



1st International Conference on Applied Economics and Business, ICAEB 2015

A Study of the Relationship between Product Market Competition and Earnings Management

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Abstract

The product market competition is one of the factors contributing to earnings management. It forces managers to manipulate the firm's earning for opportunistic reasons. Intense competition in product market forces managers to manipulate corporate earnings so that by reduction of financial pressures via acquisition of low-cost external financial resources and reduction of capital costs, the product prices are lowered; this in turn gives the firm a competitive advantage by which it acquires a greater share of the market and raises above other competitors. On this basis, the present paper studies the relationship between intense competition in the product market and earnings management. As far as the dimensions of competition are concerned, market size, entry costs, and centralization are the three factors used to measure the competition in product market. In order to examine the hypotheses, the financial statements of 77 companies listed in Tehran stock exchange in 5 industry levels over the time period 2002-2011 are analyzed using regression analysis. The results reveal that factors of entry cost and industry concentration have a significant relationship with earnings management. However, in contrast with existing research literature, the relationship between market size and earnings management is not confirmed.

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Peer-review under responsibility of SCIJOUR-Scientific Journals Publisher

Keywords: product market competition; earnings management; discretionary accruals

1. Introduction

In the modern literature of economic development, there are numerous instances of discussions about the structure of the market in which the producers are active. One of the most important subjects in such discussions is providing

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an appropriate medium for competition between economic actors. In this sense, introduction of competition into markets and business activities is known as a cure for inefficiency and under-development (Mehrabani, 2012).

The emphasis on competition is of course an age-old idea. Ever since Adam Smith's (1776) quote "monopoly is a great enemy of good management" until Caves (1980), who states that economists have a "vague suspicion that competition is the enemy of sloth" this idea that competition is an important crucial factor of economic growth has been preserved and advertised (Karuna et al., 2012).

Nowadays, competitiveness is considered to be a main global issue. It is known as a means to achieve desirable economic growth and sustainable development. Competitiveness is the ability to attain a stable and appropriate position in international markets. In an age when globalization is increasingly on the rise, competitiveness is an important subject among policy-makers, industries, and firms all over the world (Shur Chuluu, 2000).

However, despite great benefits of competitive market for nations' economy, recent studies suggest that intense product market competition increases the likelihood of risk taking and fraudulent behaviors by firm managers. Shleifer (2004) explains that if a firm manages to reduce its tax payments and other costs through corruption and bribe, its competitors are forced either to do so or exit the market. Therefore, the impact of intense competition on unethical behavior can extend to earnings manipulation in firms. It seems that earnings management is one of the ways through which company executives can confront pressures and threats of intense competition. On this basis, in order to help stakeholders and those who benefit from accounting information and to expand the existing literature on the subject, the following question is explored in this study:

What is the nature of relationship between intense competition in product market and earnings management?

2. Theoretical basis and research hypotheses

2.1. Product market competition and earnings management

Although the idea that as a crucial part of a business environment earnings management can be beneficial to shareholders, evidence points out to the fact that firms' earnings are intentionally manipulated in order to manage shareholders' opinions. This behavior is exacerbated when competition is greater in the industry, thus leading to firms in the industry managing earnings on average (Bagnoli & Watts, 2010). Shleifer (2004) argues that when the product market competition is intense, in order to increase the firm's stock value, managers are forced to manipulate the earnings in order to keep the actual investors and motivate potential investors to invest in the company. Further, if managers' freedom in decision-making and authority in choosing accounting methods are accompanied by great competition, it gives them greater latitude to engage in such opportunistic attempts (earnings management) especially concerning actions that are less observable or understandable due to their complex nature (Christie, Joye, & Watts, 2003; Kole & Lehn, 1997).

Linck, Netter, and Shu (2010) suggest that using earnings management firm managers can alleviate financial pressures and acquire financial resources with lower costs. Therefore a firm with lower costs of capital can better price products and acquire a larger share of the market (Karuna et al., quoted from Linck, Netter, and Shu, 2010).

Based on these discussions, the main hypothesis of this study is presented as follows:

The main hypothesis: intense competition in product market increase earnings management in the firms.

Product market competition and earnings management can be assessed and measured in various ways. In this study, the three factors of size of the industry, entry costs, and industry concentration are used to measure product market competition. Also in order to measure earnings management, the modified Jones model has been employed. In this model, the extent of using discretionary accruals is the criterion for measurement of earnings management.

2.2. Industry size and earnings management

The industry size reflects the market demand and the density of consumers in the industry. When the demands for a product with a certain price increase then the sales of that product naturally rise. Then due to likelihood of its profitability more firms enter the industry and the industry size becomes bigger. This in turn intensifies the competition in that industry (Karuna et al. 2012; quoted from Sutton, 1991).

For that reason, it is expected that along with increase in industry size and the subsequent increase in the competition, the attempts on earnings management by the firms also increase in number and consistency. On that basis, the first sub-hypothesis of the present study is explained as follows:

The first sub-hypothesis: there is a positive and significant relationship between industry size and discretionary accruals.

2.3. *Entry costs*

Entry costs refer to the barriers to entry in an industry. The higher these barriers, the lower will be the intensity of price competition. In other words, the more capital, technology, and other factors required for entering an industry, the competition in that industry would be less intense. On the other hand, the lower these barriers to entry in an industry, the higher will be the intensity of price competition (Karuna et al. 2012).

For that reason, it is expected that along with decrease of entry cost and subsequent increase of product market competition, the attempts on earnings management by the firms increase in number and consistency. On that basis, the second sub-hypothesis of the present study is explained as follows:

The second sub-hypothesis: there is a negative and significant relationship between entry cost and discretionary accruals.

2.4. *Industry concentration and earnings management*

Industry concentration reflects the major volume of production and sales controlled by one or more active firms of an industry. When one or a few firms possess a major share of production and sales in an industry, other firms' ability to work in that industry is reduced and monopoly takes hold. On the other hand, as the industry concentration is reduced, more companies enter the industry and hence the competition intensifies (Karuna et al. 2012).

Therefore it is expected that along with decreased concentration, the competition intensifies and earnings management in the firms of that industry increases. On that basis, the third sub-hypothesis of the present study is explained as follows:

The third sub-hypothesis: there is a positive and significant relationship between industry concentration and discretionary accruals.

3. **Methodology**

By nature, the present research is a correlational study, and by purpose it is an applied research. The required statistical analyses have been carried out using Eviews software program. In order to analyze the data and examine the hypotheses the multivariate linear regression with the ordinary least squares method has been employed. The data used to test the hypothesis is compositional data which has been determined via appropriate estimation using Limmer F-test and Hausman test. The statistical population is consisted of companies listed in Tehran stock exchange. The study's time period is from 2002 to 2011. The sample members are determined after elimination procedure, in the sense that the sample firms have the following features and characteristics:

- Their fiscal year ends in March 20th.
- The period of their fiscal year has not been changed during the studied time period.
- The book value of the shareholders' payment in the studied time period is not negative.
- Are not among the bankrupt firms mentioned in article 141 of trade law.
- Their information is accessible.
- They are production companies, and are not one of holding, leasing, financial intermediate, or investment firms.
- For the purpose of measuring intense production competition, at least six firms should be active in their same area of industry; also their average indicators of industry size, entry cost, and industry concentration (which are the criteria of measuring intense competition) must be high, low, and low respectively.

Based on the above observations, the firms which have not met these criteria have been eliminated from the sample. In the end, 77 firms in 5 industries have been selected; and 770 firm-years in the form of 50 industry-years have been studied.

4. Research model

In order to examine the hypotheses, model (1) has been used:

$$DA_{i,t} = \beta_0 + \beta_1 + AVGMKTSIZE_{i,t} + \beta_2 AVGENTCOST_{i,t} + \beta_3 AVGHINDEX_{i,t} + \beta_4 AVGLN(SALE)_{i,t} + \beta_5 AVGLN(MB)_{i,t} + \beta_6 AVGOPERATIONCYCLE_{i,t} + \beta_7 AVGREVENUEVOLATILITY_{i,t} \quad (1)$$

4.1. Dependent variable

DA_{i,t} = discretionary accruals which are indicators of earnings management. In order to determine discretionary accruals in this research, the modified Jones model 2 has been used:

$$TACC_{i,t} = \delta_0 + \delta_1 \left(\frac{1}{ASSET_{i,t-1}} \right) + \delta_2 (\Delta SALE_{i,t} + \Delta AR_{i,t}) + \delta_3 PPE_{i,t} + V_{i,t} \quad (2)$$

Wherein:

$TACC_{i,t}$ = firm i's total accruals in year t;

$ASSET_{i,t-1}$ = firm i's total assets in year t-1;

$\Delta SALE_{i,t}$ = change in firm i's sales from year t-1 to year t;

$\Delta AR_{i,t}$ = change in firm i's accounts receivable from operating activities from year t-1 to year t;

$PPE_{i,t}$ = firm i's gross property, plant, and equipment in year t.

$V_{i,t}$ = models residual which is used to determine discretionary accruals, and their mean absolute value in industry-year level is used as dependent variable of model (1).

4.2. Explanatory variables

Among the explanatory variable in model (1), the first three are the main variables which are indicators of product market competition; and the other explanatory variables are control variables which based on the literature have a part in earnings management.

$AVGMKTSIZE_{i,t}$ = the natural logarithm of industry sales in each industry-year. It denotes the industry size and its larger values denote greater market size and hence greater competition.

$AVGENTCOST_{i,t}$ = the natural logarithm of the weighted average gross value of the cost of property, plant, and equipment for firms weighted by each firm’s market share in the industry. This factor indicates the barriers of industry entry and its smaller values reflect less intense competition.

$AVGHINDEX_{i,t}$ = Herfindahl-Hirschman Index which determines industry concentration. It is the sum of the squared market shares of the firms in the industry in each industry-year. The smaller values of this index denote more intense competition in product market.

$AVGLN(SALE)_{i,t}$ = Firm size which is equal to the natural log of firm sales over each industry-year.

$AVGLN(MB)_{i,t}$ = Market-to-book ratio which is equal to the natural log of market value/book value of shareholder equity in each industry-year.

$AVGOPERATIONCYCLE_{i,t}$ = natural log of average firm operating cycle in each industry-year calculated using the formula below.

$$\left(\frac{\text{Average accounts receivable}}{\text{Sales}} + \frac{\text{Average inventory}}{\text{Cost of goods sold}} \right) - \left(\frac{\text{Average accounts payable}}{\text{Purchase}} \right)$$

$AVGREVENUEVOLATILITY_{i,t}$ = Sales volatility which is the standard deviation of sales scaled by beginning assets during each industry-year.

The AVG sign indicates the fact the in order to develop the data matrix for examination of the hypotheses, the mean for firm-year variables should be calculated in industry-year level.

5. Research findings

In the present paper, before hypothesis examination the descriptive statistics of the research variables are explored and then the Limmer F-test has been employed in order to determine the most appropriate regression model; in the end the hypotheses are examined.

5.1. Descriptive statistics

The descriptive statistics regarding the research variables are presented in table 1.

Table 1. descriptive statistics of the research variables

variables	Number of observations	Mean	Maximum	Minimum	Std. deviation
Discretionary accruals	50	103.0	197.0	046.0	032.0
Industry size	50	20.16	08.19	35.14	272.1
Entry costs	50	732.8	20.10	849.6	795.0
Concentration	50	183.0	404.0	070.0	095.0
Firm size	50	70.12	73.13	78.11	489.0
Market-to-book value	50	831.0	614.2	181.0-	653.0
Operating cycle	50	460.5	743.5	945.4	191.0

As demonstrated, the number of observations equal 50 industry-years. The mean for discretionary accruals in industry level is 0.103. Its minimum, maximum, and standard deviation are 0.046, 0.197, and 0.032 respectively, which indicate the normality of distribution for dependent variable and normality of regression model's residual. For industry size, mean, standard deviation, maximum, and minimum are 16.20, 1.272, 19.08, and 14.3 respectively. This indicates normality of the data. Also the large mean value of industry size points out to the intensity of competition between firms in the industries. As for entry cost, the mean value is 8.732, standard deviation, maximum, and minimum are 0.795, 10.20, and 6.849 respectively. This indicates that entry costs are low and the competition among firms is intense. Also the mean value of concentration index equals 0.183, and the minimum and maximum are 0.070 and 0.404 respectively. This also points out to low industry concentration and high competition.

5.2. Test of model determination

In order to test the H0 hypothesis (using pooled model) as opposed to H1 hypothesis (using panel model), the Limmer F-test has been employed. The hypotheses for this test are defined as below:

H0: pooled model

H1: panel model

Table 2 represents pooled data vs. panel data.

Table 2. pooled data vs. panel data

Test	Statistic value	Sig.	Result
Limmer F-test	454.0	893.0	H0 is confirmed

Considering the test results, the use of pooled data is confirmed. Therefore there is no need to carry out Hausman test to determine fixed effects vs. random effects in panel data model, and the regression model is assessed using least ordinary squares method. The results of model 1 estimation are presented in table 3. Based on the obtained results, F-statistic equals 7.591 and confirms the regression model at the 0.000 significance level. On the other hand, the coefficient of determination indicates that 0.56 percent of change in dependent variable can be explained by

independent variables. Also the value of Durbin-Watson statistic equals 1.92 which indicates that there is no autocorrelation between independent variables. In the test of the relationship between product market competition and earnings management, the coefficient of industry size variable which is considered to be an indicator of competition equals -0.025, and its t-statistic is -3.92 which is significant at the 0.000 level and indicates that this factor has a negative and significant relationship with discretionary accruals. Yet, regarding the existing research literature it was expected that there is a positive relationship between industry size and discretionary accruals. However the hereby obtained results confirm a negative relation between industry size and product market competition. On this basis, the first sub-hypothesis is rejected.

Moreover, the coefficient of entry costs variable as the second indicator of competition equals -0.021, and its t-statistic is -2.90 which is significant at the 0.005 level and confirms the relationship between entry costs and discretionary accruals. On this basis, there is a negative and statistically significant between this indicator of competition and discretionary accruals, and therefore the second sub-hypothesis is confirmed.

Table 3. the impact of competition on discretionary accruals

Variable	Coefficient	Standard error	t-statistic	Sig.
Constant	736.0-	220.0	39.3-	001.0
Industry size	025.0-	06.00	92.3-	0.000
Entry costs	021.0-	0.007	90.2-	0.005
Concentration	25.0	07.0	51.3	001.0
Firm size	078.0	0.013	82.5	000.0
Market-to-book value	0.010	0.008	24.1	218.0
Operating cycle	065.0	031.0	08.2	043.0
Sales volatility	0.245	098.0	485.2	0.017
Coefficient of determination				
56.0	F-statistic	591.7		
Adjusted coefficient of determination	48.0	P-value	0.000	

The test of the relationship between concentration as the third indicator for measurement of product market competition and discretionary accruals indicates that the coefficient of industry concentration variable equals 0.25, and its t-statistic is 3.51, which is significant at the 0.001 level. This indicates that this factor has a positive and significant relationship with discretionary accruals; hence the third sub-hypothesis is confirmed. Among the control variable of model (1), only the relationship between market-to-book value of shareholders' equity and discretionary accruals can not be confirmed; however the relationship of other variables are statistically significant.

6. Conclusion and suggestions

The present study has been an effort to identify the impact of intense competition in product market on earnings management. It seeks to confirm the relationship between dimensions and indicators of competition and earnings management so that the body of literature on earnings management could be expanded. The results obtained in the present research reveal that:

- There is a negative relationship between industry size as the first indicator of product market competition and discretionary accruals. As opposed to what was expected, this relationship is not positive and therefore the first sub-hypothesis is rejected.
- The relationship between entry costs and discretionary accruals indicated a significant and negative nature. This reveals that by decrease of entry costs and intensification of competition, the use of discretionary accruals for earnings management will increase. On this basis, the second sub-hypothesis is confirmed.
- Examination of the relationship between concentration and discretionary accruals reveals that there is a positive and significant relationship between these two variables. This means that that by reduction of concentration and intensification of competition, the use of discretionary accruals for earnings management will increase. Therefore the third sub-hypothesis is confirmed.
- Concerning the results of the sub-hypotheses examination, it can be concluded that there is a significant relationship between intense competition in product market and discretionary accrual-based earnings management. Hence the research main hypothesis is confirmed.

In the end, in order to follow up this research and carry out similar studies regarding the relationship between product market competition and earnings management, it is suggested that the following issues are taken into consideration:

- Considering the dimensions of product market competition and different methods of measuring competition and earnings management, it is suggested that the relationship between competition and earnings management is examined with regard to those dimensions and using different methods.
- It is suggested that for future studies, researchers categorize markets in terms of structure (i.e. monopolistic, perfect, or imperfect competition) and compare them in terms of earnings management.
- Finally, it should be noted that a similar study can be carried out on insurance or banking industry, or any other industry which has not been included in the present research due to sampling limitations.

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