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Study on effects of industry competition in the product market on earnings management of listed companies in stock exchange

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Abstract
Earnings management has inverted the main objective of financial reporting through the distortion of the actual economic performance of companies and prevented the complete transfer of information to market. Given the importance of subject of research, incentives that cause earnings management have been reviewed from various aspects. The main purpose of this research is to examine the relationship between competition in industry and pricing power at product market and earnings management in the companies listed in Tehran stock exchange. For this, modified Lerner index was used to measure pricing power and three middle Lerner indices including industry, reverse number of firms in the industry, four-firm concentration ratio were used as the indices of competition in industry. To measure earnings management, Modified Jones Model was used. The statistical population consists of all the firms listed in Tehran stock exchange. With regard to the considered criteria, 100 companies among 9 industries were selected as sample based on two digit ISIC codes. Findings of research indicate that the companies which enjoy the pricing power at product market less likely manage their earnings. Another finding indicates that earnings management increases by increasing competition in industry. Hence, the investors who intend to invest in competition industry should pay more attention to earnings management.

Key Words: *competition in production market, pricing power, earnings management*

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Introduction

Without doubt, emergence of corporations in the industrialized world is one of the largest economic developments and perhaps the most important factor for industrial progress. The results from this phenomenon include Separation of ownership from management, natural differences in their utility function and as a result emergence of conflicts of interest followed by the formation of the principal-agent relationship and representation theory. Since that time, problem of conflicting rights in general and the risk of stripping the rights of minority shareholders by large shareholders have a controlling influence in particular, appeared as a major owner-agent problem in most of countries worldwide. With regard to the theory of conflict of interest between managers and owners, it can argue that business managers can enjoy the required incentive to manipulate earnings to maximize their own interests. Therefore they can manipulate the earnings accruals to improve performance of the company and manage the earnings. Earnings management has been defined as the process of taking informed steps at the range of the accepted accounting principles to reach the reported earnings to the considered level (Chalaki & Yousefi, 2013). In numerous empirical studies, the relationship between competition at product market and a variety of financial variables has been proved(Januszewski et al, 2002, the relationship between competition at product market and company performance; Kale and Loon, 2011, the relationship between power at product market and liquidity at stock market; Lyandres and Watanabe, 2012,the relationship between competition at product market and return on stock; Huang and Lee, 2013, the relationship between competition at product market and credit risk), study on this subject whether a relationship exists between competition at product market and earnings management has been ignored.

Problem statement

Proper decision making at economic enterprises and other institutions require authentic, clear and comparable information. Accounting refers to an information system, taken into account in business units as an effective means in the process for providing and representing financial information for users' informed decision making. A large part of accounting information is reflected in financial statements. Profit and loss report refers to one of the major financial statements which enjoy a significant importance in economic decision making and evaluating the managers' stewardship (Saghafi & Bahar moghadam, 2008). Since earnings refers to one of the most important factors affecting economic decision makings, users' awareness from earnings reliability can assist them in making better decisions for profitability and analysis of financial statements(Yaghoub Nejad et al. 2012). Earnings manipulation and management have inverted the main aim of financial reporting through distorting the real economic performance of companies and avoid thorough transfer of information to market. In this regards, the phenomenon of information asymmetry emerges (Datta et al. 2013). Review by Graham and colleagues (2005) suggest that earnings management is a widespread phenomenon. Findings of research by Skinner and Sloan (2002) indicate that managers of companies manage the earnings to avoid unveiling of their company's real value, because the reported earnings less than the expected earnings are punished by the investors. Researchers have referred to various aspects of earnings management. Most of the studies conducted in this context have addressed the incentives of earnings management such as increase of stock value (Collins and Hribar, 2000) and acquisition of less financing costs (Déchu et al, 1996). Some studies have mentioned that earnings management takes place aiming at influencing the decisions by foreign creditors (Adams et al. 2009; Teoh et al. 1998). Followed by related works, the present research intend to determine whether power

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at product market can be a driving force for earnings management by the companies using the panel data of the companies listed in Tehran stock exchange. In addition, we will examine that how competition in industry will affect earnings management. Further, to examine the subject of research, effect of two concepts of institutional ownership and information asymmetry on the relationship between 'power at product market and competition at industry' and 'earnings management' is evaluated.

Research hypotheses

With regard to the aims of research, the hypotheses considered in the present research are formulated as follows:

1- There is a negative significant relationship between power at product market and accruals management.

2- There is a significant relationship between competition at industry and accruals management.

3- There is a significant relationship between Middle Lerner Index and accruals management.

4- There is a significant relationship between number of companies working in industry and accruals management.

5- There is a significant relationship between number of companies working in industry and accruals management.

6- There is a significant relationship between big four firms over the total sale and accruals management.

7- Mechanisms of Governance influence the relationship between accruals management and power at product market.

8- The company's information environment influences the relationship between accruals management and power at product market.

Variable	Number of observations	Mean	Median	Standard deviation
Power at product market				
Modified Lerner	500	-1.16	-0.08	2.41
Competition at product market				
industries Lerner Middle	9	0.16	0.13	0.08
Number of companies	9	13.76	11.00	6.79
four-firm concentration ratio	9	0.26	0.24	0.12
accruals management				
The absolute value of discretionary accruals	500	0.72	0.52	0.69
Properties of company				
Institutional ownership	500	36.45	23.89	33.19
Information asymmetry	500	0.02	0.01	0.01
Growth rate of asset	500	0.12	0.10	0.22
Ratio of market value to book value	500	1.63	1.30	3.70
Size	500	12.47	12.30	1.40
volatility of sale	500	0.19	0.14	0.16
volatility of operating cash flow	500	0.16	0.07	1.52
Financial leverage	500	0.08	0.05	0.10

Table 1. Descriptive indices of research variables

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Research method

Library and field methods have been considered as the method for data collection. The essential information to describe the theoretical background of research are obtained from the Iranian and foreign research and articles and internet sources. The research variables will be calculated using the existing information in reports and financial statements of the exchange companies. This information will be extracted from Rahavard Novin software and www.Rdis.ir. In this research, discretionary accruals which is obtained using Modified Jones Model is used to measure earnings management (Jones, 1991; Dechu et al. 1995). The mentioned model is as follow:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_1 \frac{1}{A_{it-1}} + \alpha_2 \frac{\Delta REV_{it} - \Delta AR_{it}}{A_{it-1}} + \alpha_3 \frac{PPE_{it}}{A_{it-1}} + \alpha_4 \frac{NetIncome_{it-1}}{A_{it-1}} + e_{it}$$

(1-1)

Where

TA: Total accruals

ΔREV: sale changes

ΔAR: Changes in accounts receivable

PPE: value of property, plant and equipment

A: sum of assets

Findings of research

With regard to calculations, total number of observations for each of research variables is 500 years-companies. This point is true regarding the property of the used panel data, because information of 100 selected companies was collected as sample during 5 years. The data with this property is called panel data.

Descriptive indices have been classified to four groups. The indices related to power at product market, competition at product market, earnings management and properties of company. Median of Modified Lerner index equals to -8%. Negative sign of this index is consistent with the finding of research by Data et al.(2013). In few Iranian studies which have used this index (Namazi & Ibrahimi, 2012), descriptive statistics have not been reported to compare the descriptive findings of research with them. Correspondingly, median of Lerner median has equaled to 13% in 9 industries under study. This index has been reported equal to 9.44% in the research by Data et al.(2013). Median of four-firm concentration ratio equals to 24%, indicating that severity of concentration in all the industries under study is low, so that it has been put in the framework under the pattern of Qualls(1968). In other words, contribution of four leading enterprises at any industry at all the time range of research has been under 25%, and the competition is severe in nine industries. This result is consistent with the finding of research by Ghorbani et al(2013) based on Herfindahl-Hirschman Index (HHI). They have reported mean (16.3%) for the mentioned index in their research which indicates competition at product market based on the theoretical background.

Correlation analysis

In the models used to test hypothesis, several explanatory variables are used. Lack of severe linear relationship between explanatory variables is the major hypothesis in the regression models. To examine this, Pearson correlation coefficients between explanatory variables have been proposed in table below. With regard to the obtained correlation coefficients, there is not a severe correlation between explanatory variables, so that all the coefficients are under 0.3 and most of them are not significant. Therefore, it can mention that collinearity in regression models of research is not serious.

Hypothesis testing

After the initial stages for data analysis including calculation of descriptive indices and estimation of modified jones model, it should now test hypotheses.

Testing the relationship between power at product market and earnings management

The first hypothesis

There is a negative significant relationship between power at product market and accruals management

To examine the relationship between discre-

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	Modified Lerner	Number of companies listed in Tehran stock exchange	Median of Lerner industry	Concentration ratio
Rate of asset growth	0.061	-0.047	*0.098	-0.016
Ratio of market value to book value	0.084	*-0.094	*0.095	0.011
Size	**0.015	0.054	**0.262	-0.055
volatility of sale	0.022	0.031	**-0.0207	**-0.211
volatility of operating cash flow	0.021	-0.036	-0.050	-0.007
Financial leverage	0.075	**-0.141	**0.217	**0.235

Table 2. Pearson correlation coefficients between explanatory variables; *significance at level 0.05; ** significance at level 0.01

Variable	Regression coefficient	t-value	Sig
Power at product market	-0.002	-0.16	0.873
Rate of asset growth	0.068	0.46	0.644
Ratio of market value to book value	0.012	1.45	0.148
Size	-0.007	-0.30	0.762
volatility of sale	0.476	2.46	0.014
Financial leverage	-0.521	-1.65	0.009
f-statistics	2.21		
Significance level of F	0.041		
Determination coefficient	0.026		

Table 3. Results from estimation of regression model related to the first hypothesis

tionary accruals and pricing power at product market, the regression model below is used.

(1)

$$AbsDiscAccruals_{jt} = b_0 + b_1 MarketPower_{jt} + b_2 Growth_{jt} + b_3 Market-to-Book_{jt} + b_4 Volatility_{jt} + b_5 Size_{jt} + b_6 Leverage_{jt} + e_j$$

Results from the estimation of model above have been reported in table below. It should be noted that the results from this table per volatility of sate have been obtained. With regard to the obtained results, there is a negative relationship between power at product market and earnings management. But with regard to the obtained significance level, this relationship is not significant (t=-0.16, Sig.>0.05). The estimation of model per volatility of cash flow indicated that results do not change a lot. With regard to the obtained results, the first hypothesis of research grounded on "there is a significant relationship between power at

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	Model 1		Model 2	
Variable	Regression coefficient	t-value	Regression coefficient	t-value
Lerner index	-0.782	*-1.97	-0905	**-2.34
Rate of asset growth	0.091	0.62	0.106	0.73
Ratio of market value to book value	0.013	1.60	0.015	*1.74
Size	0.004	0.19	0.009	0.38
volatility	0.392	**1.98	0.063	***3.13
Financial leverage	-0.378	-1.18	-0.405	-1.27
f-statistics	2.86		3.87	
Significance level of f	0.009		0.000	
Determination coefficient	0.034		0.045	

Table 4. The results from estimation of the regression model related to the second hypothesis per Lerner index; *sig at 0.1 level; **sig at 0.05 level; *** sig at 0.01 level

	model 1		model 2	
Variable	Regression coefficient	t-value	Regression coefficient	t-value
inverted number of companies working in industry	-1.321	*-1.67	-1.65	**-2.11
Rate of asset growth	0.080	0.54	0.099	0.68
Ratio of market value to book value	0.013	1.56	0.014	*1.72
Size	-0.006	-0.27	-0.003	-0.14
volatility	0.436	**2.24	0.067	***3.31
Financial leverage	-0.435	-1.37	-0.469	-1.49
f-statistics	2.68		3.69	
Significance level of f	0.014		0.001	
Determination coefficient	0.032		0.043	

Table 5. The results from estimation of the regression model related to the second hypothesis per number of companies working in industry; *sig at 0.1 level; **sig at 0.05 level; *** sig at 0.01 level

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product market and accruals management" is not confirmed.

Testing the relationship between competition at industry and earnings management

The second hypothesis

There is a significant relationship between competition at industry and accruals management

The second hypothesis has been formulated in form of three secondary hypotheses as follows:

The first hypothesis: median of Lerner index has a significant relationship with accruals management

The second hypothesis: number of companies working in industry has a significant relationship with accruals management

The third hypothesis: big four firms over the total sale has a significant relationship with accruals management

To examine the relationship between earnings

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Variable	Model 1		Model 2	
	Regression coefficient	t-value	Regression coefficient	t-value
four-company concentration ratio at industry	-0.656	**-2.40	-0.752	***-2.48
Rate of asset growth	0.079	0.53	0.089	0.62
Ratio of market value to book value	0.013	1.52	0.014	1.64
Size	-0.010	-0.44	-0.007	-0.33
volatility	0.383	*1.95	0.065	***3.21
Financial leverage	-0.361	-1.13	-0.385	-1.21
f-statistics	3.19		4.13	
Significance level of f	0.004		0.000	
Determination coefficient	0.037		0.050	

Table 6. the results from estimation of the regression model related to the second hypothesis per four-company concentration ratio at industry; *sig at 0.1 level; **sig at 0.05 level; *** sig at 0.01 level

management and competition at industry, the regression model below is used:

As mentioned, three indices have been used to measure competition at industry. Hence, the results from estimation of above regression model per three indices are reported. Table 4 displays the relationship between competition at industry and earnings management per Lerner index. Further, two variables of standard deviation of sale and cash flow have been used as the criteria of volatility. Results under model 1 and model 2 have been represented in table below.

Table 5 displays the relationship between competition at industry and earnings management per inverted number of companies working in industry. Further, both variables of standard deviation of sale and cash flow have been used as the criteria of volatility. Results have been represented in model 1 and model 2.

Table6 displays the relationship between competition at industry and earnings management per four-company concentration ratio at industry. Further, both variables of standard deviation of sale and cash flow have been used as the criteria of volatility. Results have been represented in model 1 and model 2.

With regard to the results from estimation of regression model related to the second hypothesis, there is a negative relationship between all the indices of competition at industry and earnings management, because sign of regression coefficients of all the indices of competition at industry has been obtained negative. With regard to the obtained significance levels, the relationship between earnings management and competition at industry has been significant at error level (0.1) at all the states (sig<0.1). Further, this relationship has been significant at error level (0.01) in some cases (sig<0.01). These results are in consistent with the findings of research by Data et al.(2013). With regard to the discussions above, the second research hypothesis under "competition in industry has a significant relationship with accruals management" is confirmed based on three indices of inverted number of companies working in industry, Lerner index and big four firms over the total sale.

Study on effect of governance mechanisms

Third hypothesis

Governance mechanisms influence the relationship between accruals management and power at product market. To test this hypothesis, the regression model related to the first

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Variable	Regression coefficient	t-value	Sig
Power at product market	0.002	0.18	0.854
Institutional ownership	-0.002	-1.92	0.055
Rate of asset growth	0.059	0.40	0.689
Ratio of market value to book value	0.013	1.50	0.133
Size	-0.001	-0.02	0.982
volatility	0.452	2.34	0.02
Financial leverage	-0.549	-1.74	0.082
f-statistics	2.43		
Significance level of f	0.019		
Determination coefficient	0.033		

Table 7. The results from third hypothesis testing

Variable	Regression coefficient	t-value	Sig
Power at product market	-0.003	-0.22	0.828
information asymmetry	2.134	0.93	0.355
Rate of asset growth	0.088	0.59	0.558
Ratio of market value to book value	0.012	1.48	0.138
Size	-0.009	-0.39	0.694
volatility	0.445	2.26	0.024
Financial leverage	-0.522	-1.66	0.098
f-statistics	2.01		
Significance level of f	0.052		
Determination coefficient	0.028		

Table 8. Results from the fourth hypothesis testing

hypothesis is used with this difference that the institutional ownership is added to the model. The results from third hypothesis testing have been displayed in table 7.

With regard to the obtained results, presence of institutional ownership in model has changed the sign of regression coefficient of power at product market from negative to positive. Yet the relationship between earnings management and power is still insignificant at market (t=0.18, Sig>0.05). In this regards, the third hypothesis under "mechanisms of governance influence the relationship between accruals management and power at product market" is not confirmed.

Study on effect of information environment of company

The fourth hypothesis

The information environment of company influences the relationship between accruals

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management and power at product market. To test this hypothesis, the regression model related to the first hypothesis is used with this difference that the variable of information asymmetry is added to the model. The results from the fourth hypothesis testing have been displayed in table 8.

With regard to the obtained results, presence of information asymmetry in model has not changed the sign of regression coefficient of power at product market, which the relationship between earnings management and power at market has still remained insignificant (t=-0.22, Sig>0.05). In this regards, the fourth hypothesis under "information environment of company influences the relationship between accruals management and power at product market" is not confirmed.

Conclusion

Information analysis of 100 companies listed in Tehran stock exchange during 2007-2011 indicates that power at product market has an inverse relationship with management of discretionary accruals. This finding indicates that the managers of companies more likely involve in earnings management activities under lack of power at product market, and conversely the companies which enjoy power at product market less likely manage their earnings. This result is consistent with the findings of research by Data et al.(2013) and Khajavi et al.(2013), with this difference that such relationship has been significant in the related works, but this relationship has not been detected significant in the present research. Yet it should be noted that the control variables different from control variables used in this study have been used in the research by Khajavi et al.(2013). Further the earnings management has been calculated using Dechu et al.(1995). The result from the second hypothesis testing indicates that there is an inverse relationship between indices of competition at product market and earnings management, i.e. earnings management reduces by increasing the competition. Since increase in competition implies increase of monopoly in industry, it is deduced that earnings management reduces by increasing monopoly at product market; in other words, earnings management increases by increasing competition. Therefore, at competitive industries, managers have fewer tendencies to disclose information for their competitors (Data et al. 2013). This result has been stable per various competition criteria at product market, so that the regression coefficient of three indices including inverted number of companies working in industry, four-company concentration ratio and Lerner index has been reported with a negative sign. These results are consistent with findings of Data et al.(2013). Study on institutional ownership and information asymmetry indicated that presence of these variables have no significant effect on the relationship between earnings management and pricing power at product market, and the relationship between these two variables has still remained insignificant. These results are consistent with the findings of research by Data et al.(2013). With regard to these results, increase of institutional ownership as one of the mechanisms of corporate governance has not effect on the relationship between earnings management and pricing power at market and earnings management is made independent from pricing power at market. Further, the companies with pricing power at product market regardless of information asymmetry might induce to earnings management. However, negative sign for the institutional ownership indicates that institutional owners by making their monitoring role cause reduction in earnings management among the companies listed in Tehran stock exchange. This result has been reported in the studies by Morad Zahedfard et al.(2009). Positive sign of regression coefficient for the difference between the proposed purchase and sale price indicates that increase in information asymmetry predisposes the companies to the earnings management so as to reduce the unfavorable effects of information asymme-

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try (Data et al. 2013).

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