature of the relationship between earnings manipulation and managers' perception of product market competition. Consistent with prior work in this area, we find that the level of competition perceived by the top management team and as highlighted in firms' 10-K filings provides a plausible explanation for earnings management practices. Furthermore, this is one of the first studies to investigate the influence of managers' perceptions of product market competition on earnings management behavior using firm-level data. Prior studies have considered the relationship between competition and earnings management; however, these works (except the recent paper by Shi et al., 2018) have used measures of a firms' product market environment that do not capture managers' perceptions of it at the firm level (e.g., the Herfindahl–Hirschman Index). We posit that this is a crucial dimension and helps to inform managerial behaviors. Hence, failure to account for managers' perception of the firms' competitive environment could explain some of the inconsistent results reported. Further, unlike Shi et al., (2018) who simply adopt the measure provided in Li et al.,'s (2013), we construct a new text-based measure that captures managers' perception of product market competition with the aid of GPT-4 and use this new measure in the empirical analysis. Our findings provide support to the idea that an increase in competition can exacerbate accruals-based earnings meanwhile diminishing real earnings management.



Hence, we can expand the economics-based accounting and finance literature, which investigates the impact of product market competition on policies and outcomes.

The remainder of this paper is presented as follows: Section 2 highlights details of the data and summary statistics; Sections 3 and 4 presents the empirical results and the robustness checks, respectively; and Section 5 concludes.

## **2 DATA**

### **2.1 Sample selection**

To investigate the impact of managers' perception of firms' product market competition on earnings management we build our sample by gathering information acquired from various public data sources. Firstly, we obtain from Standard and Poor's COMPUSTAT database annual firm-level accounting and market data pertaining to US publicly listed non-financial firms for the period 1994 – 2021. Secondly, to measure managers' perception of firm competitive environment, we obtain from the SEC's Edgar database firms' 10-K reports. Table 1 and 2 report the bag of words used to develop our new measure of managers' perception of product market competition and the definitions of all the main variables.

[Insert Table 1 and Table 2 Here]

### **2.2 Pre-processing**

Before commencing with the data analyses, we attempt to mitigate the effects of outliers by winsorizing all continuous variables at the 1% and 99% levels. Further, we attempt to limit survivorship bias by allowing firms that became inactive and/or that were acquired by another firm during the study period to be retained in the sample. In

addition, we delete all observations with missing data on the key variables of interest from our sample. Finally, all financial firms (SIC 6000 – 6999) and utilities (SIC 4900 – 4999) are removed from our sample. This pre-processing resulted in a main sample of 70,264 firm-year observations. Table 2 presents the descriptive statistics.

[Insert Table 3 Here]

### 2.3 Measuring managers' perception of product market competition

Using the 10-K reports obtained from the SEC's Edgar database, we develop a measure of managers' perception of product market competition by conducting a textual analysis on these documents. This approach permits the quantification of semantic content found in a body of text. In keeping with recent work, we assume that firms' documents (e.g., the 10-K reports) can reveal information concerning managers' perceptions regarding firms' competitive environment (Bushman et al. 2016; Li et al., 2013).

We determine managers' perception of firms' product market competition following the general approach in Li et al., (2013) and Bushman et al. (2016). In particular, we began with the product market competition words first found in Li et al., (2013); these words are namely, "competition", "competitor", "competitive", "compete", and "competitiveness". We then expand this initial list based on our own reasoning to identify competition-related terms related to manager's understanding of the firm's competition environment. Next, we prompt GPT-4 to update the expanded word lists to include additional keywords, word variants and associated synonyms meant that capture how managers view the competitive landscape and the firm's position within it. We follow this approach since recently published work suggests that recommendations from powerful large language models like ChatGPT and GPT-4 can

provide powerful statistical learning approaches for textual analysis (Harris, 2023). Furthermore, we prompt GPT-4 to identify and remove problematic words. GPT-4 flagged and removed problematic words based on two criteria—context and industry-specificity. The final bag of words is presented in Table 1.

Following the finalization of the wordlist, we convert each firm–year 10–K report into lower case so that capitalization is ignored. Next, we replace any URLs embedded in the document with the text “http”. URL normalization helps to ensure that our measure is not biased due to web addresses contained in the firms’ 10–K. Next, all non–words and punctuations are removed and all white spaces (e.g., tabs and newlines) are trimmed to a single space. Following this necessary preprocessing, we then produce our measure of managers’ perception of product market competition, *MPCOMP*, by counting the number of times the words provided in the bag of words (see Table 1) appears in a firm’s annual 10–K report. We account for negation by excluding those times when “not”, “less”, “few” or “limited” precede each word by three or fewer words. Finally, we then control for the length of the 10–K by scaling by the number of words in the report. Simply put, we compute our measure of product market competition as follows:

$$MPCOMP = \frac{\text{Total \# of competition words}}{\text{Total \# of words in firms' 10-K reports}} \quad (1)$$

Prior work suggests that textual analysis can be used to extract valuable information from firms’ reports (Li, 2010a, 2010b; Li et al., 2013; Fiordelisi and Ricci, 2014, 2021; Bushman et al., 2016; Loughran and McDonald 2016; Shi et al., 2018; Nguyen et al., 2019; Andreou et al., 2020, 2021; Luu et al., 2022; Harris, 2018, 2023; Abdelsalam *et al.*, 2023; Fang *et al.*, 2023; Cummings *et al.*, 2023; etc.). Hence, we

are convinced that our approach allows us to construct a relative measure of managers' perception of firms' competitive market environment.

We assess the construct validity of our measure by correlating it with Li et al.,'s (2013) text-based measure of product market competition.<sup>1</sup> We find a positive and significant (correlation = 0.70); thus, we are confident that our measure captures the intended construct.

#### 2.4 Measuring accruals earnings management

For our empirical analyses we adopt a discretionary accruals-based measure of earnings management. This approach to measuring earnings management has been widely accepted in empirical accounting and finance related literature (see, e.g., Dechow and Sloan, 1991; Jones, 1991; Dechow et al., 1995, 2012; Healy and Wahlen, 1999; Hribar and Collins, 2002; Filip and Raffournier, 2014; Ali and Zhang, 2015; Francis et al., 2016; Jiang et al., 2020; Lara et al., 2020; Habib et al., 2022). It is well known that in financial reporting accounting accruals depend on the accounting choices of managers and are essentially the difference between cash flows and reported earnings. To measure earnings management, we follow Hribar and Collin's (2002) approach and capture working capital accruals from data contained in the statement of cash flows. Following this, working capital accruals, *WCA*, is decompose into abnormal (i.e., discretionary) working capital accruals, *DWCA*, and normal (i.e., nondiscretionary) working capital accruals, *NWCA*, where abnormal working capital accruals cannot be explained from normal activities, while normal working capital

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<sup>1</sup> Li et al.,'s (2013) measure was obtained from: <http://webuser.bus.umich.edu/feng>

accruals are explained from the normal activities of the firm. As a result, managers can influence abnormal working capital accruals but are unable to influence normal working capital accruals. To estimate our measure of abnormal working capital accruals, we utilize the modified Jones model (Dechow et al., 1995), which we adjust to account for the influence of firm performance and growth (Kothari et al., 2005; Collins et al., 2017).

First, we compute  $WCA_t$  as:

$$WCA_t = (RECCH_t + INVCH_t + APALCH_t + TXACH_t + AOLOCH_t) / TA_{t-1}, \quad (2)$$

where,  $RECCT_t$  is firms' accounts receivable decrease (increase),  $INVCH_t$  denotes changes in inventory,  $APALCH_t$  represent increases (decreases) in accounts payable and accrued liabilities;  $TXACH_t$  denotes changes in income taxes accrued, while  $AOLOCH_t$  is net changes in firm's assets and liabilities. We estimate abnormal working capital accruals as the residuals from the following empirical model:

$$WCA_t = a_0 + a_1 \left( \frac{1}{TA_{t-1}} \right) + a_2 \frac{(\Delta REV_t - \Delta AR_t)}{TA_{t-1}} + a_3 \frac{(PPE_t)}{TA_{t-1}}, \\ + a_4 (ROA_t) + a_5 (SG_t) + \varepsilon_t \quad (3)$$

where, the variable,  $TA_{t-1}$ , is total assets at year  $t - 1$ ;  $\Delta REV_t$  represents changes in revenue in year  $t$ ;  $\Delta AR_t$  is equals to changes in accounts receivables in year  $t$ ,  $PPE_t$  firms' property, plant, and equipment in year  $t$ ,  $ROA_t$  firms' net income scaled by total assets in year  $t$ , and  $SG_t$  the current growth in sales.

## 2.5 Measuring real earnings management

First, we construct two main measures of real earnings management: namely, discretionary expenditures, and over- or under-production. As in Roychowdhury

(2006), we estimate abnormal production costs,  $APROD$ , and abnormal discretionary expenditures,  $ADEXP$ , as the residuals from the following models:

$$PROD_t = b_0 + b_1 \left( \frac{1}{TA_{t-1}} \right) + b_2 \frac{(REV_t)}{TA_{t-1}} + b_3 \frac{(\Delta REV_t)}{TA_{t-1}} + b_4 \frac{(\Delta REV_{t-1})}{TA_{t-1}} + \varepsilon_t, \quad (4)$$

and,

$$DEXP_t = c_0 + c_1 \left( \frac{1}{TA_{t-1}} \right) + c_2 \frac{(REV_{t-1})}{TA_{t-1}} + \varepsilon_t, \quad (5)$$

where the variable,  $PROD_t$ , is defined as the sum of costs of goods sold and the change in inventory scaled by total assets at year  $t - 1$ , while  $DEXP_t$ , is the sum of SG&A, R&D, and advertising scaled by total assets at year  $t - 1$ .

Finally, we add together our two measures of real earnings management to produce,  $REM$ .

## 2.6 Control variables

We select control variables for our empirical work based on the extant literature to capture firm-specific characteristics. In particular, we include the following measures. First, consistent with past works in this area (see e.g., Petersen and Rajan, 1997; Callen et al., 2008; Stubben 2010) which suggest that accruals are a function of a firm's stage in the business cycle, we control for the effect of firm age (as a proxy for firm's stage in the business cycle) on earnings management behavior by including the variable,  $AGE$ , which represents the number of years since the firm first appears in COMPUSTAT. Next, to control for the effects of the auditor on earnings management activity (please see Becker et al., 1998, Zang, 2012) we include  $BIG4$ , an indicator that is equal to one if firm is audited by one of the big4 accounting firms (i.e., Deloitte, PwC, Ernst & Young, and KPMG), and zero otherwise. Further, since it has been argued by Bowen et al., (1995) that negative earnings surprises can have negative

publicity effects, which can in turn negatively affect the impact of implicit claims between stakeholders and the firm, we include the variable *CLAIM*, proxied by labor intensity, calculated as one minus the ratio of gross property plant and equipment to total assets at the end of the fiscal year. We also include firm's annual dividend yield, *DIV\_YIELD* and financial leverage as indicated by total liabilities to total assets, *LEV* as they have been found to influence earnings management (Dechow et al., 2011, Hribar and Nichols, 2007). Following Francis et al., (1994), we control for litigious industries by including a dummy variable that captures whether the firm is in a high litigation industry, *LIT*. We include the variable *MODIFIED* which is an indicator is equal to one if firm's auditor issues a modified audit opinion, and zero otherwise, since prior work suggests that earnings management activity can be accepted by auditors modified opinion (Davidson III et al., 2006). Lee et al., (2006) find that firms with greater capital market pressure then to manipulate their earnings we include market value of equity to book value of equity *MTB*. Similarly, since Barton and Simkon (2002) find that firms with higher beginning of period net operating assets are less likely to manipulate earnings, we include net operating assets, *NOA*. Additionally, we control for sales growth, *SALES*, computed as sales for the fiscal year divided by sales for the prior fiscal year, since incentives to engage in earnings manipulation are usually higher for growth firms (Skinner and Sloan, 2002). Following Dechow and Dichev (2002), we control for the effect of firm size by including the natural logarithm of the market value of equity, *SIZE*. Finally, past studies have examined the relationship between earnings management behavior and firm's financial health (please see e.g., DeAngelo et al., 1994; DeFond and Jiambalo, 1994; Burgstahler and Dichev, 1997), hence we control for firm's level of financial distress by including Altman's (1968) bankruptcy measure *ZSCORE*.

## 2.7 Descriptive statistics and correlations

Table 3 highlights descriptive statistics for all variables used in our empirical analyses, where the mean of our earnings management variables *DWCA*, *REM*, *ADEXP*, and *APROD* are, -0.024, 0.245, 0.459 and -0.004, respectively. The mean value of our measure of managers' perception of product market competition, *MPCOMP* is 0.826. These summary statistics are comparable with those reported in previous studies that have used these data (Bowen et al., 1995; Barton and Simko, 2002; Dechow and Dichev, 2002; Skinner and Sloan, 2002; Cheng and Warfield, 2005; Roychowdhury, 2006; Kim and Sohn, 2013; Li et al., 2013; Filip and Raffournier, 2014; Ali and Zhang, 2015; Cheng et al., 2016; Shi et al., 2018; Fan et al., 2019; Lara et al., 2020; Rahman et al., 2021; Andreou et al., 2020, 2021; Harris, 2018, 2023).

In Table 4, the mean *MPCOMP* within each Fama and French (1997) 48 industry is reported, with Computers at the top, scoring 1.065 *MPCOMP* words per one thousand, and Precious Metals at the bottom, with 0.202. Also, we find that the Electronic Equipment, Medical Equipment, Business Services, and Pharmaceutical Products have the highest level of *MPCOMP*; meanwhile, the Shipping Containers, Coal, Non-Metallic and Industrial Metal Mining, Petroleum and Natural Gas, and Agriculture have the lowest. The industry ranking in terms of the level of market orientation is as expected, with more regulated industries ranked lower and industries featuring lower barriers to entry (and therefore intense competition) ranked highest. Table 4 shows that there is substantial variation in *MPCOMP* both across and within industries as indicated by the standard deviation, which is on average greater than half the industry mean value. We exploit both sources of variation in our analyses

[Insert Table 4 Here]



Table 5 presents Pearson correlation coefficients for the main variables used in the empirical analysis. Some of the more interesting correlation results include the relation between *DWCA* and *MPCOMP*, where we find, consistent with expectations, a positive and significant correlation (correlation = 0.004). Also, we find a negative and statistically significant correlation between *REM* and *MPCOMP* (correlation = -0.111), a negative and statistically significant correlation between *ADEXP* and *MPCOMP* (correlation = -0.116) and a negative and statistically significant correlation between *APROD* and *MPCOMP* (correlation = -0.073). These results are consistent with our expectations that managers' perception of firm's product market competition is positively related to accrual-based earnings management and negatively related to real earnings management activity.

[Insert Table 5 Here]

The correlation results suggest that, as far as the independent and control variables are concerned, there does not exist a high degree of correlation between them. Further, we assess the potential that multi-collinearity affects the empirical results by computing variance inflation factors (VIF) for all regression models. A VIF greater than 10 is indicative of multi-collinearity; however, in this study all VIF's are below 4. As a result, we have no multi-collinearity concerns when conducting our empirical analyses.

### 3 EMPIRICAL RESULTS

#### 3.1 Main results

We consider whether and how managers' perception of product market competition impacts upon earnings management as indicated by discretionary working capital accrual and real earnings management. Prior studies have documented mixed results concerning the relation between market intensity and earnings management (please see Babar and Habib, 2021); however, we argue that relative performance pressures increase managers propensity to opportunistically engage in discretionary accruals-based accounting manipulation when product market competition increases.

To empirically test this relationship, we estimate the following regression model:

$$\begin{aligned} DWCA_t = & \alpha_1 + \alpha_2 MPCOMP_t + \alpha_3 AGE_t + \alpha_4 BIG4_t + \alpha_5 CLAIM_t + \alpha_6 DIV\_YIELD_t \\ & + \alpha_7 LEV_t + \alpha_8 LIT_t + \alpha_9 MODIFIED_t + \alpha_{10} MTB_t + \alpha_{11} NOA_t \\ & + \alpha_{12} SALES_t + \alpha_{13} ZSCORE_t + \varepsilon_t, \end{aligned} \quad (6)$$

where we include control variables that capture firm-specific characteristics. These control variables are adopted to help ensure that the impact of our measure of product market competition, *MPCOMP*, on earnings management, *DWCA*, is not driven by other factors. In addition, we include year dummies to control for unobserved time-invariant year factors. The standard errors are corrected for firm clustering to control for potential bias in the estimates that occur when the residuals are correlated by firm.

The coefficient of interest is  $\alpha_2$ , and in the case of the relationship between managers' perception of product market competition and accruals earnings management, this coefficient is expected to be positive and significant in our empirical estimates. Results alternative to our expectations are possible; however, if  $\alpha_2$  is negative, or is positive but insignificant, the relationship between product market competition and earnings management is not as we predict. We find that the coefficient

term 0.019 on the *MPCOMP* variable, which is presented in Table 6 Panel A column (1), is significant at the 1 percent level with a *t*-value of 3.690.

In further tests, we consider whether and how managers' perception of product market competition relates to real earnings management activity. We argue that when firms' product market competition is high, real earnings management can become increasingly costly for the firm. Hence, we posit that relative performance pressures brought about by increases in managers' perception of product market competition decreases managers' inclination to attempt to manipulate earnings by reducing cost of goods sold through over-production and/or by cutting discretionary expenditures such as advertising expenses and research and development (R&D) expenses. Consequently, we argue that product market competition should be negatively related to real earnings management. To empirically test this relationship, we estimate the following regression model:

$$\begin{aligned}
 REAL_t = & \alpha_1 + \alpha_2 MPCOMP_t + \alpha_3 AGE_t + \alpha_4 BIG4_t + \alpha_5 CLAIM_t + \alpha_6 DIV\_YIELD_t \\
 & + \alpha_7 LEV_t + \alpha_8 LIT_t + \alpha_9 MODIFIED_t + \alpha_{10} MTB_t + \alpha_{11} NOA_t \\
 & + \alpha_{12} SALES_t + \alpha_{13} ZSCORE_t + \varepsilon_t,
 \end{aligned} \tag{7}$$

where the variable *REAL* represents *REM*, *ADEXP* and *APROD*. In our estimates of Eq. (7) the  $\alpha'_2$ s are the coefficient of interest which capture the relationship between product market competition and our measures of real earnings management, *REM*, *ADEXP*, and *APROD*. These coefficients are expected to be negative and significant in our empirical estimates.

Table 6 Panel A presents the results of our empirical estimation for the impact of product market competition on real earnings management. The results for our estimates for the effect of *MPCOMP* on *REM* are presented in column (2). Here we find the coefficient term on the *MPCOMP* variable -0.083 to be significant at the 1 percent level with a *t*-value of 8.990. Similarly, the empirical estimates of the model

presented for the impact of *MPCOMP* on *ADEXP* are shown in column (3). We find the coefficient term on the *MPCOMP* variable -0.077 to be significant at the 1 percent level with a *t*-value of 8.740. In column (4), we report the empirical estimates for the impact of *MPCOMP* on *APROD*; the coefficient term of interests on the *MPCOMP* variable is -0.061 and this is found to be significant at the 1 percent level with a *t*-value of 6.790.

Finally, in Table 6 Panel A columns (5) to (8) we repeat our estimates of Eq.'s (6) and (7) where we include year and industry dummies to control for unobserved time-invariant year and industry factors. The industry dummies are based on Fama and French's (1997) 48 industry classifications. We find results consistent with our prior findings.

Table 6 Panel B reports re-estimates of Eq.'s (6) and (7), where we substitute our measure of product market competition, *MPCOMP*, with the firms by industry-year decile rank of product market competition minus one, *MPCOMP\_RANK*. Likewise, Table 6 Panel C reports re-estimates of Eq.'s (6) and (7) where we replace our measure of product market competition, *MPCOMP*, with an indicator variable computed by industry-year that is equal to one if the firm has an above median level of product market competition, and zero otherwise, *MPCOMP\_HIGH*. These additional regression results strongly suggest that product market competition positively influences accruals-based earnings manipulation while negatively affecting firms' real earnings management activity.

[Insert Table 5 Here]

## 4 ROBUSTNESS TESTS AND SUPPLEMENTAL ANALYSES

Further to the main empirical work, we conduct additional analyses and robustness tests to assess the sensitivity of the results to our design choices. It is well known that endogenous relations complicate research in accounting and finance (Larcker and Rusticus, 2010; Wintoki et al., 2012); consequently, we utilize 2SLS instrumental variable regressions and a Heckman two-stage self-selection modelling approach to attempt to mitigate the potential that endogeneity affects our findings.

### 4.1 Instrumental variable regressions

In addition to the relationship that we describe, it is possible that the level of managers' perception of product market competition is influenced by past instances of accruals and/or real earnings management behavior; therefore, our measure of product market competition could be jointly determined with our measures of real and accruals-based earnings management and consequently our main results subject to potential simultaneity bias. We attempt to take this into consideration by estimating the following two-stage models to allow for potential endogeneity:

$$\begin{aligned} MPCOMP_t = & \delta_1 + \gamma_1 MPCOMP\_INDUST_t + \gamma_2 MPCOMP\_STATE + \beta_1 AGE_t + \beta_2 BIG4_t \\ & + \beta_3 CLAIM_t + \beta_4 DIV\_YIELD_t + \beta_5 LEV_t + \beta_6 LIT_t \\ & + \beta_7 MODIFIED_t + \beta_8 MTB_t + \beta_9 NOA_t + \beta_{10} SALES_t \\ & + \beta_{11} ZSCORE_t + \epsilon_t, \end{aligned} \tag{8.a}$$

$$\begin{aligned} DWCA_t = & \alpha_1 + \alpha_2 \widehat{MPCOMP}_t + \alpha_3 AGE_t + \alpha_4 BIG4_t + \alpha_5 CLAIM_t + \alpha_6 DIV\_YIELD_t \\ & + \alpha_7 LEV_t + \alpha_8 LIT_t + \alpha_9 MODIFIED_t + \alpha_{10} MTB_t + \alpha_{11} NOA_t \\ & + \alpha_{12} SALES_t + \alpha_{13} ZSCORE_t + \epsilon_t, \end{aligned} \tag{8.b}$$

and,

$$\begin{aligned}
REAL_t = & \alpha_1 + \alpha_2 \widehat{MPCOMP}_t + \alpha_3 AGE_t + \alpha_4 BIG4_t + \alpha_5 CLAIM_t + \alpha_6 DIV\_YIELD_t \\
& + \alpha_7 LEV_t + \alpha_8 LIT_t + \alpha_9 MODIFIED_t + \alpha_{10} MTB_t + \alpha_{11} NOA_t \\
& + \alpha_{12} SALES_t + \alpha_{13} ZSCORE_t + \varepsilon_t.
\end{aligned} \tag{8.c}$$

Following prior work in this area, we adopt *MPCOMP\_INDUST* and *MPCOMP\_STATE* as instruments for manager's perception of product market competition (Bushman et al., 2016; Li et al., 2013). In particular, *MPCOMP\_STATE* is defined as the yearly average level of manager's perception of product market competition in the firm's state. Likewise, we define the variable *MPCOMP\_INDUST* as the yearly average level of manager's perception of product market competition in the firm's industry. The results of our 2SLS IV estimates are presented in Table 7. The sign and significance of the fitted value of *MPCOMP* for all models are consistent with those presented in our main analysis.

To reassure that our 2SLS IV results are valid we conduct several diagnostic tests. We conduct Hausman's (1978) tests to assess the endogeneity of the first stage of our 2SLS IV estimates; our results suggest that we should reject the null hypotheses that our measures of earnings management and product market competition are exogenous. In addition, the Stock and Yogo's (2004) test for weak instruments suggest that our instruments are appropriate. Furthermore, the Hansen J-statistics indicate that the instruments used in our analyses are uncorrelated with the disturbance process of the models and this satisfies the exclusion principle.

[Insert Table 7 Here]

#### 4.2 Heckman two-stage self-selection model

We seek to establish further evidence of a relationship between our firm-level measure of manager's perception of product market competition and our measures of

accruals and real earnings management practices. To do this we recognize that one problem with our main estimations is that they assume that error term  $\varepsilon$  is uncorrelated with the explanatory variable of interest,  $MPCOMP$ . A potential concern here is that a selection bias arises when an independent variable included in the model is potentially a choice variable and is therefore potentially correlated with an unobservable variable that is captured by the error term. As a result, the correlation between  $\varepsilon$  and  $MPCOMP$  is potentially non-zero, thereby leading to inconsistent estimates.

To control for selection bias, Heckman (1979) proposes a two-stage estimation procedure, commonly known as a treatment effect model when the dependent variable is observed for all observations in the data (Heckman, 1979). In the first stage, a regression for observing an above median score on our measure of managers' perception of product market competition,  $MPCOMP\_HIGH$  is estimated using a probit model where we use the same firm specific control variables used in the prior analyses. The estimated parameters from this first stage are used to calculate the inverse Mill's ratio,  $LAMBDA$ , which is then included as an additional explanatory variable in the second stage (Lennox et al., 2012). To be clear, we estimate the following empirical models:

$$\begin{aligned}
MPCOMP\_HIGH_t = & \alpha_1 + \alpha_2 AGE_t + \alpha_3 BIG4_t + \alpha_4 CLAIM_t + \alpha_5 DIV\_YIELD_t + \alpha_6 LEV_t \\
& + \alpha_7 LIT_t + \alpha_8 MODIFIED_t + \alpha_9 MTB_t + \alpha_{10} NOA_t \\
& + \alpha_{11} SALES_t + \alpha_{12} ZSCORE_t + \varepsilon_t,
\end{aligned} \tag{9.a}$$

$$\begin{aligned}
DWCA_t = & \alpha_1 + \alpha_2 MPCOMP_t + \alpha_3 AGE_t + \alpha_4 BIG4_t + \alpha_5 CLAIM_t + \alpha_6 DIV\_YIELD_t \\
& + \alpha_7 LEV_t + \alpha_8 LIT_t + \alpha_9 MODIFIED_t + \alpha_{10} MTB_t + \alpha_{11} NOA_t \\
& + \alpha_{12} SALES_t + \alpha_{13} ZSCORE_t + \alpha_{14} LAMBDA + \varepsilon_t,
\end{aligned} \tag{9.b}$$

and,

$$REAL_t = \alpha_1 + \alpha_2 MPCOMP_t + \alpha_3 AGE_t + \alpha_4 BIG4_t + \alpha_5 CLAIM_t + \alpha_6 DIV\_YIELD_t$$

$$\begin{aligned}
& + \alpha_7 LEV_t + \alpha_8 LIT_t + \alpha_9 MODIFIED_t + \alpha_{10} MTB_t + \alpha_{11} NOA_t \\
& + \alpha_{12} SALES_t + \alpha_{13} ZSCORE_t + \alpha_{14} LAMBDA + \varepsilon_t,
\end{aligned} \tag{9.c}$$

The estimates from our empirical analysis are presented in Table 8. The coefficients of interest are the  $\alpha_2$ 's in Eq's (9.b) and (9.c). These coefficients capture the effect of managers' perception of product market competition on accruals (column 1) and real (columns 2 – 4) earnings management. Consistent with our expectations and our other results, we predict and find the coefficient of interest is positive and significant for the relation between managers' perception of product market competition and accruals earnings management; meanwhile, the coefficients of interests are negative and significant as it relates to the effect of product market competition on our measures of real earnings management.

[Insert Table 8 Here]

## 5 CONCLUSION

In summary, we examine the effect of managerial opportunism on earnings management by considering the pivotal role of managers' perception of firms' product market competition in influencing earnings management practices through a spectrum of avenues — accounting accruals, over-production, and manipulation of discretionary expenditures.

Our theoretical framework postulates an increase in the propensity for managers to indulge in accounting manipulation via accruals as they perceive a surge in product market competition. This arises from an augmented desire to portray favorable financial standings amid heightened competition. Simultaneously, we posit that a high degree of competition amplifies the risks associated with real earnings management,



discouraging managers from adopting practices that could potentially jeopardize the firm's future competitive edge, thereby witnessing a decrease in real earnings management undertakings.

Empirically, we find robust evidence that when managers perceive an intensification of firms' product market competition, managers engage in greater levels of accruals-based earnings management and lower levels of real earnings management behavior. These finding suggests that product market competition can in fact lead to greater levels of accounting manipulation via accruals, due to the opportunistic behavior of managers, but are also consistent with notion that increased levels of product market competition diminishes managements' propensity to take actions that undermine the competitive position of the firm (see, e.g., Alchian, 1950; Friedman, 1953; Stigler, 1958; among others).

Our results have important ramifications that would be of interest to standard-setters, academics, educators, investors, and the wider business community. This is because the effect of managers' perceptions of product market competition on earnings management behavior has important implications for the way firms are governed, managed, audited and regulated. In particular, our findings should be of interest to boards of directors, who have a responsibility to design corporate governance systems that help to achieve greater congruence between the interests of managers and shareholders. In this vein, board members can use our results to inform the monitoring of product market competition and managers' perception of it. Further, managers and those charged with governance can use our findings to develop policies and training programs aimed at reducing the likelihood of earnings manipulation and increasing managers awareness of the ethical implications of engaging in earnings management activity in response to competitive pressures. In addition, auditors and regulators could

use our findings to monitor 10-K filings proactively for indications of increased competitive concerns, which may signal a higher risk of accruals-based earnings manipulation. Likewise, analysts and investors might incorporate textual analysis data on competition perception into their models to better assess earnings quality and firm valuation, acknowledging the impact of managerial discretion in financial reporting. What's more, the findings of this study suggests that accounting and finance education curricula could include the use of AI and textual analysis in identifying patterns in corporate communication that may signal changes in earnings management practices, and that firms may need to be cautious about how they communicate competitive issues in public filings, as it could be used to infer earnings management behavior, impacting firm reputation and investor relations.

All told, our research casts a revelatory light on the interplay between managerial perceptions of product market competition and earnings management, unfolding a tapestry of complex behaviors and influences that govern this dynamic. As we stand on the cusp of the innovative pathways in corporate governance, our findings suggest a future where insights into managerial perceptions can be the linchpin in nurturing environments of fiscal integrity and sustainable competitiveness.

## REFERENCES

- Abdelsalam, O., Harris, T., & Zebian, T. (2023). Corporate culture and stock return comovement, Unpublished Working Paper, <https://doi.org/10.2139/ssrn.4311338>.
- Alchian, A. A. (1950). Uncertainty, evolution, and economic theory. *The Journal of Political Economy*, 53(3), 211-221.
- Ali, A., & Zhang, W. (2015). CEO tenure and earnings management. *Journal of Accounting and Economics*, 59(1), 60-79.
- Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4), 589-609.
- Andreou, P.C., Fiordelisi, F., Harris, T., & Philip, D. (2021). Institutional ownership and firms' thrust to compete. *British Journal of Management*.
- Andreou, P.C., Harris, T., & Philip, D. (2020). Measuring firms' market orientation using textual analysis of 10-k filings. *British Journal of Management*, 31, 872-895.
- Babar, M., & Habib, A. (2021). Product market competition in accounting, finance, and corporate governance: A review of the literature. *International Review of Financial Analysis*, 73, 101607.
- Balakrishnan, K., & Cohen, D.A. (2013). Competition and financial accounting misreporting. Available at SSRN: <https://dx.doi.org/10.2139/ssrn.1927427>
- Bagnoli, M., & Watts, S.G. (2010). Oligopoly, disclosure, and earnings management. *The Accounting Review*, 85(4), 1191-1214.
- Baiman, S. (1990). Agency research in managerial accounting: A second look. *Accounting, Organizations and Society*, 15 (4), 341-371.
- Barton, J., & Simko, P. J. (2002). The balance sheet as an earnings management constraint. *The Accounting Review*, 77(1), 1-27.
- Becker, C. L., DeFond, M. L., Jiambalvo, J., & Subramanyam, K. R. (1998). The effect of audit quality on earnings management. *Contemporary Accounting Research*, 15(1), 1-24.
- Bergstresser, D., & Philippon, T. (2006). CEO incentives and earnings management. *Journal of Financial Economics*, 80(3), 511-529.
- Bertomeu, J., Cheynel, E., Li, E.X., & Liang, Y. (2021). How pervasive is earnings management? Evidence from a structural model. *Management Science*, 67(8), pp.5145-5162.

- Bowen, R. M., DuCharme, L., & Shores, D. (1995). Stakeholders' implicit claims and accounting method choice. *Journal of Accounting and Economics*, 20(3), 255-295.
- Burgstahler, D., & Dichev, I. (1997). Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics*, 24(1), 99-126.
- Bushman, R. M., Hendricks, B. E., & Williams, C. D. (2016). Bank Competition: Measurement, Decision-Making, and Risk-Taking. *Journal of Accounting Research*, 54(3), 777 – 826.
- Callen, J. L., Robb, S. W., & Segal, D. (2008). Revenue manipulation and restatements by loss firms. *Auditing: A Journal of Practice & Theory*, 27(2), 1-29.
- Chang, H.Y., Liang, L.H., & Yu, H.F. (2019). Market power, competition and earnings management: accrual-based activities. *Journal of Financial Economic Policy*.
- Cheng, Q., Lee, J., & Shevlin, T. (2016). Internal governance and real earnings management. *The Accounting Review*, 91(4), 1051-1085.
- Cheng, Q., Luo, T., & Yue H. (2013). Managerial incentives and management forecast precision. *The Accounting Review*, 88(5), 1575-1602.
- Cheng, Q., & Warfield, T. D. (2005). Equity incentives and earnings management. *The Accounting Review*, 80 (2), 441-476.
- Collins, D. W., Pungaliya, R. S., & Vijh, A. M. (2017). The effects of firm growth and model specification choices on tests of earnings management in quarterly settings. *The Accounting Review*, 92(2), 69-100.
- Cumming, D.J., Meles, A., Sampagnaro, G., & Verdoliva, V. (2023). Corporate culture and IPOs. *European Financial Management*.
- Darrough, M., & Stoughton, N. (1990). Financial Disclosure Policy in an Entry Game. *Journal of Accounting and Economics*, 12(1-3), 219-243.
- Datta, S., Iskandar-Datta, M., & Singh, V. (2013). Product market power, industry structure, and corporate earnings management. *Journal of Banking and Finance*, 37 (8), 3273-3285.
- Davidson III, W. N., Jiraporn, P., & DaDalt, P. (2006). Causes and consequences of audit shopping: an analysis of auditor opinions, earnings management, and auditor changes. *Quarterly Journal of Business and Economics*, 69-87.
- DeAngelo, H., DeAngelo, L., & Skinner, D. J. (1994). Accounting choice in troubled companies. *Journal of Accounting and Economics*, 17(1-2), 113-143.
- Dechow, P. M., & Dichev, I. D. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review*, 77 (1), 35-59.

- Dechow, P. M., Hutton, A. P., Kim, J. H., & Sloan, R. G. (2012). Detecting earnings management: A new approach. *Journal of Accounting Research*, 50(2), 275-334.
- Dechow, P. M., Ge, W., Larson, C. R., & Sloan, R. G. (2011). Predicting material accounting misstatements. *Contemporary Accounting Research*, 28(1), 17-82.
- Dechow, P. M., & Sloan, R. G. (1991). Executive incentives and the horizon problem: An empirical investigation. *Journal of Accounting and Economics*, 14(1), 51-89.
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *The Accounting Review*, 70(2), 193-225.
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1996). Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research*, 13(1), 1-36.
- DeFond, M. L., & Jiambalvo, J. (1994). Debt covenant violation and manipulation of accruals. *Journal of Accounting and Economics*, 17(1-2), 145-176.
- DeFond, M. L., & Park, C. W. (1999). The effect of competition on CEO turnover. *Journal of Accounting and Economics*, 27(1), 35-56.
- El Diri, M., Lambrinoudakis, C., & Alhadab, M. (2020). Corporate governance and earnings management in concentrated markets. *Journal of Business Research*, 108, 291-306.
- Fama, E. F., & French, K. R. (1997). Industry costs of equity. *Journal of Financial Economics*, 43 (2), 153-193.
- Fan, Y., Jiang, Y., Zhang, X., & Zhou, Y. (2019). Women on boards and bank earnings management: From zero to hero. *Journal of Banking & Finance*, 107, 105607.
- Fang, Y., Fiordelisi, F., Hasan, I., Leung, W. S., & Wong, G. (2023). Corporate culture and firm value: Evidence from crisis. *Journal of Banking & Finance*, 146, 106710.
- Filip, A., & Raffournier, B. (2014). Financial crisis and earnings management: The European evidence. *The International Journal of Accounting*, 49(4), 455-478.
- Fiordelisi, F., & Ricci, O. (2014). Corporate Culture and CEO Turnover. *Journal of Corporate Finance*, 28, 66-82.
- Fiordelisi, F., & Ricci, O. (2021). Corrigendum to “Corporate Culture and CEO Turnover”. *Journal of Corporate Finance*, 70, 102064.

- Francis, B., Hasan, I., & Li, L. (2016). A cross-country study of legal-system strength and real earnings management. *Journal of Accounting and Public Policy*, 35(5), 477-512.
- Francis, J., Philbrick, D., & Schipper, K. (1994). Shareholder litigation and corporate disclosures. *Journal of Accounting Research*, 32(2), 137-164.
- Friedman, M. (1953). The methodology of positive economics. *Essays in Positive Economics*, 147-178.
- Habib, A., Ranasinghe, D., Wu, J. Y., Biswas, P. K., & Ahmad, F. (2022). Real earnings management: A review of the international literature. *Accounting & Finance*, 62(4), 4279-4344.
- Hart, O. (1983). The Market Mechanism as an Incentive Scheme. *Bell Journal of Economics*, 14(2), 366-382.
- Hasan, M. M., Hossain, M. S., & Gotti, G. (2022). Product market competition and earnings management: the role of managerial ability. *Review of Accounting and Finance*, 21(5), 486-511.
- Hausman, J. A., (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society*, 46(6), 1251-1271.
- Harris, T. (2018). Essays on the role of firms' competition culture in finance: A textual analysis based approach, Durham theses, Durham University. Available at: Durham E-Theses Online: <http://etheses.dur.ac.uk/12711>.
- Harris, T. (2023). Competition Culture and Corporate Finance: A Measure of Firms' Competition Culture Based on a Textual Analysis of 10-K Filings. Springer Nature.
- Healy, P. M. (1985). The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics*, 7(1), 85-107.
- Healy, P., & Wahlen, J. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting Horizons*, 13(4), 365-383.
- Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of the Econometric Society*, 47(1), 153-161.
- Hribar, P., & Collins, D. W. (2002). Errors in estimating accruals: Implications for empirical research. *Journal of Accounting Research*, 40(1), 105-134.
- Hribar, P., & Craig Nichols, D. (2007). The use of unsigned earnings quality measures in tests of earnings management. *Journal of Accounting Research*, 45(5), 1017-1053.
- Jiang, F., Ma, Y., & Wang, X. (2020). Multiple blockholders and earnings management. *Journal of Corporate Finance*, 64, 101689.

- Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research*, 29(2), 193-228.
- Kim, J.B., & Sohn, B.C. (2013). Real earnings management and cost of capital. *Journal of Accounting and Public Policy*, 32(6), 518-543.
- Kothari, S. P., Leone, A. J., & Wasley, C. E. (2005). Performance matched discretionary accrual measures. *Journal of Accounting and Economics*, 39(1), 163-197.
- Kothari, S.P., Mizik, N., & Roychowdhury, S. (2015). Managing for the moment: The role of earnings management via real activities versus accruals in SEO valuation. *The Accounting Review*, 91(2), 559-586.
- Laksmna, I., & Yang, Y. W. (2014). Product market competition and earnings management: Evidence from discretionary accruals and real activity manipulation. *Advances in Accounting*, 30(2), 263-275.
- Lara, J.M.G., Osma, B.G., & Penalva, F. (2020). Conditional conservatism and the limits to earnings management. *Journal of Accounting and Public Policy*, 39(4), 106738.
- Larcker, D. F., & Rusticus, T. O. (2010). On the use of instrumental variables in accounting research. *Journal of Accounting and Economics*, 49 (3), 186-205.
- Lee, C. W. J., Li, L. Y., & Yue, H. (2006). Performance, growth and earnings management. *Review of Accounting Studies*, 11, 305-334.
- Leibenstein, H. (1966). Allocative efficiency vs. X-efficiency. *The American Economic Review*, 56 (3), 392-415.
- Lemma, T.T., Negash, M., Mlilo, M., & Lulseged, A. (2018). Institutional ownership, product market competition, and earnings management: Some evidence from international data. *Journal of Business Research*, 90, 151-163.
- Lennox, C. S., Francis, J. R., & Wang, Z. (2011). Selection models in accounting research. *The Accounting Review*, 87(2), 589-616.
- Li, F. (2010a). The information content of forward-looking statements in corporate filings: A naive Bayesian machine learning approach. *Journal of Accounting Research*, 48(5), 1049-1102.
- Li, F. (2010b). Textual analysis of corporate disclosures: A survey of the literature. *Journal of Accounting Literature*, 29, 143-165.
- Li, F., Lundholm, R., & Minnis, M. (2013). A Measure of Competition Based on 10 - K Filings. *Journal of Accounting Research*, 51(2), 399-436.

- Loughran, T., McDonald, B. (2016). Textual analysis in accounting and finance: A survey. *Journal of Accounting Research*, 54(4), 1187-1230.
- Luu, H., Nguyen, L., & Wilson, J.O.S. (2022). Organizational Culture, Competition and Bank Loan Loss Provisions. Available at SSRN: <https://ssrn.com/abstract=3921043>
- Luippold, B. L., Kida, T., Piercey, M. D., & Smith, J. F. (2015). Managing audits to manage earnings: The impact of diversions on an auditor's detection of earnings management. *Accounting, Organizations and Society*, 41, 39-54.
- Machlup, F. (1967). Theories of the firm: marginalist, behavioral, managerial. *The American Economic Review*, 57(1), 1-33.
- Markarian, G., & Santaló, J. (2014). Product market competition, information and earnings management. *Journal of Business Finance and Accounting*, 41(5-6), 572-599.
- Nguyen, D.D., Nguyen, L., & Sila, V. (2019). Does Corporate Culture affect Bank Risk-Taking? Evidence from Loan-Level data. *British Journal of Management*, 30, 106-133.
- Petersen, M. A., & Rajan, R. G. (1997). Trade credit: theories and evidence. *The Review of Financial Studies*, 10(3), 661-691.
- Rahman, D., Kabir, M., & Oliver, B. (2021). Does exposure to product market competition influence insider trading profitability?. *Journal of Corporate Finance*, 66, 101792.
- Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting and Economics*, 42(3): 335-370.
- Shi, G., Sun, J., & Zhang, L. (2018). Product market competition and earnings management: A firm-level analysis. *Journal of Business Finance and Accounting*, 45(5-6), 604-624.
- Shleifer, A. (2004). Does competition destroy ethical behavior? National Bureau of Economic Research.
- Shleifer, A., & Vishny, R.W. (1997). A Survey of Corporate Governance. *Journal of Finance*, 52, 737-783.
- Skinner, D. J., & Sloan, R. G. (2002). Earnings surprises, growth expectations, and stock returns or don't let an earnings torpedo sink your portfolio. *Review of Accounting Studies*, 7 (2-3), 289-312.
- Stigler, G. J. (1958). The Economies of Scale. *Journal of Law and Economics*, 1, 54-71.



- Stock, J. H., & Yogo, M. (2004). Testing for weak instruments in linear IV regression. *Identification and inference for econometric models: Essays in honor of Thomas Rothenberg*.
- Stubben, S. R. (2010). Discretionary revenues as a measure of earnings management. *The Accounting Review*, 85(2), 695-717.
- Teoh, S. H., Welch, I., & Wong, T. J. (1998). Earnings management and the long-run market performance of initial public offerings. *The Journal of Finance*, 53(6), 1935-1974.
- Teoh, S. H., Welch, I., & Wong, T. J. (1998). Earnings management and the underperformance of seasoned equity offerings. *Journal of Financial Economics*, 50(1), 63-99.
- Verrecchia, R.E. (1983). Discretionary disclosure. *Journal of Accounting and Economics*, 5, 365–380.
- Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics*, 105(3), 581-606.
- Yung, K., & Root, A. (2019). Policy uncertainty and earnings management: International evidence. *Journal of Business Research*, 100, 255-267.
- Zang, A. Y. (2012). Evidence on the trade-off between real activities manipulation and accrual-based earnings management. *The Accounting Review*, 87(2), 675-703.

**Table 1**  
**Bag of Words**

This table reports bag of words with synonyms that best describe the managers' perception of product market competition. While conducting our count, we exclude negation of the lexical items by ignoring occasions when the word is preceded by "no", "non", "not", "less", "few" or "limited" by three or fewer words.

<p>"competition", "competitions", "competitor", "competitors", "competitive", "competitiveness", "compete", "competes", "competing", "challenger", "challengers", "contender", "contenders", "rival", "rivalry", "rivals", "rivaling", "rivalrous", "rivalries", "market-share", "market share", "substitute", "substitutes", "substitution", "alternative", "alternatives", "differentiation", "differentiate", "differentiating", "entry", "entrant", "entrants", "barrier", "barriers", "market-power", "market power", "market dominance", "oligopoly", "monopoly", "monopolistic", "monopolies", "pricing", "strategy", "strategic", "strategies", "positioning", "segmentation", "segment", "segments", "segmenting", "penetration", "market penetration", "innovation", "innovative", "innovations", "invention", "inventions", "disruption", "disrupt", "disruptive", "disruptions", "disrupting", "threat", "threaten", "threatens", "threatening", "threats", "collaboration", "collaborate", "collaborating", "collaborative", "cooperation", "cooperate", "cooperating", "dominance", "dominant", "dominating", "synergy", "synergies", "synergistic", "consolidation", "consolidate", "consolidating", "diversification", "diversify", "diversifying", "diversified"</p>
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Table by author.

**Table 2**  
**Definition of Main Variables**

Symbol	Definitions
<i>DWCA</i>	= Accrual earnings management measured as abnormal working capital accruals (Hribar and Collins, 2002) estimated using the modified cross-sectional Jones approach (Dechow et al., 1995) adjusted to control for the influence of firm performance and growth (Kothari et al., 2005; Collins et al., 2017);
<i>REM</i>	= Real earnings management measured as the addition of <i>APROD</i> and <i>ADEXP</i> which are Roychowdhury's (2006) abnormal production cost and abnormal discretionary expenses by minus 1, respectively;
<i>APROD</i>	= Roychowdhury's (2006) abnormal production cost;
<i>ADEXP</i>	= Roychowdhury's (2006) abnormal discretionary expenses by minus 1;
<i>MPCOMP</i>	= the managers' perception of product market competition estimated for each company each fiscal year using text-analysis;
<i>AGE</i>	= number of years since the firm first appears in COMPUSTAT;
<i>BIG4</i>	= equal to 1 if firm is audited by one of the big4 accounting firms (i.e., Deloitte, PwC, Ernst & Young, and KPMG), and 0 otherwise;
<i>CLAIM</i>	= implicit claim proxied by labor intensity, calculated as 1 minus the ratio of gross property plant and equipment to total assets at the end of the fiscal year;
<i>DIV_YIELD</i>	= annual dividend yield;
<i>LEV</i>	= long-term debt divided by total assets, both at the end of the fiscal year;
<i>LIT</i>	= equals to 1 if firm is in one of the following industries: pharmaceutical/ biotechnological (SIC 2833 - 2836, 8731 - 8734), computer (3570 - 3577, 7370 - 7374), electronics (3600 - 3674), or retail (5200 - 5961), and 0 otherwise;
<i>MODIFIED</i>	= equal to 1 if firm's auditor issues a modified audit opinion (i.e., auop = 2, 4 or 5), and 0 otherwise;
<i>MTB</i>	= market to book value of equity at the end of the fiscal year;
<i>NOA</i>	= net operating asset (i.e., shareholders' equity minus and marketable securities, plus total debt) at the end of the prior fiscal year, scaled by sales for the prior fiscal year;
<i>SALES</i>	= sales for the fiscal year divided by sales for the prior fiscal year;
<i>SIZE</i>	= natural logarithm of market value of equity at the end of the fiscal year; and
<i>ZSCORE</i>	= Altman's 1968 bankruptcy score measure at the beginning of the year ( $= 1.2 \times [(act - lct)/at] + 1.4 \times [re/at] + 3.3 \times [ebit/at] + 0.6 \times [(csho*prcc\_f)/lt] + 0.999 \times [revt/at]$ ).

Table by author.

**Table 3**  
**Descriptive Statistics**

This table presents the mean, median, 25<sup>th</sup> percentile, 75<sup>th</sup> percentile, and number of observations for all variables used in the study for the period 1994 to 2021.

Variable	Obs.	Mean	Std. Dev.	25 <sup>th</sup> MP.	Median.	75 <sup>th</sup> MP.
<i>DWCA</i> (%)	70,264	-0.024	7.943	-3.073	0.171	3.312
<i>REM</i> (%)	64,538	0.245	45.691	-19.627	3.897	25.218
<i>ADEXP</i> (%)	64,538	0.459	29.446	-10.274	3.134	15.998
<i>APROD</i> (%)	64,538	-0.004	0.229	-0.122	-0.003	0.107
<i>MPCOMP</i>	70,264	0.826	0.482	0.457	0.744	1.106
<i>AGE</i>	70,264	17.973	8.815	10.000	18.000	28.000
<i>BIG4</i>	70,264	0.719	0.449	0.000	1.000	1.000
<i>CLAIM</i>	70,264	0.520	0.396	0.328	0.632	0.816
<i>DIV_YIELD</i>	70,264	0.007	0.016	0.000	0.000	0.006
<i>LEV</i>	70,264	0.512	1.326	0.009	0.136	0.440
<i>LIT</i>	70,264	0.403	0.491	0.000	0.000	1.000
<i>MODIFIED</i>	70,264	0.000	0.019	0.000	0.000	0.000
<i>MTB</i>	70,264	1.678	1.940	0.585	1.078	1.996
<i>NOA</i>	70,264	0.765	3.952	0.222	0.461	0.830
<i>SALES</i>	70,264	0.194	0.720	-0.036	0.074	0.226
<i>SIZE</i>	70,264	5.782	2.223	4.132	5.760	7.313
<i>ZSCORE</i>	70,264	4.299	8.413	1.705	3.237	5.492

Table by author.

**Table 4**  
**Product Market Competition by Fama and French Industry Classifications**

This table presents the product market competition by industry mean, median, standard deviation, number of firms and number of observation.

Fama & French 48 Industry Classification	Mean	Median	Std. Dev.	# Firms	Obs.
Computers	1.065	0.998	0.534	585	3,222
Electronic Equipment	1.053	0.991	0.542	780	5,656
Medical Equipment	1.003	0.945	0.492	578	3,501
Business Services	0.982	0.918	0.511	2,553	11,629
Pharmaceutical Products	0.977	0.928	0.461	1,597	6,261
Measuring and Control Equipment	0.930	0.873	0.462	239	1,983
Recreation	0.831	0.761	0.456	128	712
Almost Nothing	0.823	0.756	0.507	527	666
Electrical Equipment	0.812	0.747	0.434	189	1,405
Machinery	0.770	0.695	0.440	370	3,132
Candy & Soda	0.769	0.680	0.443	31	239
Shipbuilding and Railroad Equipment	0.738	0.745	0.413	28	179
Retail	0.736	0.657	0.437	723	4,495
Wholesale	0.726	0.669	0.415	497	3,130
Construction	0.724	0.666	0.428	214	1,641
Automobiles and Trucks	0.723	0.665	0.393	208	1,349
Beer & Liquor	0.717	0.637	0.425	47	341
Healthcare	0.690	0.614	0.380	318	1,736
Chemicals	0.684	0.617	0.386	238	1,806
Business Supplies	0.679	0.630	0.403	136	975
Consumer Goods	0.676	0.572	0.421	198	1,283
Entertainment	0.671	0.599	0.378	257	1,173
Food Products	0.668	0.617	0.359	204	1,513
Apparel	0.662	0.606	0.372	148	1,158
Steel Works Etc.	0.657	0.621	0.380	162	1,076
Restaurants, Hotels, and Motels	0.652	0.615	0.347	286	1,639
Defence	0.651	0.638	0.322	22	213
Aircraft	0.637	0.597	0.334	46	500
Construction Materials	0.630	0.591	0.328	173	566
Rubber and Plastic Products	0.625	0.545	0.378	107	679

Fabricated Products	0.621	0.518	0.383	40	277
Personal Services	0.614	0.522	0.365	206	782
Printing and Publishing	0.592	0.535	0.344	92	607
Textiles	0.569	0.491	0.371	51	246
Shipping Containers	0.549	0.513	0.286	34	256
Coal	0.535	0.531	0.243	33	134
Non-Metallic and Industrial Metal Mining	0.507	0.368	0.384	129	239
Petroleum and Natural Gas	0.460	0.397	0.302	642	3,540
Agriculture	0.458	0.360	0.326	50	142
Precious Metals	0.202	0.180	0.126	163	183
<i>Total</i>					<i>70,264</i>

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Table by author.

**Table 5**  
**Correlation Matrix of Main Variables**

This table presents Pearson correlation coefficients for the main variables used in the empirical analyses. The bold figures indicate significance at the 10 percent level and above.

	<i>DWCA</i>	<i>REM</i>	<i>ADEXP</i>	<i>APROD</i>	<i>MPCOMP</i>	<i>AGE</i>	<i>BIG4</i>	<i>CLAIM</i>
<i>REM</i>	<b>-0.012</b>							
<i>ADEXP</i>	-0.008	<b>0.889</b>						
<i>APROD</i>	<b>-0.016</b>	<b>0.819</b>	<b>0.492</b>					
<i>MPCOMP</i>	0.004	<b>-0.111</b>	<b>-0.116</b>	<b>-0.073</b>				
<i>AGE</i>	<b>0.022</b>	<b>0.053</b>	<b>0.095</b>	<b>-0.015</b>	<b>-0.010</b>			
<i>BIG4</i>	<b>0.026</b>	<b>-0.065</b>	<b>-0.080</b>	<b>-0.024</b>	-0.002	<b>0.085</b>		
<i>CLAIM</i>	<b>-0.019</b>	<b>-0.051</b>	<b>-0.063</b>	<b>-0.022</b>	<b>0.246</b>	<b>-0.095</b>	0.007	
<i>DIV_YIELD</i>	<b>0.021</b>	<b>0.042</b>	<b>0.073</b>	-0.009	<b>-0.103</b>	<b>0.198</b>	<b>0.046</b>	<b>-0.133</b>
<i>LEV</i>	<b>0.018</b>	<b>0.082</b>	<b>0.066</b>	<b>0.080</b>	<b>-0.128</b>	<b>-0.096</b>	-0.008	<b>-0.168</b>
<i>LIT</i>	0.009	<b>-0.101</b>	<b>-0.107</b>	<b>-0.071</b>	<b>0.275</b>	<b>-0.128</b>	<b>0.038</b>	<b>0.189</b>
<i>MODIFIED</i>	0.004	-0.003	-0.003	-0.001	-0.003	-0.008	0.003	-0.001
<i>MTB</i>	-0.006	<b>-0.224</b>	<b>-0.232</b>	<b>-0.161</b>	<b>0.166</b>	<b>-0.022</b>	<b>0.013</b>	<b>0.187</b>
<i>NOA</i>	<b>-0.018</b>	<b>0.046</b>	<b>0.081</b>	0.000	<b>-0.047</b>	<b>-0.022</b>	<b>-0.013</b>	<b>-0.077</b>
<i>SALES</i>	<b>-0.039</b>	<b>-0.057</b>	<b>-0.123</b>	<b>0.038</b>	<b>0.040</b>	<b>-0.113</b>	<b>-0.021</b>	<b>0.116</b>
<i>SIZE</i>	<b>0.020</b>	<b>-0.083</b>	<b>-0.053</b>	<b>-0.090</b>	-0.009	<b>0.356</b>	<b>0.405</b>	<b>0.044</b>
<i>ZSCORE</i>	<b>-0.031</b>	<b>-0.078</b>	-0.006	<b>-0.148</b>	<b>0.081</b>	<b>0.071</b>	<b>0.047</b>	<b>0.158</b>

  

	<i>DIV_YIELD</i>	<i>LEV</i>	<i>LIT</i>	<i>MODIFIED</i>	<i>MTB</i>	<i>NOA</i>	<i>SALES</i>	<i>SIZE</i>
<i>LEV</i>	<b>0.024</b>							
<i>LIT</i>	<b>-0.139</b>	<b>-0.112</b>						
<i>MODIFIED</i>	0.000	<b>0.014</b>	-0.003					
<i>MTB</i>	<b>-0.098</b>	<b>-0.248</b>	<b>0.199</b>	0.001				
<i>NOA</i>	<b>-0.010</b>	<b>0.039</b>	<b>-0.029</b>	0.008	<b>-0.051</b>			
<i>SALES</i>	<b>-0.086</b>	<b>-0.050</b>	<b>0.067</b>	0.004	<b>0.167</b>	<b>-0.045</b>		
<i>SIZE</i>	<b>0.170</b>	<b>-0.205</b>	0.003	-0.005	<b>0.241</b>	<b>-0.060</b>	<b>0.016</b>	
<i>ZSCORE</i>	0.005	<b>-0.158</b>	<b>0.034</b>	-0.008	<b>0.517</b>	<b>-0.112</b>	<b>0.090</b>	<b>0.215</b>

Table by author.

**Table 6**  
**OLS Regression Results for the Impact of Product Market Competition on Earnings Management**

This table presents estimates used to investigate the relationship between managers' perception of product market competition and earnings management as indicated by the discretionary working capital accruals (Columns 1 and 5), real earnings management (Columns 2 and 6), abnormal discretionary expenses (Columns 3 and 7), and abnormal production costs (Columns 4 and 8). All models include a constant and the standard errors are clustered at the firm- level. *T*-statistics are given in parentheses.

Panel A: Product market competition on earnings management.

	<i>DWCA<sub>t</sub></i>	<i>REM<sub>t</sub></i>	<i>ADEXP<sub>t</sub></i>	<i>APROD<sub>t</sub></i>	<i>DWCA<sub>t</sub></i>	<i>REM<sub>t</sub></i>	<i>ADEXP<sub>t</sub></i>	<i>APROD<sub>t</sub></i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>MPCOMP<sub>t</sub></i>	0.019*** (3.690)	-0.083*** (8.990)	-0.077*** (8.740)	-0.061*** (6.790)	0.014*** (2.620)	-0.086*** (9.360)	-0.084*** (9.650)	-0.061*** (6.640)
<i>AGE<sub>t</sub></i>	0.023*** (4.490)	0.059*** (4.970)	0.083*** (7.320)	0.008 (0.690)	0.024*** (4.540)	0.057*** (4.800)	0.080*** (7.390)	0.006 (0.510)
<i>BIG4<sub>t</sub></i>	0.037*** (3.260)	-0.095*** (4.240)	-0.175*** (8.330)	0.032 (1.430)	0.040*** (3.500)	-0.107*** (4.870)	-0.190*** (9.320)	0.029 (1.310)
<i>CLAIM<sub>t</sub></i>	-0.012*** (3.030)	0.018* (1.860)	0.009 (0.960)	0.028*** (2.890)	-0.019*** (3.320)	-0.011 (0.850)	-0.034*** (2.640)	0.025** (1.980)
<i>DIV_YIELD<sub>t</sub></i>	0.016*** (4.950)	0.008 (1.030)	0.023*** (2.900)	-0.014* (1.850)	0.018*** (5.420)	0.006 (0.830)	0.022*** (2.910)	-0.016** (2.060)
<i>LEV<sub>t</sub></i>	0.023*** (6.630)	0.020*** (3.610)	0.008 (1.600)	0.029*** (5.030)	0.024*** (6.590)	0.030*** (5.440)	0.020*** (4.120)	0.033*** (5.600)
<i>LIT<sub>t</sub></i>	0.027*** (2.650)	-0.053** (2.220)	-0.027 (1.170)	-0.083*** (3.480)	0.054*** (2.860)	-0.312*** (6.670)	-0.270*** (6.290)	-0.275*** (5.890)
<i>MODIFIED<sub>t</sub></i>	0.235 (1.020)	-0.188 (0.930)	-0.153 (0.660)	-0.172 (0.920)	0.234 (1.020)	-0.140 (0.610)	-0.099 (0.380)	-0.143 (0.740)
<i>MTB<sub>t</sub></i>	0.023*** (2.890)	-0.214*** (13.920)	-0.274*** (18.560)	-0.095*** (6.190)	0.025*** (2.970)	-0.239*** (15.560)	-0.307*** (20.310)	-0.100*** (6.610)
<i>NOA<sub>t</sub></i>	-0.023*** (3.850)	0.037*** (3.470)	0.080*** (6.750)	-0.018** (1.970)	-0.022*** (3.770)	0.036*** (3.460)	0.079*** (6.780)	-0.017* (1.940)
<i>SALES<sub>t</sub></i>	-0.038*** (4.790)	-0.018*** (2.710)	-0.081*** (10.490)	0.063*** (9.400)	-0.035*** (4.410)	-0.024*** (3.660)	-0.088*** (11.280)	0.061*** (8.810)
<i>SIZE<sub>t</sub></i>	0.020***	-0.063***	-0.030**	-0.074***	0.021***	-0.048***	-0.011	-0.069***



	(3.390)	(4.380)	(2.180)	(5.000)	(3.560)	(3.340)	(0.810)	(4.550)
<i>ZSCORE<sub>t</sub></i>	-0.048***	0.053***	0.154***	-0.084***	-0.049***	0.066***	0.171***	-0.082***
	(6.810)	(3.860)	(11.290)	(5.830)	(6.890)	(4.900)	(12.510)	(5.730)
<i>CONSTANT</i>	0.020	0.055*	0.153***	-0.070**	-0.052	-0.076	0.032	-0.176*
	(0.65)	(1.850)	(5.370)	(2.320)	(0.930)	(0.820)	(0.450)	(1.730)
<i>YEAR DUMMIES</i>	YES	YES	YES	YES	YES	YES	YES	YES
<i>INDUSTRY DUMMIES</i>	NO	NO	NO	NO	YES	YES	YES	YES
<i>R<sup>2</sup></i>	0.010	0.070	0.110	0.050	0.010	0.110	0.150	0.060
<i>N</i>	70,264	64,831	64,831	64,831	70,264	64,831	64,831	64,831

Panel B: Decile rank of product market competition on earnings management.

	<i>DWCA<sub>t</sub></i>	<i>REM<sub>t</sub></i>	<i>ADEXP<sub>t</sub></i>	<i>APROD<sub>t</sub></i>	<i>DWCA<sub>t</sub></i>	<i>REM<sub>t</sub></i>	<i>ADEXP<sub>t</sub></i>	<i>APROD<sub>t</sub></i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>MPCOMP_RANK<sub>t</sub></i>	0.019***	-0.078***	-0.074***	-0.056***	0.014***	-0.085***	-0.084***	-0.058***
	(3.870)	(8.380)	(8.420)	(6.120)	(2.770)	(9.210)	(9.940)	(6.170)
<i>AGE<sub>t</sub></i>	0.023***	0.061***	0.084***	0.009	0.024***	0.057***	0.081***	0.007
	(4.450)	(5.070)	(7.430)	(0.780)	(4.520)	(4.880)	(7.470)	(0.580)
<i>BIG4<sub>t</sub></i>	0.037***	-0.096***	-0.176***	0.032	0.040***	-0.107***	-0.190***	0.029
	(3.250)	(4.260)	(8.360)	(1.410)	(3.500)	(4.900)	(9.350)	(1.290)
<i>CLAIM<sub>t</sub></i>	-0.013***	0.019*	0.009	0.028***	-0.019***	-0.011	-0.034***	0.025*
	(3.100)	(1.860)	(0.980)	(2.870)	(3.330)	(0.870)	(2.650)	(1.950)
<i>DIV_YIELD<sub>t</sub></i>	0.016***	0.008	0.023***	-0.014*	0.018***	0.006	0.021***	-0.016**
	(4.980)	(1.010)	(2.880)	(1.860)	(5.450)	(0.770)	(2.840)	(2.100)
<i>LEV<sub>t</sub></i>	0.023***	0.021***	0.009*	0.029***	0.024***	0.030***	0.020***	0.033***
	(6.630)	(3.700)	(1.680)	(5.120)	(6.600)	(5.470)	(4.130)	(5.650)
<i>LIT<sub>t</sub></i>	0.027***	-0.056**	-0.030	-0.085***	0.054***	-0.316***	-0.274***	-0.279***
	(2.680)	(2.350)	(1.280)	(3.600)	(2.900)	(6.780)	(6.390)	(5.990)
<i>MODIFIED<sub>t</sub></i>	0.236	-0.190	-0.154	-0.173	0.235	-0.143	-0.102	-0.145
	(1.020)	(0.940)	(0.670)	(0.920)	(1.020)	(0.620)	(0.380)	(0.750)
<i>MTB<sub>t</sub></i>	0.023***	-0.214***	-0.275***	-0.095***	0.025***	-0.239***	-0.307***	-0.100***
	(2.890)	(13.920)	(18.580)	(6.200)	(2.970)	(15.570)	(20.350)	(6.630)
<i>NOA<sub>t</sub></i>	-0.023***	0.037***	0.081***	-0.017*	-0.022***	0.036***	0.079***	-0.017*
	(3.860)	(3.520)	(6.800)	(1.950)	(3.780)	(3.530)	(6.850)	(1.910)
<i>SALES<sub>t</sub></i>	-0.038***	-0.018***	-0.081***	0.063***	-0.035***	-0.025***	-0.088***	0.060***

	(4.780)	(2.720)	(10.520)	(9.370)	(4.400)	(3.700)	(11.350)	(8.760)
<i>SIZE</i> <sub>t</sub>	0.020***	-0.063***	-0.030**	-0.073***	0.021***	-0.048***	-0.011	-0.068***
	(3.420)	(4.360)	(2.170)	(4.980)	(3.580)	(3.340)	(0.820)	(4.530)
<i>ZSCORE</i> <sub>t</sub>	-0.048***	0.052***	0.153***	-0.085***	-0.049***	0.065***	0.170***	-0.083***
	(6.770)	(3.780)	(11.230)	(5.890)	(6.880)	(4.840)	(12.480)	(5.780)
<i>CONSTANT</i>	0.021	0.055*	0.152***	-0.069**	-0.049	-0.085	0.0210	-0.180*
	(0.690)	(1.860)	(5.350)	(2.280)	(0.880)	(0.920)	(0.300)	(1.760)
<i>YEAR DUMMIES</i>	YES	YES	YES	YES	YES	YES	YES	YES
<i>INDUSTRY DUMMIES</i>	NO	NO	NO	NO	YES	YES	YES	YES
<i>R</i> <sup>2</sup>	0.010	0.070	0.110	0.050	0.010	0.110	0.150	0.060
<i>N</i>	70,264	64,831	64,831	64,831	70,264	64,831	64,831	64,831

Panel C: Above median product market competition on earnings management.

	<i>DWCA</i> <sub>t</sub>	<i>REM</i> <sub>t</sub>	<i>ADEXP</i> <sub>t</sub>	<i>APROD</i> <sub>t</sub>	<i>DWCA</i> <sub>t</sub>	<i>REM</i> <sub>t</sub>	<i>ADEXP</i> <sub>t</sub>	<i>APROD</i> <sub>t</sub>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>MPCOMP_HIGH</i> <sub>t</sub>	0.020**	-0.132***	-0.130***	-0.092***	0.020**	-0.110***	-0.107***	-0.080***
	(2.400)	(9.000)	(9.520)	(6.300)	(2.420)	(7.910)	(8.280)	(5.620)
<i>AGE</i> <sub>t</sub>	0.022***	0.061***	0.084***	0.010	0.023***	0.061***	0.084***	0.009
	(4.310)	(5.140)	(7.480)	(0.840)	(4.440)	(5.130)	(7.740)	(0.730)
<i>BIG4</i> <sub>t</sub>	0.039***	-0.101***	-0.180***	0.028	0.041***	-0.112***	-0.195***	0.026
	(3.400)	(4.480)	(8.580)	(1.250)	(3.570)	(5.110)	(9.570)	(1.150)
<i>CLAIM</i> <sub>t</sub>	-0.010**	0.006	-0.002	0.019**	-0.018***	-0.014	-0.037***	0.023*
	(2.410)	(0.660)	(0.230)	(2.010)	(3.250)	(1.060)	(2.860)	(1.830)
<i>DIV_YIELD</i> <sub>t</sub>	0.016***	0.009	0.024***	-0.013*	0.018***	0.007	0.023***	-0.015**
	(4.840)	(1.170)	(3.020)	(1.730)	(5.400)	(0.930)	(3.000)	(2.000)
<i>LEV</i> <sub>t</sub>	0.022***	0.024***	0.012**	0.032***	0.023***	0.032***	0.023***	0.034***
	(6.350)	(4.310)	(2.270)	(5.560)	(6.520)	(5.880)	(4.610)	(5.890)
<i>LIT</i> <sub>t</sub>	0.033***	-0.080***	-0.053**	-0.103***	0.056***	-0.333***	-0.291***	-0.289***
	(3.350)	(3.400)	(2.310)	(4.410)	(3.040)	(7.080)	(6.740)	(6.190)
<i>MODIFIED</i> <sub>t</sub>	0.235	-0.185	-0.150	-0.170	0.235	-0.140	-0.099	-0.143
	(1.020)	(0.900)	(0.640)	(0.900)	(1.020)	(0.600)	(0.370)	(0.740)
<i>MTB</i> <sub>t</sub>	0.024***	-0.218***	-0.278***	-0.098***	0.025***	-0.241***	-0.309***	-0.101***
	(3.030)	(14.160)	(18.800)	(6.400)	(3.000)	(15.610)	(20.380)	(6.670)
<i>NOA</i> <sub>t</sub>	-0.023***	0.038***	0.081***	-0.017*	-0.022***	0.037***	0.080***	-0.017*

	(3.910)	(3.580)	(6.840)	(1.870)	(3.800)	(3.570)	(6.890)	(1.860)
<i>SALES<sub>t</sub></i>	-0.038***	-0.016**	-0.080***	0.064***	-0.035***	-0.024***	-0.088***	0.061***
	(4.820)	(2.510)	(10.370)	(9.540)	(4.400)	(3.640)	(11.290)	(8.810)
<i>SIZE<sub>t</sub></i>	0.018***	-0.057***	-0.025*	-0.069***	0.020***	-0.044***	-0.007	-0.066***
	(3.100)	(3.970)	(1.800)	(4.690)	(3.510)	(3.070)	(0.520)	(4.380)
<i>ZSCORE<sub>t</sub></i>	-0.048***	0.053***	0.154***	-0.085***	-0.049***	0.064***	0.169***	-0.084***
	(6.730)	(3.820)	(11.270)	(5.840)	(6.860)	(4.730)	(12.350)	(5.820)
<i>CONSTANT</i>	-0.007	0.184***	0.276***	0.0230	-0.080	0.087	0.191***	-0.061
	(0.230)	(6.010)	(9.570)	(0.750)	(1.450)	(0.960)	(2.730)	(0.600)
<i>YEAR DUMMIES</i>	YES	YES	YES	YES	YES	YES	YES	YES
<i>INDUSTRY DUMMIES</i>	NO	NO	NO	NO	YES	YES	YES	YES
<i>R<sup>2</sup></i>	0.010	0.070	0.110	0.040	0.010	0.100	0.150	0.060
<i>N</i>	70,264	64,831	64,831	64,831	70,264	64,831	64,831	64,831

\* $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table by author.

**Table 7**  
**2SLS Instrumental Variable Regression Results for the Impact of Product Market Competition on Earnings Management**

This table presents estimates from 2SLS IV regressions used to investigate the relationship between managers' perception of product market competition and earnings management. Columns (1) and (3) present first stage results, while Columns (2), (4) (5) and (6) highlight the second stage estimates. All models include a constant and the standard errors are clustered at the firm-level. *T*-statistics are given in parentheses.

	$MPCOMP_t$	$DWCA_t$	$MPCOMP_t$	$REM_t$	$ADEXP_t$	$APROD_t$
	(1)	(2)	(3)	(4)	(5)	(6)
$MPCOMP\_IND_t$	0.385*** (22.900)		0.370*** (20.950)			
$MPCOMP\_STATE_t$	0.218*** (19.650)		0.208*** (18.460)			
$MPCOMP_t$		0.012** (2.210)		-0.082*** (8.570)	-0.078*** (8.660)	-0.060*** (6.350)
$AGE_t$	-0.088*** (10.070)	0.022*** (4.290)	-0.084*** (8.930)	0.065*** (5.470)	0.089*** (8.170)	0.0120 (0.970)
$BIG4_t$	0.097*** (5.870)	0.041*** (3.650)	0.086*** (4.950)	-0.118*** (5.360)	-0.199*** (9.720)	0.020 (0.880)
$CLAIM_t$	0.056*** (6.170)	-0.018*** (3.150)	0.054*** (5.690)	-0.017 (1.280)	-0.040*** (3.090)	0.021 (1.630)
$DIV\_YIELD_t$	-0.022*** (3.510)	0.017*** (5.300)	-0.023*** (3.570)	0.009 (1.160)	0.025*** (3.220)	-0.014* (1.810)
$LEV_t$	-0.056*** (11.180)	0.023*** (6.360)	-0.056*** (10.830)	0.035*** (6.410)	0.026*** (5.240)	0.036*** (6.210)
$LIT_t$	0.474*** (14.460)	0.061*** (3.300)	0.473*** (13.790)	-0.358*** (7.680)	-0.315*** (7.350)	-0.308*** (6.630)
$MODIFIED_t$	0.069 (0.340)	0.234 (1.020)	-0.003 (0.020)	-0.131 (0.570)	-0.091 (0.350)	-0.136 (0.700)
$MTB_t$	0.033*** (4.060)	0.025*** (3.050)	0.031*** (3.540)	-0.249*** (16.050)	-0.313*** (20.320)	-0.109*** (7.130)
$NOA_t$	-0.014*** (2.960)	-0.023*** (3.820)	-0.013*** (2.650)	0.040*** (3.660)	0.084*** (6.750)	-0.014 (1.530)
$SALES_t$	-0.004 (0.870)	-0.035*** (4.400)	-0.014*** (3.080)	-0.024*** (3.640)	-0.088*** (11.160)	0.063*** (9.100)

<i>SIZE</i> <sub>t</sub>	-0.121*** (11.550)	0.019*** (3.310)	-0.121*** (11.080)	-0.035** (2.420)	0.001 (0.070)	-0.058*** (3.880)
<i>ZSCORE</i> <sub>t</sub>	0.073*** (8.870)	-0.048*** (6.780)	0.070*** (7.880)	0.063*** (4.570)	0.167*** (12.020)	-0.085*** (5.840)
<i>CONSTANT</i>	0.066 (0.480)	-0.071 (1.280)	-0.010 (0.070)	0.044 (0.490)	0.148** (2.110)	-0.090 (0.900)
<i>YEAR DUMMIES</i>	YES	YES	YES	YES	YES	YES
<i>INDUSTRY DUMMIES</i>	YES	YES	YES	YES	YES	YES
<i>R</i> <sup>2</sup>	0.310	0.010	0.300	0.110	0.150	0.060
<i>N</i>	70,264	70,264	64,538	64,538	64,538	64,538

\* $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table by author.

**Table 8**  
**Heckman Self Selection Two Stage Regression Results for the Impact of Product Market Competition on Earnings Management**

This table presents estimates from Heckman's self-selection model used to investigate the relationship between managers' perception of product market competition and earnings management. The inverse Mills ratio (*LAMBDA*) is from the first stage Heckman Model. Columns (1) – (4) presents second stage results. All models include a constant and the standard errors are clustered at the firm- level. *T*-statistics are given in parentheses.

	<i>DWCA<sub>t</sub></i>	<i>REM<sub>t</sub></i>	<i>ADEXP<sub>t</sub></i>	<i>APROD<sub>t</sub></i>
	(1)	(2)	(3)	(4)
<i>MPCOMP<sub>t</sub></i>	0.014*** (2.620)	-0.085*** (9.210)	-0.083*** (9.560)	-0.059*** (6.490)
<i>AGE<sub>t</sub></i>	0.020 (0.730)	-0.180*** (3.640)	-0.052 (1.050)	-0.273*** (5.400)
<i>BIG4<sub>t</sub></i>	0.044 (1.390)	0.152*** (2.700)	-0.043 (0.760)	0.336*** (5.870)
<i>CLAIM<sub>t</sub></i>	-0.016 (0.860)	0.152*** (4.190)	0.058 (1.590)	0.218*** (5.950)
<i>DIV_YIELD<sub>t</sub></i>	0.016 (1.530)	-0.087*** (4.320)	-0.030 (1.480)	-0.126*** (6.160)
<i>LEV<sub>t</sub></i>	0.021 (1.090)	-0.143*** (4.150)	-0.077** (2.210)	-0.172*** (4.820)
<i>LIT<sub>t</sub></i>	0.071 (0.510)	0.915*** (3.630)	0.419* (1.670)	1.177*** (4.520)
<i>MODIFIED<sub>t</sub></i>	0.230 (0.990)	-0.470** (1.970)	-0.285 (1.050)	-0.534*** (2.600)
<i>MTB<sub>t</sub></i>	0.026* (1.670)	-0.132*** (4.780)	-0.246*** (8.790)	0.028 (1.030)
<i>NOA<sub>t</sub></i>	-0.023*** (3.270)	0.004 (0.340)	0.063*** (4.310)	-0.056*** (4.900)
<i>SALES<sub>t</sub></i>	-0.035*** (4.390)	-0.035*** (5.040)	-0.095*** (11.680)	0.050*** (6.940)
<i>SIZE<sub>t</sub></i>	0.015 (0.360)	-0.425*** (5.650)	-0.223*** (2.920)	-0.514*** (6.690)
<i>ZSCORE<sub>t</sub></i>	-0.047** (2.330)	0.232*** (7.240)	0.264*** (8.090)	0.112*** (3.270)
<i>LAMBDA</i>	0.048 (0.130)	3.284*** (5.020)	1.843*** (2.820)	3.884*** (5.730)
<i>CONSTANT</i>	-0.096 (0.280)	-3.239*** (5.080)	-1.744*** (2.750)	-3.918*** (5.940)
<i>YEAR DUMMIES</i>	YES	YES	YES	YES
<i>INDUSTRY DUMMIES</i>	YES	YES	YES	YES
<i>R<sup>2</sup></i>	0.010	0.110	0.150	0.060
<i>N</i>	70,264	64,538	64,538	64,538

\**p*<0.1; \*\* *p*<0.05; \*\*\* *p*<0.01

Table by author.



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