Proceedings of the National Conference
On Undergraduate Research (NCUR) 2019
Kennesaw State University
Kennesaw, Georgia
April 11-13, 2019

The Impact of Market Competition on Accounting Fraud

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Abstract

The purpose of this study is to analyze how product market competition is correlated with the occurrence of fraudulent financial reporting. Given how literature on the association between competition and fraud is both limited and contradictory in results, this paper seeks to implement new measures of competition in order to come to more definitive conclusions. Competition in current literature is confined to concentration measures such as the Herfindahl-Hirschman Index, which ignores other major features of how rivaling firms within an industry interact with each other. By introducing additional product competition measures, mainly measures based on size inequality and profit margins, this study hopes to answer what type of correlation competition has with fraud and if the addition of new competition measures increases the explanatory power of concentration measures on accounting fraud.

Keywords: Competition, Accounting Fraud, Monopoly

1. Introduction

Competition shapes the interactions that firms have with their rivals and the business models they develop to sustain their market position. Factors such as concentration, barriers to entry, and operational costs are often used to describe the "competitiveness" of an industry. Based on some of these parameters, recent studies have suggested that more intense competition negatively impacts cash flows and stock returns, making it more difficult for firms to obtain external financing and demonstrate high performance.[37] This has led some to theorize that intense competition may encourage financial misreporting in order to meet certain managerial goals or to alleviate shareholder fears of poor performance. However, these assertions contradict other theories that suggest that competition helps to reduce instances of financial accounting misreporting. Since competition continues to impact the business environment in which a firm operates, it is necessary to have an understanding of whether it acts as an inherent disciplining force that discourages fraud or an enabling force that encourages unethical behavior. This study aims to fill this gap and investigate how a series of competition measures can be used to predict financial accounting misreporting.

Many papers that studied competition have parameterized it via industry concentration. Most commonly cited is the Herfindahl-Hirschman Index, which categorizes an industry's competitiveness using the market shares of all firms in an industry. Balakrishnan and Cohen[5] use the Herfindahl-Hirshman Index to find a negative correlation between competition and the occurrence of financial misreporting, suggesting that competition acts as a disciplining force against fraud. Cheng, Man and Yi[13] likewise use the Herfindahl-Hirshman Index to find a positive relation between product market competition and earnings quality, which is thought to improve the precision of private and public information held by investors and analysts. However, Karuna, Subramanyam and Tian[27] use this concentration measure and other controls for competition to find a positive relation between competition and earnings management. Ali, Klasa and Yeung[1] use the four-firm ratio to conclude that firms in more concentrated industries have less

informative disclosure practices and thus hide information from investors. Despite using similar measures, the results of these studies contradict each other and offer inadequate evidence on the prevailing effect of competition on fraud.

Instead of relying on concentration as the sole proxy of competition, additional measures can be introduced to better capture competition and its impact on financial misreporting. Karuna[26] argues that cross-industry analyses and endogenous market structures do not clarify whether low values of concentration capture low or high competition, and so focuses on using product substitutability, market size, and entry costs as determinants of competition. Beneito et al.[7] likewise posit that studies that use the Herfindahl-Hirschman Index overemphasize the role of concentration in measuring competition and ignore other vital dimensions of market structure. The paper uses the same measures of competition as Karuna[26] and introduces innovation as a dependent of competition. Du and Chen[18] build upon these measures by including entropy, the Lerner index, and measures related to size inequality and profit margins.

The results of this paper have important applications for both academic literature and accounting practitioners. While the interaction between competition and fraud has begun to be explored, there are few studies that have researched such interactions with regards to size inequality and profit margins. This paper will gain insight into the study of market competition and further opportunities to research implications that product competition may have on managerial incentives and firm positioning within their respective industries. Additionally, this paper will encourage the use of alternative competition measures in order to establish more conclusive results in academic literature. The use of product substitutability, entry barriers, product differentiation, and other proxies of competition will extend current literature's understanding of competition's impact on the decision to commit fraud. From a practitioner perspective, the results of this paper will encourage auditors and forensic accountants to pay more attention to highly competitive industries and to better anticipate fraud. In other words, auditors will need to further analyze how the business environment impacts management assertions and stated strategies. Likewise, forensic accountants will need to anticipate if competition intensity is a factor in asset misappropriation or fraudulent financial reporting.

The paper will proceed as follows: Section 2 will provide background and discuss existing literature regarding competition, accounting fraud, and other related topics. Section 3 will discuss the different competition measures that will be used in this study. Section 4 will discuss the sample selection and the regression models. Section 5 will present empirical results. Finally, Section 6 will provide the conclusions and potential extensions of this study.

2. Prior Literature and Hypothesis Development

2.1 Prior Literature

Current accounting literature has studied market competition in relation to earnings quality. Dechow et al.[16] explains that earnings quality is measured by the ability of the accounting system to measure performance in conjunction with financial statement users' ability to identify aspects of a company's underlying, unobservable financial performance, which includes competition. Cheng et al.[13] argues that concentrated industries tend to have lower earnings quality and value relevant disclosures, whereas competitive industries have higher earnings quality and precision of public information. Thus, the challenge in literature on competition has been developing methods to isolate external competitive forces from internally generated forces and determining its relevance in management decisions.

In studying the relationship between competition and earnings quality, several studies have suggested that reported earnings decrease when competition is more intense. Healy et al.[21] finds that "product market and capital market variables have the largest impact on performance persistence," where increased labor competitiveness accelerates mean income reversion during years in which a firm exceeds earnings expectations. Likewise, Dhaliwal et al.[17] found that firms are more likely to write down book value when facing intense competition in order to preserve earnings quality on a conservative basis. Further studies show that firms are more reluctant to disclose forecasts when in intense competition to minimize the impact on the stock price.[3; 4; 22] Overall, intense competition increases the cost of debt financing, increases a firm's default risk, decreases investment opportunities, and decrease liquidation value.[35; 38]

A related branch of literature focuses on the ideal business conditions for committing accounting fraud. Povel et al.[29] theorized that the incentive to commit fraud is high during economic booms because they signal that investors believe firms' public information to be positive and therefore lessen financial reporting monitoring. Several studies also show that in times of lower earnings, firms commit fraud to convince themselves that real performance will improve in the future.[10; 12; 32] However, if performance does not improve soon enough, then deception must be repeated and the compounding of the misstatements will make the fraud easier to uncover.[6] Wang et al.[37] found that firms tend to take advantage of investor optimism when industry prospects suggest opportunities for growth to commit fraud.

By combining these two branches of literature, a new branch of modern accounting literature emerges that seeks to establish a correlation between market competition and the occurrence of fraudulent financial reporting. Balakrishnan and Cohen[5] find that higher levels of competition are correlated with a lower probability that accounting fraud is committed. They infer from these results that competition is a disciplining effect that constrains managers from misreporting financial information. On the other hand, Karuna et al.[26] find that higher levels of competition are correlated with a higher probability of accounting fraud. They find that more intense competition may encourage managers to commit fraud in order to appear more successful than rival firms. The difference in these results suggest that there is plenty of room for additional research to introduce new methods for measuring competition against fraud.

The primary concern is that the two aforementioned studies primarily depended on the use of industry concentration as a measure of competition. The Herfindahl-Hirschman Index is the most commonly used measure of competition, which happens to only measure concentration. Beneito et al.[7] state that many "empirical [analyses] suffer from a lack of information about [the] fundamentals of competition." In response to the limitations imposed by relying solely on concentration measures, Du and Chen[18] identify the use of product accounting measures to create a fuller depiction of the parameters of competition. This study will follow this recommendation by incorporating product competition measures to come to a more complete conclusion on the correlation between competition and accounting fraud.

2.2 Hypothesis Development

The external business environment that creates the incentive to commit accounting fraud often involves the pressure to meet earnings forecasts. Firms in competitive industries are often not able to meet forecasts because accounting returns revert faster to the mean in industries with more intense product and capital market competition.[21] Riahi-Belkaoui and Picur[31] explain that accounting fraud occurs because management is making "mere cosmetic changes of camouflage of serious problems" related to earnings persistence. Jensen[24] points out that firms that are overvalued due to earnings smoothing commit fraud in order to continue the appearance of growth and meet earnings forecasts. Crutchley et al.[14] likewise find that fraudulent firms are consistently aggressive in their reporting practices to meet forecasts and turn to fraud when the disparity between market value and book value widens. Markarian and Santalo[28] further observe that earnings manipulation is especially prevalent among companies that seem to be underperforming their competitors. From the compensation perspective, Tinaikar and Xue[34] find that managers of firms in competitive industries will smooth earnings and manipulate accruals to protect the influence they exert via stock holdings.

As industries become more competitive, total industry sales are split among a greater number of firms and the cost of capital increases for earnings persistence. Managers are often unable to meet forecasts, which results in lower reported sales and a consequential decrease in a firm's stock price. The aforementioned studies show that managers are willing to commit fraud and manipulate the firm's financial statements to demonstrate their ability to meeting the forecasts. However, the results of Balakrishnan and Cohen[5] and Karuna, Subramanyam and Tian[27] contradict each other. In other words, there is no conclusive evidence on the prevailing effect of market competition on the occurrence of accounting fraud. Based on the foundation formed by previous studies, the following hypothesis is proposed:

H1: There is no correlation between market competition and the occurrence of accounting fraud.

The competitiveness of an industry has been narrowly defined in the literature as the concentration of firms' market shares in that industry. Concentration is captured by the Herfindahl-Hirschman Index, which is calculated as the weighted average of firms' market share in a particular industry. Several studies correctly cite that the way firms interact with each other dictates the industry structure, yet restrict their definition of competition to that of only concentration.[11; 19; 23] Ellis et al.[20] recognizes that a single measure is not enough to completely describe the nature of competition, as concentration ignores other factors such as barriers to entry and product differentiation. Ali, Klasa, and Yeung[2] also find concentration measures to be poor proxies for actual industry concentration, as the correlation in the use of concentration measures between Compustat data and U.S. Census of Manufactures data is only 0.13.

Current literature suggests new measures to complement concentration in describing market competition. Vives[36] proposes the use of entry costs and market size to describe industry interactions, and product substitutability and the Lerner Index to describe "product measures." Syverson[33] suggests that low product substitutability is indicative of low competition since rival firms are unable to perfectly copy innovation. Jung and Subramanian[25] validate the use of entry costs as a proxy for competition, because the ease of entrance influences price levels and therefore market share.

By itself, the Herfindahl-Hirschman Index has been shown to poorly illustrate the competitive landscape of an industry. However, with the inclusion of product substitutability, entry costs, the Lerner Index, and other product

measures with the concentration measures, researchers will have a more accurate depiction of competition in an industry. Thus, the following hypothesis is proposed:

H2: The combined concentration and product measures of competition are more correlated with accounting fraud than concentration measures alone.

3. Market Competition Measures

Because of its abstract nature, market competition cannot be perfectly quantified using readily available financial data. Researchers have thus developed different proxies to represent market competition. The measures used in this study, which are summarized below, can be divided into three primary categories: (1) Measures of Market Concentration; (2) Measures of Size Inequality; and (3) Measures of Profit Margins.

3.1 Measures of Market Concentration

By far the most popular concentration measure is the Herfindahl-Hirschman Index.[8; 17; 35] This measure, which will be abbreviated as *HHI*, is calculated by the following formula:

$$HHI = \sum_{i=1}^{N} {s_i}^2 \quad (1)$$

where s_i is the market share of firm *i* and *N* is the total number of firms in the industry. The maximum value of *HHI* is 1, which occurs when there is a single firm in the industry (i.e. a firm with 100% market share) and represents a monopoly. The minimum value of *HHI* is 1/N, which occurs when there are *N* equal-sized firms.

3.2 Measures of Size Inequality

These measures are used to describe the size distribution in an industry. The general assumption regarding size inequality measures is that "the higher firm size inequality in an industry, the more likely that the competition level is low." Size inequality measures are less popularly used in literature, with very few studies citing their use.[15] The first size inequality measure is the Coefficient of Variation (abbreviated as COV) and is calculated as the following:

$$COV = \sqrt{[\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2]/\bar{x}} \quad (2)$$

where x_i is the firm size in total assets, $\bar{x}$ is the mean of *x*, and *n* is the number of firms in the industry. As noted by Du and Chen[18], *COV* scales the variance by the size mean, which avoids the problem of mean-dependence.

The second size inequality measure is the Relative Mean Deviation (abbreviated as RMD). This measure is calculated as the following:

$$\text{RMD} = \frac{1}{2\bar{x}n}\sum_{i=1}^{n}|x_i - \bar{x}| \quad (3)$$

where x_i is the firm size in total assets, $\bar{x}$ is the mean of *x*, and *n* is the number of firms in the industry. *RMD* gauges the extent to which an individual firm's total assets differ from the mean. This is especially useful for measuring inequality between firms that are above and below the mean.

3.3 Measures of Profit Margins

These measures capture an industry's profit margin, which is expected to be negatively correlated with competition. The primary profit margin measure used is the Lerner Index (abbreviated as L), which measures a firm's relative ability to manipulate the industry price of a product or service. However, because it is difficult to gather the necessary information to capture this effect, a modified version based on Bloom and Van Reenen[9] is used:

$$L = \frac{1}{N_j - 1} \sum_{\substack{k=1..i-1,i+1.. \\ k \in j}}^{N} \left(1 - \frac{profit_k}{sales_k}\right) \quad (4)$$

where N is the number of firms in industry *j*. Note that the summation does not include firm *i*'s own characteristics.

3.4 Entry Costs and Other Control Variables

Entry costs (abbreviated as ENTCOST) are controlled in each regressions in order to contrast the difference between current threats that are proxied by the aforementioned four measures and potential threats that may arise from firms entering an industry. This measure is calculated as follows:

$$ENTCOST = \ln\left(\sum_{i=1}^{n} x_i w_i\right) \quad (5)$$

where x_i is the gross value of firm *i*'s cost of property, plant, and equipment, w_i is the market share of firm *i*, and n is the total number for firms in an industry. Intuition suggests that lower entry costs promote entry and therefore increases the total number of firms in an industry. All other control variables, including market size, return on assets, leverage, and firm size, are commonly used in similar studies.[13; 16; 22]

4. Research Design

4.1 Data and Sample Selection

Accounting and Auditing Enforcement Releases (AAERs) data is obtained from Dr. Patricia Dechow's webpage on the University of Berkeley website. AAERs represent lawsuits filed by the SEC against individual firms for fraudulent financial reporting and are commonly used in research on accounting fraud.[29; 37] The sample started with all 3,052 SEC AAERs (1,214 firm misstatement events) in the database. Financial data from COMPUSTAT North America Fundamentals Annual required to measure concentration, size inequality, and profit margin competition proxies, and financial ratios was then collected. Firms are classified into industries using the three-digit SIC codes classification method. Firm-year observations were obtained by matching the CIK identification values used in the AAERs database to GVKEY used in the COMPUSTAT data. Due to the availability of data and missing CIK to GVKEY matches, the sample period was limited to 1991-2005. The final sample includes 51,886 firm-year observations with 9,292 unique COMPUSTAT firms, and is comprised of 580 AAERs-committing firm-years.

4.2 Empirical Design

4.2.1 hypothesis 1: there is no correlation between market competition and accounting fraud.

The first hypothesis examines how the occurrence of accounting fraud changes with different levels of market competition. A logistic model that also includes several potential explanatory variables commonly used in previous research on market competition and accounting fraud is estimated. The following details the regression model:

$$\text{Prob}(AAER = 1) = \beta_0 + \beta_1 COMP + \beta_2 ENTCOST + \beta_3 MKT\_SIZE + \beta_4 ROA + \beta_5 LEV + \beta_6 FIRM\_SIZE + \varepsilon \quad (6)$$

The dependent variable *AAER* is an indicator variable taking the value 1 if the firm was issued an AAER during the year, and 0 otherwise. The main independent variable of interest *COMP* is coded to represent the market competition measure based on aggregated industry financial data. This regression is repeated four times, with *COMP* taking on each of the competition measures studied in this research: the Herfindahl-Hirschman Index (*HHI*), the Coefficient of Variation (*COV*), the Relative Mean Deviation (*RMD*), and the Lerner Index (*L*). Entry costs represent the threat of potential industry competitors, and are calculated as the square root of the weighted average of the gross value of property, plant, and equipment of firms within an industry. Market size, return on assets, leverage, and firm size are included to control for industry and firm characteristics.

4.2.2 hypothesis 2: the addition of competition measures based on size inequality and profit margins gives more explanatory power to measures based solely on concentration.

To test H2, a logistic regression similar to that used to test the first hypothesis is used, but instead applies the use of two competition measures. This is done by including the Herfindahl-Hirschman Index into the regression as a predictor, and then adding each of the size inequality and profit margin measures as predictors to test for the interactions between two given competition measures. The following estimates the logit regression model:

$$\text{Prob}(AAER = 1) = \beta_0 + \beta_1 NEW\_COMP + \beta_2 HHI + \beta_2 ENTCOST + \beta_3 MKT\_SIZE + \beta_4 ROA + \beta_5 LEV + \beta_6 FIRM\_SIZE + \varepsilon \quad (7)$$

Once again, the dependent variable *AAER* is an indicator variable that takes on the value of 1 if there was an AAER issued during that firm-year, and 0 otherwise. The independent variable *NEW_COMP* represents each of the size inequality and profit margin measures. As with the regression model used to test Hypothesis 1, firm and industry characteristics using entry costs, market size, return on assets, leverage, and firm size are controlled.

First, the logit regression is run with the Herfindahl-Hirschman Index as the sole competition proxy. The statistical significance of the Herfindahl-Hirschman Index is examined and the p-value is used as a benchmark. Next, the regression is repeated three times, with *NEW_COMP* taking on the value of the Coefficient of Variation, the Relative Mean Deviation, and the Lerner Index during each test, respectively. The p-values of the Herfindahl-Hirschman Index and the additional competition proxy are compared against the benchmark for analysis.

5. Empirical Results

5.1 Descriptive Statistics

Table 1 provides the ten industries with the most fraud events. There is significant variation in the industries in which accounting fraud events were observed, with 164 different industries identified using the three-digit SIC classification method. Among these industries, Computer and Data Processing Services, Drugs, and Eating and Drinking Places had the most observed accounting fraud cases, with 97 (12.3%), 37 (4.7%), and 31 (3.9%), respectively.

Table 1: Frequency of Accounting Fraud Events

3-digit SIC codes	Industry	Count
737	Computer and Data Processing Services	97
283	Drugs	37
581	Eating and Drinking Places	31
357	Computer and Office Equipment	29
481	Telephone Communication	28
367	Electronic Components and Accessories	25

366	Communications Equipment	19
131	Crude Petroleum and Natural Gas	18
384	Medical Instruments and Supplies	15
382	Measuring and Controlling Devices	14

The characteristics of competition and accounting fraud events are detailed in Panel A of Table 2. The summary statistics for the competition proxies – namely, HHI, COV, RMD, and L – are consistent with those in other studies.[18; 27] The natural log of firm size and market size is taken to reduce the effect of unusually large values. Given that the average logged firm size is $4.64 million and the averaged logged market size is $10.76 million, there are several large firms with high market shares included in the sample. On average, firms included in the sample have an ROA of 4.5% and are 25% leveraged. The extreme values of each variable are winsorized at the 1 and 99 percentiles.

Panel B shows the correlation matrix of each variable used in this study. With exception to COV and RMD, none of the variables seem to be highly correlated with one another. This may be due to the fact that the two size inequality measures are very similarly calculated. One interesting observation is that the Herfindahl-Hirschman Index is positively correlated with market size, whereas COV, RMD, and L are all negatively correlated with market size. This seems to suggest that the bigger industries in the sample tend to be more highly concentrated and may be monopolized by the firms who have the biggest market shares, which in turn enables them to influence price levels.

Table 2: Competition and Accounting Fraud Characteristics

Panel A: Summary Statistics

Variable	N	Mean	Median	Std	P25	P75
AAER	788	0.015	0.000	0.117	0.000	0.000
HHI	1,408	0.179	0.133	0.137	0.089	0.231
COV	1,408	0.038	0.152	0.891	-0.529	0.749
RMD	1,408	0.186	0.194	0.054	0.152	0.225
L	1,408	0.638	0.648	0.110	0.550	0.772
MKT_SIZE (millions)	1,408	10.761	10.965	1.698	9.637	12.337
ENTCOST (millions)	1,408	76.97	70.60	55.255	32.940	108.110
ROA	51,886	0.045	0.010	0.090	0.000	0.062
FIRM_SIZE (millions)	51,886	4.642	4.680	2.491	3.047	6.320
LEV	51,886	0.250	0.186	0.263	0.018	0.380

Panel B: Pearson Correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) HHI	1								
(2) COV	**0.044**	1							
(3) RMD	**0.018**	**0.942**	1						
(4) L	**-0.247**	**0.380**	**0.401**	1					
(5) MKT_SIZE	**0.373**	**-0.413**	**-0.300**	**-0.334**	1				
(6) ENTCOST	**0.065**	**-0.353**	**-0.180**	**-0.166**	**0.766**	1			
(7) ROA	**0.053**	**-0.112**	**-0.138**	**-0.019**	**0.033**	**0.032**	1		
(8) FIRM_SIZE	**0.029**	**-0.266**	**-0.361**	**-0.169**	**-0.044**	**-0.142**	**0.292**	1	
(9) LEV	**-0.078**	**0.199**	**0.259**	**0.207**	**-0.139**	**0.039**	**0.081**	**-0.300**	1

In Panel B, numbers in bold are significant at the 1% level.

5.2 Main Results

5.2.1 how is competition associated with accounting fraud?

Table 3 reports results from testing H1 that there is no correlation between market competition and accounting fraud. The standard error and the significance at the 1% (***), 5% (**), or 10% (*) levels are reported, with the t-statistics in parentheses. HHI, COV, and RMD are all significantly negative at the 0.10 level, with coefficients of -1.56756, -

0.20197, and -6.84516, respectively. Although L is not statistically significant, it is interesting to note that it also has a negative coefficient. This may be due to concerns in prior literature that it is difficult to quantify the Lerner Index in terms of readily available financial data.[9; 18] Nevertheless, the results seem to suggest that there is a negative correlation between market competition and accounting fraud, which is consistent with the findings of Balakrishnan and Cohen.[5]

Additionally, the statistical significance of the control variables can be framed in the context of market competition as a disciplining force for constraining financial misreporting. As market size is positively significant, the results suggest that accounting fraud is more prevalent in industries with higher profitability. Furthermore, firm size and ROA are found to be significantly positive, while leverage is found to be significantly negative. Since the competition proxies show that there is a significantly negative correlation between competition and accounting fraud, it appears that large firms with high returns in less competitive industries are able to use their size to dominate their markets.[12]. The pseudo R^2 values shown in Table 3 approximate those found in probit models of Karuna, Subramanyam and Tian[27], which demonstrates the models' validity. Although the incremental differences in the pseudo R^2 values are negligible, RMD has the greatest individual explanatory power, followed by COV, HHI, and L. This seems to suggest that firms' deviation from the mean total assets is potentially the most indicative of the possibility to commit fraud. Size inequality, industry concentration, and market power too are indicative of the potential to commit fraud, but possibly to a slightly weaker extent due to not capturing how firms view themselves compared to industry standards.

Table 3: How is Competition Associated with Accounting Fraud?

COMP =	**HHI**	**COV**	**RMD**	**L**
(Intercept)	-5.105***	-4.851***	-5.972***	-4.844***
	(0.098)	(0.054)	(0.218)	(0.054)
COMP	-1.568***	-0.202***	-6.845***	-0.029
	(0.466)	(0.051)	(1.247)	(0.047)
MKT_SIZE	0.659***	0.474***	0.451***	0.535***
	(0.085)	(0.079)	(0.078)	(0.080)
ENTCOST	-0.722***	-0.685***	-0.660***	-0.661***
	(0.078)	(0.078)	(0.078)	(0.078)
ROA	0.080*	0.071	0.066	0.075
	(0.048)	(0.048)	(0.048)	(0.048)
LEV	-0.120**	-0.110**	-0.093*	-0.124**
	(0.052)	(0.052)	(0.052)	(0.053)
FIRM_SIZE	0.120***	0.693***	0.726***	0.664***
	(0.053)	(0.053)	(0.053)	(0.054)
Observations	51,886	51,886	51,886	51,886
Pseudo R^2	4.46%	4.56%	4.84%	4.28%

5.2.2 does the addition of competition measures based on size inequality and profit margins add more explanatory power to measures based solely on concentration?

Table 4 reports the results on whether adding size inequality or profit margin measures will increase the statistical significance and explanatory power of HHI, with the t-statistics presented in parentheses. As with the previous analysis, the standard error and the significance at the 1% (***), 5% (**), or 10% (*) levels are reported. As explained in the research design, the regression is first ran with HHI as the sole competition measure to define the benchmark. The results, which are shown in the column labeled "---," show that HHI is negatively correlated with accounting fraud and statistically significant at the 1% level, with a pseudo R-squared value of 4.46%. These are consistent with the results of previous studies.[5; 27]

Table 4: Does the Addition of Competition Measures Based on Size Inequality and Profit Margins Add More Explanatory Power to Measures Based Solely on Concentration?

NEW_COMP =	**---**	**COV**	**RMD**	**L**
(Intercept)	-5.105***	-5.053***	-6.093***	-5.125***
	(0.098)	(0.09925)	(0.223)	(0.099)
NEW_COMP	---	-0.172***	-6.367***	-0.057
		(0.052)	(1.257)	(0.0478)
HHI	-1.568***	-1.211**	-1.189**	-1.668***
	(0.466)	(0.485)	(0.477)	(0.472)
MKT_SIZE	0.659***	0.574***	0.552***	0.646***
	(0.085)	(0.088)	(0.088)	(0.086)
ENTCOST	-0.722***	-0.730***	-0.712***	-0.726***
	(0.078)	(0.079)	(0.080)	(0.079)
ROA	0.080*	0.074	0.069	0.081*
	(0.048)	(0.048)	(0.048)	(0.048)
LEV	-0.120**	-0.108**	-0.091*	-0.112**
	(0.052)	(0.052)	(0.052)	(0.053)
FIRM_SIZE	-0.120***	-0.679***	-0.711***	-0.657***
	(0.053)	(0.053)	(0.054)	(0.053)
Observations	51,886	51,886	51,886	51,886
Pseudo R^2	4.46%	4.66%	4.94%	4.49%

HHI is then examined to see how it interacts with each of the other competition measures. The results show that even when the regression is ran with two competition proxies, the coefficient of each proxy is negative. These correlations are statistically significant for HHI with COV and for HHI with RMD. However, as with the regression for H1, L is not statistically significant but does indicate a negative correlation between market competition and accounting fraud.

When COV is added to the regression, HHI becomes statistically significant at the 5% level, and the pseudo r-squared value increases from 4.46% to 4.56%. Likewise, when RMD is added to the regression, HHI again becomes statistically significant at the 5% level, and the pseudo r-squared value increases from 4.46% to 4.94%. In the case of L, HHI stays statistically significant at the 1% level, but the pseudo r-squared value only increases from 4.46% to 4.49%. Although the incremental change to the pseudo r-squared value is miniscule, the statistical significance of HHI with COV and with RMD suggests that the addition of size inequality measures provides concentration measures with more explanatory power of market competition.

6. Conclusion

The objectives of this paper are to examine the impact of market competition on accounting fraud and whether adding new competition proxies would increase the explanatory power of competition measures based on concentration. Based on a sample of AAER firm-year observations for the period 1998-2005, there is consistent evidence across four different competition proxies that there is a negative correlation between market competition and accounting fraud. This is consistent with the results of Balakrishnan and Cohen[5], who suggested that market competition has a disciplining effect that discourages financial misreporting. Additionally, there is evidence that the inclusion of size inequality measures provides more explanatory power to the primary concentration measure – the Herfindahl-Hirschman Index. This follows the intuition that competition has multiple dimensions beyond concentration.[26; 30] Overall, the evidence highlights the importance of auditors and regulators carefully considering the competitive environment when determining the incentives and opportunities for a firm to commit fraud.

The findings of this paper opens avenues for future research in measuring market competition. First, this paper can be extended to studies related to fraudulent behaviors. Since AAERs only report on fraud discovered by the SEC, the use of alternative competition proxies can be used to reexamine the correlation between market competition and earnings management. Second, future researchers can develop firm-level competition measures. All of the proxies used in this study are taken at the industry level, and may include confounding variables that are not relevant to

competition. Third, studies can examine if there is a reverse causality issue with the models used in this study. It is conceivable that an increase in fraud would lead to a decrease in competition, which may show a bias in the coefficients of the competition proxies used in this paper.

7. References

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