
Product Market Competition and Earnings Management: A Firm-Level Analysis

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Abstract

In this paper, we employ a firm-level measure of product market competition constructed from the textual analysis of firms' 10-K filings to examine the relationship between managers' perceived competition pressure and earnings management. We find that accounting irregularities and accrual-based earnings management are positively related to product market competition. This finding is consistent with the notion that competition pressure increases managerial incentives to manage earnings, due to their career concerns. We also find that real earnings management is negatively related to product market competition. This finding suggests that real earnings management involves actions that decrease firms' competitiveness and thus is costly for firms confronted with high competition pressure.

JEL Classification: D6; G34; L1; M40; M41

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1. Introduction

In economic literature, intense competition can discipline managers to enhance firm value and improve social efficiency.¹ Nevertheless, several recent studies find that competition can also induce managers to take excessive risks and engage in unethical behavior. In this paper, we employ a firm-level competition measure to examine how managers' perceived competition pressure affects their incentives to manage earnings.

Competition may have two opposing effects on managerial behavior. On the one hand, it can exert disciplinary influences over managers and motivate them to make efforts by providing information on their peers' performance and/or through increasing the pressure from dismissal, firm liquidation, and takeovers (see Fama, 1980; Holmstrom, 1999; Grullon and Michaely, 2007; Tang, 2012; Giroud and Mueller, 2011). On the other hand, competition pressure can induce managers to manipulate financial results in order to mitigate the threats of dismissal, firm liquidation, and takeovers, or to improve their opportunities and conditions for financing (e.g. Bergstresser, and Philippon, 2006; Teoh, Welch, and Wong, 1998a and 1998b; Dechow, Sloan, and Sweeney, 1996; Morellec, Nikonov, and Zucchi, 2013; Markarian and Santalo, 2014).² As investors value firms based on their ability to generate profits, managers can exert influences over market valuation by managing earnings. Such behavior makes reported profits falsely reflect the firm's productivity and can even damage the firm's long-term value. Thus, earnings management can lead to distorted investment decisions and inefficient resource allocation in an economy.

In this paper, we employ a firm-level competition measure introduced in Li, Lundholm, and Minnis (2013), to examine the relationship between firm competition pressure and earnings management. Existing studies generally use competition measures that reflect an industry's overall situation and ignore variations within the industry (e.g. Karuna, Subramanyam, and Tian, 2012; Balakrishnan and Cohen, 2013; Cheng, Man, and Yi, 2013; Ali, Klasa, and Yeung, 2012; Markarian and

¹The idea has been recognized in Adam Smith's *The Wealth of Nations*, who wrote "monopoly...is a great enemy to good management." (Smith, 1776). Similar ideas have been acknowledged by Hicks (1935) and Caves (1980). In the past few decades, research has been done to formalize the idea and investigate the channels through which competition can affect managerial incentives (e.g. Hart, 1983; Nalebuff and Stiglitz, 1983; Scharfstein, 1988; Hermalin, 1992; Schmidt, 1997; Balakrishnan and Cohen, 2013; Aghion, Dewatripont, and Rey, 1999).

²In recent studies, Lin, Officer, and Zhan (2013) and Lee and Liu (2014) use import tariff reductions as a natural experiment and find that earnings management increases with the intensification of competition.

Santalo, 2014). Li, Lundholm, and Minnis (2013) construct a firm-level competition measure from the textual analysis of firms' 10-K disclosures. This measure can capture managers' perceived competition pressure, thus allowing variations across firms within each industry. It does not require an assumption on the classification of industries, and it incorporates competition information from various dimensions and sources including foreign firms, private firms, and potential entrants. This measure has several advantages over the industry-level measures in the analysis of the effects that competition has on firms' earnings management. For example, the competition measure reflects managers' perception, which can be especially useful for the examination of the managers' decisions on financial reporting and operations. More importantly, the employment of a firm-specific measure allows the examination of the relation between competition and earnings management among comparable firms.³

In this paper, we predict that when firms are facing greater competition pressure, their managers have stronger incentives to misstate earnings due to their career concerns. Further, we predict that real earnings management decreases with competition pressure. Although firms can manage real activities to manipulate their reported earnings like discretionary accruals, this real activities manipulation can be rather costly under intense competition pressure. Real earnings management involves real operational and investment decisions, which may adversely affect firms' competitiveness. For example, a firm can cut its advertising and research and development (R&D) expenses to boost reported earnings temporarily. However, those expenses can be important investments to maintain or to expand the firm's market share. Cutting those expenses can be destructive if the firm's products may quickly become obsolete or be easily substituted by those of its competitors. Therefore, costs of real earnings management increase with product market competition and firms under great competition pressure may tend to avoid real activities manipulation.

In our empirical analysis, we find a positive relation between product market competition pressure and the likelihood of accounting misrepresentation. We observe that competition is positively related to the absolute value of discretionary accruals. This observation is consistent with our prediction that when a firm is facing greater competition pressure, its managers have greater incentives to manage earnings. Further, firms under greater competition pressure are more likely to engage in actions that are identified by the SEC to be material violations of GAAP and are more likely to be sued by shareholders. This observation indicates that the positive relation between competition and misrepresentation of financial reports is not completely driven by unintentional

³In the existing empirical literature, earnings management is usually observed by comparing firms within the same industry, such as discretionary accruals and real earnings management. However, industry-level competition measures can only capture the relation between competition and earnings management across industries.

mistakes. We also observe a negative relation between competition pressure and real activities manipulation. This observation is consistent with the prediction that competition makes real earnings management so costly that firms under intense competition pressure tend to avoid real activities manipulation.

We notice that the positive relation between competition and accounting misrepresentation can also be explained by the possibility that when firms perform poorly, managers have incentives to manage earnings and at the same time, emphasize competition as the reason for poor firm performance. This alternative explanation may give rise to an endogenous relation between earnings management and competition pressure. To address this concern, we use an instrument variable for market competition, which is the average competition pressure of the firm's competitors. This measure is less likely to be affected by the firm's performance. With this instrument variable, the regression results are consistent with the previous results. This shows that our results are not driven by the endogenous relation. Furthermore, our results are also robust to the inclusion of an industry-level competition measure and the use of alternative measures of product market threats.

This paper is closely related to Markarian and Santalo (2014), who employ a standard index of industry concentration to proxy for market competition. Another related paper is Muino and Nunez-Nickel (2016). They use firm and industry profitability as competition measures and find non-monotonic relationships between competition and disclosure of segment information.⁴ Our paper contributes to the literature in three ways. First, our employment of a firm-level competition measure derived from the textual analysis of firm disclosures can well capture managers' perception of competition pressure from many sources. Thus, this measure can help us establish a direct relationship between firm managers' incentives and their behavior, especially within industries. Our tests with a traditional industry-level competition measure show that our measure complements the traditional measure and provides additional significant explanatory power for earnings management. Second, we provide new evidence on the effects of competition on the quality of reported earnings. The evidence is consistent with the notion that managers facing high competition pressure have incentives to manipulate reported earnings due to their career concerns. Third, we document a negative relationship between competition pressure and real earnings management, which is inconsistent with Karuna, Subramanyam, and Tian (2012) and Markarian and Santalo (2014). Our finding suggests that the costs of real activities manipulation stemming from product market competition can also affect managers' decisions on firm operations.

⁴ Muino and Nunez-Nickel (2016) is related to our paper in that both papers focus on firm disclosure to investigate the influence of competition. Also, both papers examine product market competition at the firm level and find that competition within an industry could have a different impact on firm disclosure than the industry-level competition.

The remainder of this paper is organized as follows. In Section 2, we discuss the literature related to product market competition and the hypotheses of the effects of product market competition on earnings management. Section 3 provides an overview of the empirical model specification and describes the sample used in our analysis. Section 4 presents and discusses empirical results. We conclude in Section 5.

2. Product Market Competition and Earnings Management

2.1 Literature review

The existing literature has two opposing views on how product market competition affects managerial behavior. First, competition is generally considered to be the force that can discipline managers and promote economic efficiency (Hart, 1983; Nalebuff and Stiglitz, 1983; Shleifer and Vishny, 1997). This view is supported by extensive empirical evidence (Guadalupe and Pérez-González, 2005; Balakrishnan and Cohen, 2013; Grullon and Michaely, 2007; Tang, 2012; Giroud and Mueller, 2011). The mechanism of this disciplinary effect can be that competition provides information on comparable firms' performance that helps the board or the labor market evaluate a manager's ability (Hart, 1983; DeFond and Park, 1999; Nalebuff and Stiglitz, 1983). The assessed ability will, in turn, affect the manager's future compensation and employment opportunities (Fama, 1980). Also, some researchers argue that competition increases the likelihood of takeovers (Kole and Lehn, 1997 and 1999) and liquidation (Schmidt, 1997), in which managers are highly likely to lose their jobs. Therefore, competition can intensify managers' career concerns, which can align the interests of managers with those of shareholders and motivate them to make efforts and undertake efficient policies. In this way, competition can exert disciplinary influences over managers' behavior.

Second, competition may also increase managers' incentives to deviate from appropriate accounting practices and to provide misleading financial results. For example, Shleifer (2004) argues that competition pressure can lead to more aggressive accounting practices in firms, such as earnings management. Markarian and Santalo (2014) argue that competition increases managerial incentives to manipulate earnings by inducing punishment/rewards in the stock market, as accounting earnings indicate a competitive disadvantage/advantage. In their theoretical paper, Bagnoli and Watts (2010) investigate how competition affects the costs and benefits of earnings management. They find that firms are pressured to manage earnings if their rivals engage in earnings management and competition could lead to more earnings management in an industry on average.

Existing empirical studies have examined the relation between industry-level product market competition and earnings management, and find evidence somewhat ambiguous. For example, Gerety and Lehn (1997) provide evidence that external market forces shape corporate activities like earnings management more than internal firm structures. Balakrishnan and Cohen (2013) find that competition has disciplinary power over earnings quality. Karuna, Subramanyam, and Tian (2012) and Markarian and Santalo (2014) find that industry-level competition increases managers' incentives to increase both accrual-based and real earnings management. In contrast, Zang (2012) argues that within an industry, competition makes it costly for less competitive firms to engage in real earnings management. She finds that market leaders tend to undertake more real earnings management, while non-market leaders tend to turn to accrual-based earnings management.

Muino and Nunez-Nickel (2016) examine the effects of competition at the firm and industry levels and relate competition to firm disclosure. They focus on the amount of information that firms provide to investors, particularly firms' decisions on segment information disclosure. Thus, this paper is different from their study in that we examine the quality of the financial information required by GAAP and SEC, i.e., reported earnings, rather than segment information disclosure.

2.2 Hypothesis Development

2.2.1 Product Market Competition and Accounting Misstatements⁵

Extensive empirical evidence has shown that firms can manipulate investors' opinions by managing earnings (Teoh, Welch, and Wong, 1998a and 1998b; Perry and Williams, 1994; Erickson and Wang, 1999; Louis, 2004; Roychowdhury, 2006), leading investors to make distorted investment decisions and resulting in inefficient resource allocation in an economy. Although to some extent, career concerns may discipline managers, they may also induce managers to manipulate reported earnings so that firm performance can falsely and favorably reflect managers' abilities. Consistent with this idea, Hermalin and Weisbach (2007) show that heightened career concerns may cause managers to distort their financial disclosures. Narayanan (1985) documents that top executives may take actions to boost short-term performance if they are concerned with their reputation in the labor market. Karaoglu, Sandino, and Beatty (2006) find evidence that relative performance evaluations in competitive industries can provide incentives for managers to manage earnings in order to match up with fraudulent competing firms. Markarian and Santalo (2014) also provide evidence consistent with the idea that relative performance drives accounting manipulations. Similarly, Jennings, Kedia, and Rajagopal (2012) argue that competition drives down profit margins and firms may employ more aggressive accounting practices to compete with their rivals' inflated financial results.

⁵In this paper, we use reported earnings management and accounting misstatements interchangeably to refer to the misrepresentation of financial reporting.

Firm profitability and the ability to achieve superior performance decline with product market competition. Therefore, managers' incentives to manipulate reported earnings can be strengthened in a more competitive environment where managers' abilities are essential for firm survival and where the firm is facing stronger threats of takeovers and liquidation.⁶ DeFond and Park (1999) find that CEO turnover increases with product market competition and decreases with firm performance. Their finding suggests that product market competition could enhance managers' career concerns and therefore, increase their propensity to manage earnings.

Most studies on earnings management focus on discretionary accruals (Teoh, Welch, and Wong, 1998a and 1998b; Perry and Williams, 1994; Erickson and Wang, 1999; Louis, 2004; Markarian and Santalo, 2014). Discretionary accruals allow firm managers to temporarily boost the firm's earnings of the current period by advancing the recognition of revenue and/or delaying the recognition of expenses. Managers can manipulate earnings by using accruals at their discretion within generally accepted accounting principles (GAAP). Managers under high competition pressure may also take more aggressive approaches to misreporting and engage in accounting misconduct, which constitutes violations of GAAP. Some of these accounting irregularities were identified by the SEC. Therefore, we expect that competition can motivate managers to engage in accounting misstatements, including accrual-based earnings management and accounting irregularities.

Hypothesis 1: Other things being equal, when firms have more competition pressure, their managers are more likely to engage in accounting misstatements.

2.2.2 Product Market Competition and Real Earnings Management

Like discretionary accruals, managers can manipulate real activities to influence reported earnings. For example, they can increase sales through providing price discounts, reduce the cost of goods sold through over-production, and cut discretionary expenditures such as advertising expenses and research and development (R&D) expenses. However, according to Cohen et al. (2008) and Zang (2012), although reported earnings management and real activities manipulation can be substituted to a certain extent, choices between them depend on their relative costs. For firms under high competition pressure, real earnings management can be highly costly and risky, and the managers' ability to manage real activities can be quite limited. Real activities manipulation involves operational decisions that may adversely affect firms' competitive positions and their long-term value. For instance, in a competitive industry, advertising and R&D expenses can be important

⁶Although, as discussed in the previous subsection, competition may discipline managers into making effort by providing additional information on their peers for performance evaluation, we argue that the desire to retain managers' positions when facing intensified competition exacerbate rather than prevent earnings management, which is consistent with Karuna, Subramanyam and Tian (2012) and Markarian and Santalo (2014).

investments to obtain and maintain firms' competition positions and can be essential for their survival. Also, over-production may reduce the cost of goods sold temporarily. Nevertheless, an excessive level of inventory represents a serious risk in a competitive industry, as products have greater chances to be substituted or become obsolete due to constant technological innovations. In addition, providing price discounts could be difficult as profit margin can be very low in a competitive market. Therefore, competition increases costs and risk for real earnings management and firms under high competition pressure are less likely to engage in real activities manipulation than firms under low competition pressure (Zang, 2012). Thus, our second hypothesis is as follows.

Hypothesis 2: Other things being equal, when firms have more competition pressure, their managers are less likely to engage in real earnings management.

The implication of this hypothesis is different from the evidence provided by Markarian and Santalo (2014), which shows that competition increases firms' real activities manipulation as well as accounting earnings. They explain that firms try to appear as profitable as their competitors by managing earnings and manipulating real activities. However, they use an industry-level market concentration index to proxy for competition, which could capture differences in market structures across industries but may omit variations within the same industry. Therefore, our firm-level competition measure is more suitable to examine the effects of competition pressure among comparable firms within an industry.

3. Model and Data

3.1 Product Market Competition

In this paper, we employ a firm-specific competition measure to examine the relation between competition pressure and earnings management. Existing studies generally use industry-level market competition measures, such as Herfindahl-Hirschman index (HHI) constructed from industry sales (Balakrishnan and Cohen, 2013; Tang, 2012; Giroud and Mueller, 2011; Alimov, 2010; Cheng, Man, and Yi, 2013; Harris, 1998; Markarian and Santalo, 2014, etc.). Karuna, Subramanyam, and Tian (2012) employ several competition measures including the industry's gross margin, market size, and entry costs. Although these measures, to some extent, describe industry-level competition intensity from different dimensions, they tend to ignore variations of competition pressure experienced by individual firms within each industry. For instance, within an industry, the market leader may have less competition pressure than new entrants. This difference can be omitted from industry-level competition measures.

In our analysis, we employ a new measure of competition based on the textual analysis of firms' 10-K filings, developed by Li, Lundholm, and Minnis (2013).⁷ Particularly, the occurrences of the competition-related words, such as "competition," "competitor," "competitive," "compete," and "competing," are counted, and those preceded with a negative word such as "not," "less," "few," or "limited" are excluded. Next, the number of competition-related words is scaled by the total number of thousand words in the report, to control for the length of the 10-K filing. Then, firms are ranked by this frequency of competition-related words each year and are put into deciles. The measure of competition pressure (*COMP*) is constructed by subtracting one from the decile rank and dividing the number by nine so that it is scaled in [0, 1].⁸

This measure has several advantages over the traditional industry-level competition measures. First, this measure captures managers' perceptions of individual firms' competitive environments and allows variations across firms within each industry in a year and variations over time for individual firms. Li, Lundholm, and Minnis (2013) find that this measure largely reflects variations of firm-specific competition pressure while capturing industry-level competition characteristics. Measuring competition at the firm level can be an important improvement since the examination of earnings management is more meaningful among comparable firms than across groups of firms operating in different businesses. Second, this measure of competition precludes the classification of industries and captures competition from sources more than firms with data available. How to define an industry is itself a controversial issue. Traditional competition measures, usually based on a certain classification of industries, can be questionable, especially for conglomerate firms and innovative firms. Our measure sidesteps the classification of industries and can capture competition threats posed by private firms, foreign firms, and potential entrants, which tend to be omitted from the traditional measures due to unavailability of data. Third, our measure is a comprehensive measure of competition pressure, while the traditional measures describe one aspect of competition, such as market concentration, entry costs, profit margin, etc. Li, Lundholm, and Minnis (2013) and Bushman, Hendricks, and Williams (2013) examine the validity of this measure by correlating it with the traditional measures. They find that the measure is related to the traditional measures with predicted signs.⁹ Besides, this measure possesses substantial variations and detailed aspects of competition which are omitted from the traditional measures due to researchers' inability to accurately define competition and incorporate all dimensions of competition. Fourth, this

⁷We thank Feng Li for the generous contribution of data to our research.

⁸In the construction of the competition measure, competition words related to labor market, input markets or investment can be included, as described in Li, Lundholm, and Minnis (2013). They show that this measure reflects product market competition and is related with firm investment decisions in predicted ways.

⁹Li, Lundholm and Minnis (2013) and Bushman, Hendricks, and Williams (2013) show that the competition measure is associated with operating and investment decisions in their predicted ways.

measure allows us to establish a direct link with managers' decisions on financial reporting and operations. Managers' perceptions of their firms' competitive environments can affect their decisions on accounting policies and operations. Therefore, with this competition measure, we can perform a vigorous test on the relation between competition pressure and firms' financial reporting and operational decisions.

Zang (2012) uses market share to measure competition pressure, which may capture individual firms' competitive positions within industries. However, her measure could ignore differences in overall product market structures and competition situations across different industries. For example, a firm with a small market share may have greater competition pressure in a concentrated industry than in an industry whose market share is widely dispersed. Still, the market leader in an industry may have greater competition pressure when its products are substitutable, or when the entry costs are low. Compared with her competition measure, our measure captures both the intra-industry variations and industry-level competition characteristics and incorporates competition pressure from different dimensions and sources.

Muino and Nunez-Nickel (2016) employ firm profitability (price-cost margin) and industry profitability as competition measures. Firm profitability allows the authors to examine the impact of competition on the amount of segment information disclosed by individual firms. Nevertheless, profitability, especially at the firm level, could be influenced by factors other than competition pressure, such as firm strategies, management abilities, production processes, sales abilities and efficiency, investment and financing policies, and earnings management. Comparatively, our competition measure can be less noisy as it is derived from management descriptions of firms' competitive environments and is less likely to be affected by management abilities and corporate policies. Also, the competition measure derived from management descriptions can be directly related to managers' decisions on earnings management. Further, our measure incorporates competition not only from existing rivals, but also from potential entrants, substitute products, and foreign competitors.

In sum, the competition measure developed by Li, Lundholm, and Minnis (2013) reflects how firm managers perceive and describe their firms' competition pressure. In this paper, we use this measure to investigate how managers' perceptions of competition pressure induce them to distort their reported earnings, by examining both reported earnings management and real activities manipulation. Also, for robustness tests, we employ two alternative variables to measure product market threats: product similarity and fluidity.

3.2 Data

Our sample is primarily based on the Standard and Poor's COMPUSTAT database from 1995 to 2007. Following previous studies, we remove observations of financial institutions (SIC code from 6000 to 6999) and utility firms (SIC code from 4900 to 4949). All continuous variables are winsorized at the 1st and 99th percentiles to eliminate the influences of extreme values.

Accounting Irregularities and Discretionary Accruals

To capture managers' incentives to manipulate reported earnings, we use accounting irregularities that called for the SEC's enforcement actions, following Karuna, Subramanyam, and Tian (2012). We obtain accounting enforcement data from the SEC's Accounting and Auditing Enforcement Releases (AAERs) to identify accounting misconduct, as in Dechow et al. (2011).¹⁰ We employ the data covering the period from 1995 to 2007. The SEC's AAERs include information on its investigations against companies, auditors, or officers for their alleged accounting and/or auditing misconduct. The misconduct results in accounting irregularities which are intentional misrepresentations of financial statements and constitute material violations of appropriate accounting practices and principles. We use these enforcement actions as the first earnings management measure to emphasize that competition pressure can induce managers to engage in intentional misstatements of financial reports and fraudulent behavior, not ignorant mistakes. In our analysis, we use an indicator variable (*AAER*) that equals to one if the firm is alleged to engage in intentional accounting misstatements in the year as disclosed in the SEC's releases, and zero otherwise.

We also use cases of securities class action lawsuits as an alternative measure of material and intentional accounting misstatements. We obtain the data from Stanford Law Database on Shareholder Lawsuits.¹¹ The database includes several types of corporate frauds, such as self-dealing frauds, disclosure failure, misrepresentation of accounting data, etc. Cases are excluded if they are specifically classified as analyst-related, IPO allocation, mutual fund, and option

¹⁰The SEC issues an AAER at the completion of an investigation involving accounting and auditing issues in violations of SEC and federal rules. We appreciate Dechow et al (2011) for their contribution of data to our research. Dechow et al (2011) construct the data by retaining releases with identified misreporting firms, dropping firms engaging in misconduct other than misstatement of financial reports or firms without CUSIP, and excluding observations with missing data for violation periods or with missing information from COMPUSTAT. See Dechow et al (2011) for details of the data construction on AAER accounting irregularities.

¹¹The database is maintained in cooperation with Cornerstone Research. The data has been used to study corporate frauds (Dyck, Morse and Zingales, 2010) and scandals (Bonini and Boraschi, 2010).

backdating. The majority of the remaining observations are classified as "Classic," which typically refers to cases involving 10(b) claims (misstatements or omissions) and/or other common securities law violations. We define an indicator variable, *LAWSUIT*, which equals to one if shareholders filed a securities class action against the firm during that specific period, and zero otherwise.

Accounting irregularities and shareholder lawsuits can represent material violations of GAAP and however, can be subject to selection problems.¹² We also use discretionary accruals in our analysis to facilitate the examination of earnings management in a more general setting. We compute discretionary accruals using the modified Jones model with firm performance (Jones, 1991; Dechow et al., 1995; Kothari, Leone, and Wasley, 2005; Karuna, Subramanyam, and Tian, 2012; Markarian and Santalo, 2014). Specifically, we run a regression of the cross-sectional modified Jones model with firm performance each year with all observations in each two-digit SIC industry and estimate nondiscretionary accruals as the fitted value from the regression.

$$\frac{TA_{i,t}}{Assets_{i,t-1}} = a_0 + a_1 \frac{1}{Assets_{i,t-1}} + a_2 \frac{(\Delta Sales_{i,t} - \Delta AR_{i,t})}{Assets_{i,t-1}} + a_3 \frac{PPE_{i,t}}{Assets_{i,t-1}} + a_4 \frac{ROA_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (1)$$

$$DA_{i,t} = \frac{TA_{i,t}}{Assets_{i,t-1}} - NDA_{i,t} \quad (2)$$

$NDA_{i,t}$ in equation (2) is the fitted value from equation (1). Discretionary accruals are the difference between total accruals and the estimated non-discretionary accruals. Discretionary accruals can result from moving revenues and expenses across time, which have to reverse in the long term. Therefore, signed discretionary accruals may not signify earnings management consistently. For example, a negative value of discretionary accruals may indicate managers' intention to reduce reported earnings or can be the result of reversing large positive discretionary accruals accumulated in the previous periods. Consistent with previous studies, we employ the absolute value of discretionary accruals (ABS_DA) to indicate managers' incentives to manage earnings by using discretionary accruals.

¹²As discussed in Dechow, et al (2011), due to limited resources, the SEC is more likely to investigate firms that demonstrate signs of misstatements, such as restatements or large write-offs. Other accounting misstatements are likely to be unidentified. Also, shareholder lawsuits alleging misstatements are highly likely after a precipitous stock price decline, even without clear supporting evidence.

Real Earnings Management

Following Roychowdhury (2006), we construct three measures of real earnings management: sales manipulation, discretionary expenditures, and over- or under-production. We derive the abnormal level of sales caused by temporary price discounts or lenient credit terms, by using cash flow from operations scaled by assets and running cross-sectional regressions. In the same way, we estimate abnormal production costs and abnormal discretionary expenditures. Particularly, we run the following regressions:

$$\frac{CFO_{i,t}}{Assets_{i,t-1}} = b_0 + b_1 \frac{1}{Assets_{i,t-1}} + b_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + b_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \epsilon_{i,t} \quad (3)$$

$$\frac{DISEXP_{i,t}}{Assets_{i,t-1}} = c_0 + c_1 \frac{1}{Assets_{i,t-1}} + c_2 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \epsilon_{i,t} \quad (4)$$

$$\frac{PROD_{i,t}}{Assets_{i,t-1}} = d_0 + d_1 \frac{1}{Assets_{i,t-1}} + d_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + d_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + d_4 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \epsilon_{i,t} \quad (5)$$

We run a cross-sectional regression of equation (5) each year for each two-digit SIC industry and estimate abnormal production costs (*AB_PROD*) as the residual from the regression. Similarly, we run cross-sectional regressions of equation (3) and (4) each year for each two-digit SIC industry, and the residuals are multiplied by negative one to generate the abnormal level of sales (*AB_CFO*) (from equation (3)) and abnormal discretionary expenditures (*AB_EXP*) (from equation (4)). In this way, a higher value consistently indicates greater real activities manipulation to boost earnings for all the three variables. In our analysis, we also employ an aggregate measure (*RM*), which is the sum of the three real earnings management variables. As we can see, a higher value of *RM* indicates that the firm engages in more income-increasing real earnings management.

[Insert Table I here]

Table I describes the sample in our analysis. The final sample consists of 19,778 firm-year observations with 4,087 firms. Since *COMP* is the competition measure derived by ranking firms, it has the mean of 0.5 with the median of 0.44. As we can see, earnings-related misreporting and frauds are infrequently identified. The mean of *AAER* is 0.02, and the mean of *LAWSUIT* is 0.01. The sample has the mean absolute value of discretionary accruals of 0.08. As for real earnings management, the sample has the mean abnormal cash flow from operation of -0.07, the mean abnormal discretionary expenditures of 0.12, and the mean abnormal production costs of 0.004.

Also, the sample firms have the mean market-to-book ratio of 2.55, the mean leverage ratio of 0.18, and the mean operating cycle of 137 days. The sample firms incur a loss in about one-third of the observations and 86 percent of the firms employ *Big Four* accounting firms as their auditors. These descriptive statistics are generally consistent with the existing literature.

3.3 Empirical Model

In order to test how competition pressure affects firms' earnings management, we develop our model specification following previous studies (Karuna, Subramanyam, and Tian, 2013; Karuna, 2007; Roychowdhury, 2006; Dechow and Dichev, 2002; Skinner and Sloan, 2002; Lee, Li, and Yue, 2006; Markarian and Santalo, 2014). Specifically, we regress earnings management measures on competition pressure (*COMP*), with controls for firm size (*SIZE*), growth potentials (*MB*), industry-adjusted firm financial performance (*ADJ_ROA*), leverage ratio (*LEV*), firm age (*FIRM_AGE*), and the length of the operating cycle (*OPCYCLE*). We also control for external equity financing (*EEF*) in our regressions, as firms with greater financing needs are more motivated to manipulate reported earnings. In order to control for the influence of auditing quality, we include an indicator variable which equals to one if the firm's auditor is one of the "Big Four" accounting firms, and zero otherwise (*Big 4*) (Becker et al (1998), and Francis et al. (1999)). Further, according to Hribar and Nichols (2007), unsigned earnings management measures are correlated with the volatility of cash flows and revenues. Therefore, we include in our regressions cash flow volatility (*CFOVOLT*) and sales growth volatility (*SALESGRVOLT*). To control for the correlations of residuals across time, we include year fixed effects in all regressions. We run regressions without and with industry fixed effects, to examine the influence of competition across industries and within industries. The standard errors are clustered by firm and year (Petersen, 2009).

Firms may use a combination of accounting misstatements and real activities manipulation to manage their reported earnings, and they tend to choose the approach that is less costly to them (Cohen et al., 2008; Zang, 2012). To control for the substitutive nature of these earnings management methods, we include accrual-based earnings management in the regressions of real activities manipulation. Similarly, we also control for real activities manipulation in the regressions of accounting irregularities and accrual-based earnings management.

Poor performance can induce firms to engage in earnings management, and at the same time, managers tend to emphasize competition as the reason for the poor performance in their financial reports.¹³ Thus, the association between competition and earnings management can be explained by the possibility that they are both related to firm performance. To address this issue, we use the

¹³Li, Lundholm and Minnis (2013) show that *COMP* does not proxy for the firm's current year performance, as might be the case if managers blame competition for poor firm performance.

average *COMP* of each firm's competitors as an instrument variable in the regressions. This variable is not related to the firm's discussion of competition and thus, is less likely to be affected by the firm's tendency to refer to competition to explain the firm's performance in its financial reports. At the same time, this variable is still firm-specific, as each firm has a different group of competitors. With this instrument variable, we can control for the possible endogenous relation dictated above.

4. Empirical Analyses

4.1 The Effects of Competition on Accounting Irregularities and Accrual-Based Earnings Management

First, we examine the relationship of perceived product market competition pressure with identified accounting irregularities and accrual-based earnings management. Besides the control variables discussed above, we also include the variable that captures real activities manipulation (*RM*) in the regressions.

[Insert Table II here]

Table II presents the regression results of accounting irregularities and accrual-based earnings management on managers' perceived competition pressure. For each of the three accounting misstatement measures, we run a regression with industry fixed effects and one without industry fixed effects. Industry fixed effects can pick up time-invariant industry-level characteristics that can influence earnings management. After controlling for industry fixed effects, *COMP* mainly captures the effects of competition on earnings management within industries.

In the first and second regressions, we employ the indicator variable for the occurrences of AAER accounting irregularities as the dependent variable and include discretionary accruals as a control variable. As we can see from the logit regression results, the coefficient of competition pressure is positive and is statistically significant at the 10% level. In the third and fourth regressions, the dependent variable is *LAWSUIT*. We also find that the perceived competition pressure is positively related to the likelihood that a securities class action lawsuit is filed against the firm. The coefficient of *COMP* is statistically significant at the 1% level in both regressions. The evidence is also economically meaningful. For example, an increase of one standard deviation in *COMP* from the mean increases the probability of AAER by 0.16 percentage point, which represents 8% of the mean probability. Further, an increase of one standard deviation in *COMP* from the mean increases the probability of *LAWSUIT* by 0.17 percentage point, which represents 17% of the mean probability. The results are consistent with *Hypothesis 1* that competition pressure induces managers to engage in intentional misrepresentation of financial reports, which can lead to punitive consequences for firms. The inclusion of industry fixed effects has little impact on the magnitude and significance of

the coefficient, implying that the results are driven mostly by within-industry effects, rather than cross-industry effects.

We also test managers' incentives to manipulate reported earnings by using discretionary accruals under competition pressure. In the fifth and sixth regressions, the dependent variable is the absolute value of discretionary accruals. As we can see, with controls for the influential factors documented in the previous literature, the coefficient of *COMP* is positive and statistically significant at the 5% level. This provides further support for *Hypothesis 1* that managers' perceived competition pressure could induce them to manage earnings by using discretionary accruals.¹⁴

4.2 The Effects of Competition on Real Earnings Management

Next, we examine the relationship between managers' perceived competition pressure and real earnings management. Similarly, we include discretionary accruals in the regressions to control for the possibility that firms choose real activities manipulation as a substitute for accrual-based earnings management. We run regressions with and without industry fixed effects.

[Insert Table III here]

Table III presents the regression results of real earnings management on perceived competition pressure. The first six regressions examine the relation between competition pressure and three different measures of real activities manipulation: abnormal level of sales, abnormal discretionary expenditures, and abnormal production costs. In the last two regressions, we employ the aggregate variable of the three measures (*RM*). As we can see, the coefficient of competition pressure is consistently negative and is statistically significant at the 1% level in seven out of eight regressions. The results are consistent with *Hypothesis 2* that for firms facing high competition pressure, managers tend to avoid offering price discounts, cutting R&D or advertising expenses, and over-production, despite their intention to improve reported earnings. For firms under high competition pressure, real earnings management can be rather costly and may damage their competitive edge. Also, except for the regressions of the abnormal level of sales (*AB_CFO*), the coefficient of *COMP* is more significant in regressions with industry fixed effects. This observation may indicate that the effects of product market competition are stronger among comparable firms within industries.

¹⁴ As a robustness check, we repeat the analysis using an alternative measure of accruals quality as in Dechow and Dechev (2002) and Francis et. al. (2005). Our results (untabulated) do not change with this new measure.

4.3 Tests with an Instrument Variable

As we have discussed above, a plausible explanation for the observed relationship between competition and earnings management is that firm managers are more motivated to engage in earnings management when firms perform poorly, and at the same time, emphasize competition in their financial reports to explain their performance. Therefore, to control for the possible endogenous relation that both *COMP* and earnings management are related to a latent variable, such as firm performance, we use an alternative competition measure, average *COMP* of each firm's competitors. This measure can proxy for the firm's competition pressure and is not directly related to the firm's performance or its managers' tendency to emphasize competition in their discussions. We identify each firm's competitors by following Hoberg and Phillips (2010) and run regressions with the average competition pressure of the firm's competitors (*COMP_HP*). Again, we examine the effects of competition on AAER accounting irregularities, shareholder lawsuits, discretionary accruals, and the aggregate measure of real earnings management.

[Insert Table IV here]

Regression results are reported in Table IV. As we can see, with this alternative measure, the magnitude and the significance of the coefficient are essentially unaffected in the regressions of *AAER* and *Lawsuits* and increase substantially in the other two regressions. This indicates that our results are not driven by the endogenous relation that an omitted factor influences both earnings management and managers' tendency to stress competition in financial reports.

4.4. Tests with an Industry-Level Competition Measure

Next, we include an industry-level competition measure in the regressions to investigate whether our measure, perceived competition pressure, can provide additional explanatory power to earnings management. In the regressions, we use Herfindahl-Hirschman index (HHI), the industry-level competition measure widely used in previous studies (Balakrishnan and Cohen, 2013; Giroud and Mueller, 2011; Karuna, Subramanyam, and Tian, 2012).¹⁵ Recognizing that industry fixed effects included in Tables II and III can effectively capture time-invariant industry-level competition characteristics, we include this time-varying competition measure to test our results further.

[Insert Table V]

Regression results are reported in Table V. The significant coefficient of *COMP* in the regressions of *AAER*, *LAWSUIT*, *ABS_DA*, and *RM* is 0.519, 0.779, 0.008, and -0.060, respectively. Therefore, the inclusion of a traditional industry-level competition measure does not change our results. With controls for market concentration, the sign and the magnitude of the coefficient of *COMP* are roughly unaffected in all regressions. This indicates that our competition measure, *COMP*, provides additional explanatory power to earnings management. The coefficient of Herfindahl-Hirschman index based on 4-digit SIC industry is insignificant in all regressions. As robustness checks, we recalculate HHI in two alternative ways by following Cremers et al. (2008) and Balakrishnan and Cohen (2013), respectively. The results are essentially unchanged. The results can be explained by the argument that industry concentration, as a competition measure, can be endogenous and incomplete and cannot capture competition threat within the industry (Demsetz, 1973; Sutton, 1991; Raith, 2003; Karuna, 2007).

As has been discussed, previous studies generally use industry-level competition measures assuming that competition is the same for all firms within each industry. Our firm-level measure is different in that it could capture within-industry variations. The correlation (Pearson) between *COMP* and *HHI* is -0.096 in Li, Lundholm, and Minnis (2013) and -0.0474 in our paper. This implies that while to some extent, these two measures are correlated, they are still quite different. *COMP* could capture additional competition effects that are left out by the industry-level competition measure.

Balakrishnan and Cohen (2013) show that competition can negatively affect accounting irregularities at the industry level, and they attribute this finding to the disciplining mechanism of

¹⁵Following Karuna, Subramanyam, and Tian (2012), we define Herfindahl-Hirschman index as the sum of squared market shares of the firms in the industry. We classify industries by using the four-digit SIC code.

competition. In this paper, after controlling for the industry-level competition measure, we show that firms in the same industry have different perceived competition pressure, and the competition pressure positively affects accounting irregularities. Our finding is consistent with the notion that individual managers who feel more competition pressure from their competitors within the same industry have greater incentives to manipulate earnings in order to secure their jobs, leading to more misstatements.

4.5 Tests with Alternative Firm-Level Competition Measures

To further test the robustness of our results, we employ two alternative firm-level measures of product market threats. Both measures are derived from the textual analysis of firms' product descriptions in their 10-K filings.

The first measure, introduced by Hoberg and Phillips (2010), captures the similarity of a firm's products to its rivals' products. Specifically, Hoberg and Phillips (2010) compute pair-wise similarity scores by analyzing the textual descriptions of firms' products in their 10-K reports, forming words vectors, and pairing each firm with every other firm each year. Then, they generate the text-based network industry classifications (TNIC) and calculate total similarity scores based on the classifications.¹⁶ According to Hoberg and Phillips (2010), this product similarity measure and the new industry classifications can better explain managerial discussions of competition and firms' investments in future product differentiation. In our analysis, we rank firms by their total product similarity scores and put the firms into deciles. Firm product similarity (*SIM*) is derived by subtracting one from the decile rank and dividing the difference by 9 to scale the variable between 0 and 1. We expect that firms with higher product similarity are facing greater competition pressure than firms with dissimilar products.

[Insert Table VI here]

Panel A in Table VI presents the regression results with firm product similarity (*SIM*) in place of the competition pressure measure. Again, we report the results of AAER accounting irregularities, shareholder lawsuit, discretionary accruals, and real earnings management. Control variables are omitted from the table to conserve space. As we can see, consistent with the previous results, firm product similarity is positively related to AAER accounting irregularities and shareholder lawsuits, and it is negatively related to real earnings management. The results further confirm our findings that product market competition pressure induces managers to engage in more accounting misstatements and to avoid real earnings management.

¹⁶ We obtain the data from the Hoberg-Phillips data library website: <http://www.rhsmith.umd.edu/industrydata/industryconcen.htm>. See Hoberg and Phillips (2010) for the detailed explanation of product similarity scores and TNIC.

Furthermore, by following Hoberg, Phillips, and Prabhala (2014), we also use product market fluidity, a dynamic measure of competition threats. Fluidity is also based on product descriptions in firms' 10-K filings and especially focuses on the changes in products. We expect that in a competitive market, firms have to constantly change their product designs, features, and technologies to maintain their competitiveness. This measure captures how a firm's rivals are changing their product description words that overlap with the description words of the firm. Fluidity is higher when the firm has a greater overlap of product descriptions with its rivals and when its rivals change their vocabulary more quickly, thereby implying greater product market threats. In our analysis, firms are ranked by fluidity and are put into deciles. Then, a transformed fluidity measure (*FLU*) is derived by subtracting one from the decile rank and then dividing the number by 9, to scale the variable between 0 and 1.

We report the regression results with the fluidity variable in Panel B of Table VI. Again, control variables are omitted in the table. Similar to the previous results, fluidity is positively related to discretionary accruals, AAER accounting irregularities, and shareholder lawsuits, and the relationship is statistically significant at the 5% level in all regressions except for AAER accounting irregularities. Also, the relationship between fluidity and real earnings management is negative and statistically significant at the 1% level. This confirms our findings that competition threats can induce managers to engage in earnings misrepresentation, and can also make real earnings management costly.

5. Conclusion

In this paper, we employ a firm-level measure of competition pressure to examine the effects of product market competition on managers' incentives to manage earnings. Unlike previous studies that generally use industry-level competition measures, our measure can capture both industry-level competition characteristics and variations within industries. With this measure, we find that firms with greater competition pressure are more likely to have accounting irregularities, engage in accrual-based earnings management, and encounter shareholder lawsuits. This finding is consistent with Karuna, Subramanyam, and Tian (2012). Nevertheless, we also find a negative relationship between competition pressure and real earnings management. This finding suggests that competition makes real earnings management costly, and firms under great competition pressure tend to avoid real activities manipulation. Our results are robust to using an instrument variable of competition and alternative measures of competition pressure.

In the existing literature, competition can be viewed as the force that improves firm efficiency and social welfare. In several recent studies, researchers investigate the dark side of competition, especially managers' behavior under competition pressure. Our study contributes to the existing literature by providing evidence on the effects of competition pressure on managers' financial

reporting behavior. It sheds new light on the research of agency problems in different competitive environments.

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Table I: Statistical Summary

This table presents the statistical summary of our sample. The sample is based on the Standard and Poor's COMPUSTAT over the period 1995 to 2007. Financial institutions and utility firms are dropped. The final sample consists of 19,778 firm-year observations with 4,087 firms. *AAER* is an indicator variable that equals to one if the firm is alleged to engage in intentional accounting misstatements for the year as disclosed in the SEC's releases and zero otherwise. *LAWSUIT* is an indicator variable that equals to one if shareholders sued the company during that specific period and zero otherwise. Discretionary accruals are derived by using modified Jones model with firm performance, and *ABS_DA* is the absolute value of the residuals from the estimation of Equation (1). *AB_CFO* and *AB_EXP* are abnormal levels of cash flows and abnormal discretionary expenditures, which are calculated as the residuals from the estimation of Equation (3) and (4), multiplied by negative one. *AB_PROD* is abnormal production costs calculated as the residuals from the estimation of Equation (5). *RM* is the sum of *AB_CFO*, *AB_EXP*, and *AB_PROD*. *COMP* is a product market competition measure defined in Li, Lundholm and Minnis (2013). *SIZE* is natural logarithm of the market value of equity. *MB* is market-to-book equity ratio. *ADJ_ROA* is 2-digit-SIC industry-adjusted ROA, where ROA is measured as income before extraordinary items, scaled by lagged total assets. *LEV* is long-term debt scaled by total assets; *EEF* is net equity financing in the next year scaled by lagged total assets. *BIG4* is an indicator variable that equals to one if the firm's auditor is one of the "Big Four" accounting firms, and zero otherwise. *CFOVOLT* is the standard deviation of operating cash flows scaled by lagged total assets during the past five years, divided by the mean of operating cash flows over the same period. *SALESGRVOLT* is the standard deviation of sales growth during the

past five years, divided by the mean of sales growth over the same period. *OPCYCLE* is operating cycle, defined as the sum of average accounts receivables divided by sales and average inventory divided by cost of goods sold, then multiplied by 365. All continuous variables are winsorized at the 1st and 99th percentiles.

| Variable | N | Mean | Median | Std. Dev. | 25th | 75th |
|-------------|-------|--------|--------|-----------|-------|--------|
| AAER | 19778 | 0.02 | 0.00 | 0.13 | 0.00 | 0.00 |
| LAWSUIT | 19778 | 0.01 | 0.00 | 0.12 | 0.00 | 0.00 |
| ABS_DA | 19778 | 0.08 | 0.06 | 0.09 | 0.02 | 0.11 |
| AB_CFO | 19778 | -0.07 | -0.06 | 0.13 | -0.14 | 0.01 |
| AB_EXP | 19778 | 0.12 | 0.11 | 0.25 | -0.01 | 0.27 |
| AB_PROD | 19778 | 0.004 | 0.003 | 0.19 | -0.10 | 0.10 |
| RM | 19778 | 0.06 | 0.06 | 0.41 | -0.15 | 0.29 |
| COMP | 19778 | 0.50 | 0.44 | 0.32 | 0.22 | 0.78 |
| SIZE | 19778 | 5.67 | 5.61 | 2.11 | 4.11 | 7.10 |
| MB | 19778 | 2.55 | 1.93 | 2.57 | 1.17 | 3.14 |
| ADJ_ROA | 19778 | 0.03 | 0.03 | 0.13 | -0.02 | 0.09 |
| LEV | 19778 | 0.18 | 0.14 | 0.19 | 0.01 | 0.29 |
| EEF | 19778 | -0.01 | 0.001 | 0.09 | -0.03 | 0.01 |
| BIG4 | 19778 | 0.86 | 1.00 | 0.35 | 1.00 | 1.00 |
| CFOVOLT | 19778 | 1.70 | 0.57 | 4.16 | 0.29 | 1.24 |
| SALESGRVOLT | 19778 | 3.27 | 1.26 | 7.50 | 0.73 | 2.43 |
| OPCYCLE | 19778 | 137.21 | 120.01 | 84.34 | 79.11 | 173.56 |

Table II: Accounting Irregularities and Accrual-based Earnings Management and Product Market Competition

This table presents the regression results of accounting irregularities and accrual-based earnings management on product market competition. *AAER* is an indicator variable that equals to one if the firm is alleged to engage in intentional accounting misstatements for the year as disclosed in the SEC's releases and zero otherwise. *LAWSUIT* is an indicator variable that equals to one if shareholders sued the company during that specific period, and zero otherwise. Discretionary accruals are derived by using modified Jones model with firm performance, and *ABS_DA* is the absolute value of the residuals from the estimation of Equation (1). *AB_CFO* and *AB_EXP* are abnormal levels of cash flows and abnormal discretionary expenditures, which are calculated as the residuals from the estimation of Equation (3) and (4), multiplied by negative one. *AB_PROD* is abnormal production costs calculated as the residuals from the estimation of Equation (5). *RM* is the sum of *AB_CFO*, *AB_EXP*, and *AB_PROD*. *COMP* is a product market competition measure defined in Li, Lundholm and Minnis (2013). *SIZE* is natural logarithm of the market value of equity. *MB* is market-to-book equity ratio. *ADJ_ROA* is 2-digit-SIC industry-adjusted ROA, where ROA is measured as income before extraordinary items, scaled by lagged total assets. *LEV* is long-term debt scaled by total assets; *EEF* is net equity financing in the next year scaled by lagged total assets. *BIG4* is an indicator variable that equals to one if the firm's auditor is one of the "Big Four" accounting firms, and zero otherwise. *CFOVOLT* is the standard deviation of operating cash flows scaled by lagged total assets during the past five years, divided by the mean of operating cash flows over the same period. *SALESGRVOLT* is the standard deviation of sales growth during the past five years, divided by the mean of sales growth over the same period. *OPCYCLE* is operating cycle, defined as the sum of average accounts receivables divided by sales and average inventory divided by cost of goods sold, then multiplied by

365. All continuous variables(except *COMP*) are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included in the regressions but are not reported. Standard errors are clustered by firm and year (Petersen, 2009; Gow et al. 2010) and t-values are presented in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | AAER | | LAWSUIT | | ABS_DA | |
|-------------|----------|----------|-----------|-----------|-----------|-----------|
| COMP | 0.501* | 0.493* | 0.744*** | 0.611*** | 0.007** | 0.004** |
| | (1.833) | (1.766) | (3.700) | (2.871) | (2.243) | (2.157) |
| ABS_DA | 2.082*** | 1.849*** | 1.595** | 0.931 | | |
| | (4.162) | (3.463) | (2.089) | (1.249) | | |
| RM | 0.623*** | 0.423** | (0.209) | -0.396** | 0.000 | -0.002 |
| | (3.010) | (2.114) | (-1.112) | (-2.199) | (0.044) | (-0.697) |
| SIZE | 0.369*** | 0.391*** | 0.396*** | 0.420*** | -0.005*** | -0.005*** |
| | (8.582) | (8.603) | (16.742) | (18.062) | (-8.532) | (-9.840) |
| MB | -0.029 | -0.034 | -0.112*** | -0.133*** | 0.004*** | 0.003*** |
| | (-0.883) | (-1.136) | (-3.651) | (-4.567) | (12.921) | (14.050) |
| ADJ_ROA | -0.589 | -0.797 | -1.598*** | -2.618*** | -0.059*** | -0.071*** |
| | (-1.020) | (-1.369) | (-2.633) | (-5.102) | (-3.191) | (-3.646) |
| LEV | -0.227 | 0.316 | -0.707* | -0.134 | -0.009 | -0.010* |
| | (-0.529) | (0.661) | (-1.695) | (-0.314) | (-0.938) | (-1.705) |
| EEF | 1.721*** | 1.790*** | -0.131 | -0.437 | 0.064*** | 0.052*** |
| | (2.887) | (3.083) | (-0.185) | (-0.600) | (6.373) | (5.662) |
| BIG4 | 0.085 | 0.045 | 0.017 | 0.019 | -0.008*** | -0.007** |
| | (0.279) | (0.151) | (0.060) | (0.069) | (-2.933) | (-2.479) |
| CFOVOLT | 0.012 | 0.004 | 0.007 | 0.003 | 0.002*** | 0.001*** |
| | (0.796) | (0.282) | (0.520) | (0.210) | (6.858) | (6.183) |
| SALESGRVOLT | -0.007 | -0.004 | -0.038* | -0.037* | 0.000 | 0.000 |
| | (-0.697) | (-0.458) | (-1.720) | (-1.707) | (1.030) | (0.818) |

| | | | | | | |
|------------------------------|----------|---------|----------|----------|----------|----------|
| | 0.002*** | 0.002* | 0.002*** | 0.002*** | 0.000 | 0.000 |
| OPCYCLE | (2.704) | (1.877) | (4.803) | (3.739) | (-0.995) | (-1.068) |
| Industry fixed effects | No | Yes | No | Yes | No | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 19778 | 17769 | 18518 | 17220 | 19778 | 19778 |
| Pseudo or Adj.R ² | 0.080 | 0.116 | 0.073 | 0.100 | 0.077 | 0.109 |

Table III: Real Earnings Management and Product Market Competition

This table presents the OLS regression results of real activities manipulation on product market competition. *AAER* is an indicator variable that equals to one if the firm is alleged to engage in intentional accounting misstatements for the year as disclosed in the SEC's releases and zero otherwise. *LAWSUIT* is an indicator variable that equals to one if shareholders sued the company during that specific period, and zero otherwise. Discretionary accruals are derived by using modified Jones model with firm performance, and *ABS_DA* is the absolute value of the residuals from the estimation of Equation (1). *AB_CFO* and *AB_EXP* are abnormal levels of cash flows and abnormal discretionary expenditures, which are calculated as the residuals from the estimation of Equation (3) and (4), multiplied by negative one. *AB_PROD* is abnormal production costs calculated as the residuals from the estimation of Equation (5). *RM* is the sum of *AB_CFO*, *AB_EXP*, and *AB_PROD*. *COMP* is a product market competition measure defined in Li, Lundholm and Minnis (2013). *SIZE* is natural logarithm of the market value of equity. *MB* is market-to-book equity ratio. *ADJ_ROA* is 2-digit-SIC industry-adjusted ROA, where ROA is measured as income before extraordinary items, scaled by lagged total assets. *LEV* is long-term debt scaled by total assets; *EEF* is net equity financing in the next year scaled by lagged total assets. *BIG4* is an indicator variable that equals to one if the firm's auditor is one of the "Big Four" accounting firms, and zero otherwise. *CFOVOLT* is the standard deviation of operating cash flows scaled by lagged total assets during the past five years, divided by the mean of operating cash flows over the same period. *SALESGRVOLT* is the standard deviation of sales growth during the past five years, divided by the mean of sales growth over the same period. *OPCYCLE* is operating cycle, defined as the sum of average accounts receivables divided by sales and average inventory divided by cost of goods sold, then multiplied by 365. All continuous variables(except *COMP*) are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included in the regressions but are not reported. Standard errors are clustered by firm and year (Petersen, 2009; Gow et al. 2010) and t-values are presented in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | AB_CFO | | AB_EXP | | AB_PROD | | RM | |
|--------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|
| COMP | -0.031*** | -0.014*** | -0.003 | -0.046*** | -0.031*** | -0.041*** | -0.065*** | -0.101*** |
| | (-6.079) | (-3.888) | (-0.342) | (-5.761) | (-4.761) | (-6.064) | (-4.747) | (-6.954) |
| ABS_DA | 0.030* | 0.062*** | -0.067 | -0.138*** | 0.040* | 0.039* | 0.003 | -0.038 |

| | | | | | | | | |
|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | (1.755) | (3.449) | (-1.368) | (-2.957) | (1.787) | (1.829) | (0.044) | (-0.677) |
| SIZE | -0.007*** | -0.008*** | 0.004 | 0.008*** | -0.002 | 0.000 | -0.005 | -0.001 |
| | (-5.804) | (-7.271) | (1.451) | (3.413) | (-1.096) | (-0.134) | (-1.384) | (-0.226) |
| MB | -0.003*** | -0.002*** | -0.013*** | -0.018*** | -0.014*** | -0.015*** | -0.030*** | -0.035*** |
| | (-5.172) | (-2.854) | (-9.599) | (-13.139) | (-13.132) | (-15.125) | (-14.129) | (-17.257) |
| ADJ_ROA | -0.404*** | -0.364*** | 0.333*** | 0.132*** | -0.172*** | -0.270*** | -0.243*** | -0.502*** |
| | (-20.540) | (-22.763) | (9.006) | (4.547) | (-6.189) | (-10.624) | (-4.025) | (-9.311) |
| LEV | 0.024*** | 0.001 | 0.090*** | 0.182*** | 0.024 | 0.069*** | 0.138*** | 0.252*** |
| | (3.708) | (0.168) | (4.472) | (10.145) | (1.390) | (4.199) | (3.785) | (7.400) |
| EEF | 0.056*** | 0.081*** | -0.063** | -0.126*** | 0.102*** | 0.090*** | 0.095* | 0.044 |
| | (4.320) | (7.702) | (-1.991) | (-4.399) | (3.949) | (3.093) | (1.957) | (0.831) |
| BIG4 | -0.003 | -0.001 | -0.013 | -0.019 | -0.008 | -0.010 | -0.024 | -0.030 |
| | (-0.812) | (-0.388) | (-1.103) | (-1.641) | (-0.929) | (-1.196) | (-1.240) | (-1.610) |
| CFOVOLT | 0.002*** | 0.002*** | 0.000 | 0.000 | 0.002*** | 0.002*** | 0.004*** | 0.004*** |
| | (5.400) | (6.351) | (0.080) | (-0.740) | (3.970) | (3.951) | (3.583) | (3.578) |
| SALESGRVOLT | 0.000* | 0.000* | 0.001*** | 0.001*** | 0.000 | 0.000* | 0.002*** | 0.002*** |
| | (1.653) | (1.668) | (3.752) | (3.646) | (1.586) | (1.688) | (3.630) | (3.427) |
| OPCYCLE | -0.000*** | -0.000** | 0.000 | -0.000*** | -0.000*** | -0.001*** | -0.000*** | -0.001*** |
| | (-5.034) | (-2.181) | (1.142) | (-2.838) | (-9.861) | (-11.647) | (-4.804) | (-7.103) |
| Industry fixed effects | No | Yes | No | Yes | No | Yes | No | Yes |
| Year fixed effects | Yes |
| # Observations | 19778 | 19778 | 19778 | 19778 | 19778 | 19778 | 19778 | 19778 |
| Adj.R ² | 0.276 | 0.330 | 0.075 | 0.208 | 0.097 | 0.140 | 0.080 | 0.145 |

Table IV: Regressions on an Alternative Competition Pressure Measure

This table presents the regression results of accounting irregularities, accrual-based earnings management and real activities manipulation on average product market competition (*COMP_HP*) of a firm's competitors, identified based on Hoberg-Phillips grouping. *AAER* is an indicator variable that equals to one if the firm is alleged to engage in intentional accounting misstatements for the year as disclosed in the SEC's releases and zero otherwise. *LAWSUIT* is an indicator variable that equals to one if shareholders sued the company during that specific period, and zero otherwise. Discretionary accruals are derived by using modified Jones model with firm performance, and *ABS_DA* is the absolute value of the residuals from the estimation of Equation (1). *AB_CFO* and *AB_EXP* are abnormal levels of cash flows and abnormal discretionary expenditures, which are calculated as the residuals from the estimation of Equation (3) and (4), multiplied by negative one. *AB_PROD* is abnormal production costs calculated as the residuals from the estimation of Equation (5). *RM* is the sum of *AB_CFO*, *AB_EXP*, and *AB_PROD*. *SIZE* is natural logarithm of the market value of equity. *MB* is market-to-book equity ratio. *ADJ_ROA* is 2-digit-SIC industry-adjusted ROA, where ROA is measured as income before extraordinary items, scaled by lagged total assets. *LEV* is long-term debt scaled by total assets; *EEF* is net equity financing in the next year scaled by lagged total assets. *BIG4* is an indicator variable that equals to one if the firm's auditor is one of the "Big Four" accounting firms, and zero otherwise. *CFOVOLT* is the standard deviation of operating cash flows scaled by lagged total assets during the past five years, divided by the mean of operating cash flows over the same period. *SALESGRVOLT* is the standard deviation of sales growth during the past five years, divided by the mean of sales growth over the same period. *OPCYCLE* is operating cycle, defined as the sum of average accounts receivables divided by sales and average inventory divided by cost of goods sold, then multiplied by 365. All continuous variables(except *COMP_HP*) are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included in all the regressions but are not reported. Standard errors are clustered by firm and year (Petersen, 2009; Gow et al. 2010) and t-values are presented in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | AAER | LAWSUIT | ABS_DA | RM |
|---------|----------|-----------|-----------|-----------|
| COMP_HP | 0.577* | 0.780*** | 0.012*** | -0.223*** |
| | (1.695) | (3.480) | (3.206) | (-11.343) |
| ABS_DA | 1.963*** | 0.997 | | -0.021 |
| | (3.890) | (1.300) | | (-0.339) |
| RM | 0.547*** | -0.336* | -0.001 | |
| | (2.911) | (-1.750) | (-0.344) | |
| SIZE | 0.378*** | 0.384*** | -0.005*** | 0.000 |
| | (7.357) | (20.316) | (-10.428) | (0.012) |
| MB | -0.042 | -0.130*** | 0.003*** | -0.033*** |
| | (-1.191) | (-4.660) | (13.419) | (-16.198) |
| ADJ_ROA | -0.528 | -2.418*** | -0.070*** | -0.528*** |
| | (-0.829) | (-4.350) | (-3.503) | (-9.219) |

| | | | | |
|------------------------|----------|----------|-----------|-----------|
| LEV | 0.224 | -0.222 | -0.007 | 0.217*** |
| | (0.427) | (-0.498) | (-1.090) | (6.028) |
| EEF | 1.118*** | -0.370 | 0.027*** | 0.015 |
| | (3.179) | (-0.896) | (5.764) | (0.423) |
| BIG4 | 0.076 | -0.009 | -0.008*** | -0.024 |
| | (0.236) | (-0.032) | (-2.685) | (-1.213) |
| CFOVOLT | -0.010 | 0.001 | 0.001*** | 0.004*** |
| | (-0.664) | (0.087) | (6.696) | (3.922) |
| SALESGRVOLT | -0.002 | -0.033 | 0.000 | 0.002*** |
| | (-0.210) | (-1.603) | (0.927) | (3.905) |
| OPCYCLE | 0.002* | 0.002*** | 0.000 | -0.001*** |
| | (1.942) | (2.656) | (-0.984) | (-7.155) |
| Industry fixed effects | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 15332 | 16163 | 17384 | 17384 |
| Pseudo or Adj.R2 | 0.111 | 0.093 | 0.108 | 0.160 |

Table V: Regressions with An Industry-level Competition Measure

This table presents the regression results of accounting irregularities, accrual-based earnings management and real activities manipulation on product market competition, with controls for product market characteristics: market structure (HHI) based on 4-digit SIC industry. *AAER* is an indicator variable that equals to one if the firm is alleged to engage in intentional accounting misstatements for the year as disclosed in the SEC's releases and zero otherwise. *LAWSUIT* is an indicator variable that equals to one if shareholders sued the company during that specific period, and zero otherwise. Discretionary accruals are derived by using modified Jones model with firm performance, and *ABS_DA* is the absolute value of the residuals from the estimation of Equation (1). *AB_CFO* and *AB_EXP* are abnormal levels of cash flows and abnormal discretionary expenditures, which are calculated as the residuals from the estimation of Equation (3) and (4), multiplied by negative one. *AB_PROD* is abnormal production costs calculated as the residuals from the estimation of Equation (5). *RM* is the sum of *AB_CFO*, *AB_EXP*, and *AB_PROD*. *COMP* is a product market competition measure defined in Li, Lundholm and Minnis (2013). *SIZE* is natural logarithm of the market value of equity. *MB* is market-to-book equity ratio. *ADJ_ROA* is 2-digit-SIC industry-adjusted ROA, where ROA is measured as income before extraordinary items, scaled by lagged total assets. *LEV* is long-term debt scaled by total assets; *EEF* is net equity financing in the next year scaled by lagged total assets. *BIG4* is an indicator variable that equals to one if the firm's auditor is one of the "Big Four" accounting firms, and zero otherwise. *CFOVOLT* is the standard deviation of operating cash flows scaled by lagged total assets during the past five years, divided by the mean of operating cash flows over the same period. *SALESGRVOLT* is the standard deviation of sales growth during the past five years, divided by the mean of sales growth over the same period. *OPCYCLE* is operating cycle, defined as the sum of average accounts receivables divided by sales and average inventory divided by cost of goods sold, then multiplied by 365. All continuous variables(except *COMP*) are winsorized at the 1st and 99th percentiles. Year fixed effects are included in all the regressions but are not reported. Standard errors are clustered by firm and year (Petersen, 2009; Gow et al. 2010) and t-values are presented in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | AAER | LAWSUIT | ABS_DA | RM |
|--------|---------------------|---------------------|--------------------|-----------------------|
| COMP | 0.519** (2.122) | 0.779*** (3.352) | 0.008* (1.819) | -0.060*** (-2.650) |
| HHI | 0.146 (0.232) | -0.201 (-0.515) | -0.002 (-0.270) | 0.085 (1.607) |
| ABS_DA | 2.034*** (3.102) | 1.660*** (2.730) | | 0.000 (0.000) |
| RM | 0.626** (2.404) | -0.228 (-1.304) | 0.000 (0.000) | |

| | | | | |
|------------------------|----------|-----------|-----------|-----------|
| SIZE | 0.340*** | 0.385*** | -0.005*** | -0.006 |
| | (9.044) | (13.649) | (-6.180) | (-1.194) |
| MB | -0.026 | -0.102*** | 0.004*** | -0.030*** |
| | (-0.941) | (-4.206) | (6.896) | (-8.606) |
| ADJ_ROA | -0.540 | -1.832* | -0.061*** | -0.242* |
| | (-1.032) | (-1.754) | (-3.501) | (-1.667) |
| LEV | -0.172 | -0.788 | -0.007 | 0.143** |
| | (-0.440) | (-1.482) | (-0.646) | (2.232) |
| EEF | 0.883*** | -0.314 | 0.030*** | 0.051 |
| | (2.917) | (-0.747) | (6.906) | (1.325) |
| BIG4 | 0.096 | -0.007 | -0.008*** | -0.024 |
| | (0.208) | (-0.022) | (-3.163) | (-1.192) |
| CFOVOLT | 0.006 | -0.004 | 0.002*** | 0.004*** |
| | (0.347) | (-0.250) | (5.495) | (3.422) |
| SALESGRVOLT | -0.008 | -0.035* | 0.000 | 0.002*** |
| | (-0.894) | (-1.875) | (0.688) | (2.650) |
| OPCYCLE | 0.002** | 0.002** | 0.000 | -0.000*** |
| | (2.197) | (2.573) | (-0.690) | (-2.998) |
| Industry fixed effects | No | No | No | No |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 19402 | 18148 | 19402 | 19402 |
| Pseudo or Adj.R2 | 0.074 | 0.071 | 0.076 | 0.082 |

Table VI: Regressions on Product Similarity and Fluidity

This table presents the regression results of accounting irregularities, accrual-based earnings management and real activities manipulation on product similarity (*SIM*) and product market fluidity (*FLU*). Panel A presents the regression results for product similarity, and Panel B presents the regression results for product market fluidity. *AAER* is an indicator variable that equals to one if the firm is alleged to engage in intentional accounting misstatements for the year as disclosed in the SEC's releases and zero otherwise. *LAWSUIT* is an indicator variable that equals to one if shareholders sued the company during that specific period, and zero otherwise. Discretionary accruals are derived by using modified Jones model with firm performance, and *ABS_DA* is the absolute value of the residuals from the estimation of Equation (1). *AB_CFO* and *AB_EXP* are abnormal levels of cash flows and abnormal discretionary expenditures, which are calculated as the residuals from the estimation of Equation (3) and (4), multiplied by negative one. *AB_PROD* is abnormal production costs calculated as the residuals from the estimation of Equation (5). *RM* is the sum of *AB_CFO*, *AB_EXP*, and *AB_PROD*. *SIM* is a product market threat measure introduced by Hoberg and Phillips (2010). *FLU* is a product market threat measure introduced by Hoberg, Phillips, and Prabhala (2014). All continuous variables(except *SIM* and *FLU*) are winsorized at the 1st and 99th percentiles. All control variables, including industry and year fixed effects, are included in all the regression but are not reported. Standard errors are clustered by firm and year (Petersen, 2009; Gow et al. 2010) and t-values are presented in parentheses. Statistical significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Panel A: Product similarity

| | AAER | LAWSUIT | ABS_DA | RM |
|------------------------------|----------|----------|---------|-----------|
| <i>SIM</i> | 1.069*** | 1.093*** | 0.002 | -0.211*** |
| | (2.756) | (4.716) | (1.405) | (-9.951) |
| All control variables | Yes | Yes | Yes | Yes |
| Industry fixed effects | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 16350 | 16906 | 18186 | 18186 |
| Pseudo or Adj.R ² | 0.116 | 0.102 | 0.105 | 0.159 |

Panel B: Product market fluidity

| | AAER | LAWSUIT | ABS_DA | RM |
|------------------------|---------|----------|----------|-----------|
| <i>FLU</i> | 0.354 | 1.492*** | 0.018*** | -0.208*** |
| | (1.050) | (6.226) | (6.532) | (-8.813) |
| All control variables | Yes | Yes | Yes | Yes |
| Industry fixed effects | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |

| | | | | |
|------------------------------|-------|-------|-------|-------|
| Observations | 14436 | 15238 | 16564 | 16564 |
| Pseudo or Adj.R ² | 0.110 | 0.100 | 0.106 | 0.158 |
