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The Relationship between Product Market Competition and Stock Returns in Tehran Stock Exchange Companies

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Abstract

The main purpose of this paper is to examine the efficiency of competitive product market shares in listed companies in Tehran Stock Exchange. Competition criteria in this study included "industry concentration", "replacement the goods", "market size", "Index-Q Tobin," "barriers to entry" (capital intensity). Therefore, a sample of 87 companies during the years 2003 to 2011 were examined. The results showed that there was a significant negative relation between industry concentration, the substitute goods, market size and index - Q Tobin with stock returns. However, there is no significant relationship between stock returns and barriers to entry. The results of this study indicate that firms with high competitiveness earn low efficiency.

Key words: stock returns, competitive of market product, Herfindahl - Hirschman index, Lerner

Introduction

The first theory of asset pricing in economics and finance was suggested after the model of pricing financial assets was raised by Sharpe (1964), Linter (1965) and Black (1977). Now CAPM is 40 years old. According to the results of field studies, this model is a model widely used today in various fields such as estimating in stock, managed portfolio performance evaluation etc. But this model explains that the only difference between stock returns is the systematic risk or beta coefficient. However, existing empirical evidence suggests that beta, as an indicator of systemic risk, does not explain alone the difference between the stock returns and other variables. The other indicator such as firm size, price-earnings ratio and the ratio of book value to market value play an important role in explaining the stock return. Recent empirical research indicates that, in some countries, in addition to the above factors, competitive product market also affects stock returns. Thus, the aim of this study is to provide the evidence showing product market competition has the effect on stock returns of listed companies in Tehran Stock Exchange.

Theoretical Foundations

Several studies have been conducted indicating that the efficiency of the stock returns are affected by many variables. Keim and Stambaugh (1986), Campbell (1987), Fama and French (1988), Hodrick (1992),Jun et al.(2002) argue that the financial variables such as the dividend price ratio, price to earnings ratio, liquidity ratio of short-term interest rates, stock returns can be predicted. Papanastasopoulos et al (2011) argue that stock returns of companies with different operating assets are different. And there is a negative and significant relationship between future stocks returns Operating Assets. In addition, agency relationship and earnings management can be noted as the factors of affecting on stock returns.

Sharma(2010) just like any other research on stock returns, studied the most important factor in today's business environment. In his research, he examined the structure of competition in the

product market, with stock returns. The results show that market factors, firm size, book-to-market firms in concentrated industries earn lower returns. He also found that companies who produce the succession is more, earn higher returns compared to firms with low succession. Companies in industries with larger market earn more efficient compared to companies with smaller market. In this paper, according to Sharma we review competitive product in market with stock returns. Companies competitive will be reviewed with a number of criteria such as the Tobin Q index (indicating the value of the company), entry barriers (capital intensity) industry concentration, market size and the replacement item.

Power product market competition

Exchange is one of the most basic human needs. Market is an institution that provides this exchange. Thus, the market is a place or situation in which buyers and sellers can buy and sell products and resources. There is a market for every kind of goods and service that are bought and sold in a market economy. The most important factor that plays a major role in the market is the competition element, which is created due to the imbalance between supply and demand.
When demand is high for the company's products, there is a high competitive between companies. In this study, to evaluate the competitiveness of product market competition, several criteria were used, each with stock returns, in the form of separate models that we will explain them briefly.

Relationship between investing heavily in the market (barriers to entry) and stock returns as a measure of competitive

Conditions indicate difficulty or ease of entry into the market. As entering into the industry is a potentially more difficult for firms, firms in the industry will be able to cooperate and adopt the non-competitive behavior. Basically, barriers to entry into an industry provide many advantages for the firms in the industry. The conditions of market and Improving entry and barriers, specifies that previous firms have the advantages to potential firms. These levels determine the competitive ability and the ability of firms to potential business. Threat of entry into an industry depends on the barriers to entry and competitor's reaction to it. If the barriers are high or the new companies expect seeking reaction from existing competitors, there would be a lower risk to entry. When a large amount of company's assets is related to invisible and fixed assets of a company the probability of corporate bankruptcy is high. As a result, investors may demand greater returns and also expect low returns due to high competitive.

Relationship between industry concentration and stock returns

When there are a large amount of companies, the possibility of solitary company in product market competition is high. And, some companies may believe that the habit can take action without notice to the other competitors. Even where the number of firms is relatively small in size if the companies have the same level of resources they can cause instability. Because they may be seeking to combat the severe retaliation and they spend their resources constantly on it. On the other hand, if the industry is highly concentrated or controlled by one or two companies, there will be no doubt about their relative strength. Leading company or companies can impose discipline and behavior and also through leadership in determining the price, the industry should play an auxiliary role. Economists have been interested in the relationship between industry concentration and profitability and a lot of research has been done in this area. Demsetz (1973) concluded that the high profitability are in the companies which are stronger in choosing and investment management and new product development. However, risk-intensive industries vulnerable and therefore, they are demanding

higher returns. Thus, it may exist a positive relationship between profitability and concentration in the industry.

The relationship between the replacement of product and stock returns

When products are easily replaceable and interchangeable with other products, then you can argue that they have reduced pricing power in the product market. Cash flows in such companies are more volatile than the companies that their products are not interchangeable. It can therefore be inferred that stakeholder in firms with greater product substitution, are demanding higher returns.

The relationship between market size and stock returns

When an industry's market size increases, more firms enter the industry and have higher profitability in the future. This will lead to increased competition over prices. But over time, the rate of entry of new firms into the industry is less than the industry growth rate. This event occurs when the existing companies, have strategic investments in quality improvement and cost reduction that both decrease the incentive of new firms to enter the industry. The market industrial companies with large market size are faced with more competition compared with smaller companies belonging to the industry. Therefore, it is expected that stakeholders in companies belonging to industries with larger market are seeking additional efficiencies.

The relationship between the market value of the company stock returns

According to the signaling theory, the market valuable companies have the information for the market that is good. Therefore, the investors invest their money in these companies to earn higher returns. Thus, there is a positive relationship between market values and stock returns.

Background of the study

Mohammad Namazi and Shahla Ebrahimi, in an article entitled "The relationship between product market competition structure and stock returns" (2012) examined the relationship between product market competition and efficiency in the shares of listed companies in Tehran Stock Exchange. To achieve this goal, the Herfindahl - Hirschman index, Lerner and moderate Lerner indices has been considered as competitive criteria. The sample included 87 firms in the period 2002-2009. The results of hypothesis testing method by combined data indicate that between Herfindahl - Hirschman index and stock returns there is a negative correlation, but this relationship was not significant. Moreover, between the Lerner and moderate Lerner and stock returns there is a significant negative relationship. These findings imply that as the competition in more in industries, the stock return would be more.

Hou and Robinson (2006) studied the structure of a competitive product prices with investment assets. Results of this study indicate that the structure of a competitive product will will affect the decision of operational management and company stock returns will be influenced. They point out that this decision associated to risks is carried out with product market competition and the company's future cash flows.

Dan et al(2007) reviewed the relationship between industry concentration stock return of Chinese companies from 2001 to 2005. This study describes the relationship between industry concentration and a stock return is positive and significant, and companies with high concentration ratio, earn more returns.

Sharma (2010) examined the relationship between industry concentration and the cross-sectional stock returns in the London Stock Exchange. His sample consisted of 1,300 companies own to 88 industry in the period 1985-2010. The results showed that the relationship between industry concentration and the expected return on stock is negative. In other words competitive industries earn more risk-adjusted returns compared with in concentrated industries. Ignatieva and

Gallagher (2010) studied the factors affecting on stock returns in Australian companies. The results show that firm size, the book value to market value, competition of product in market, impacts on the average of stock returns.

Methodology

Since the aim of this study is to evaluate the efficiency of competitive product on the market and listed companies in Tehran Stock Exchange, this research is descriptive correlational

Developing the model and hypothesis testing

The hypotheses of this study are as follows:

1. There is a significant relationship between industry concentration and stock returns
2. There is a significant relationship between the ability of replacement the product and return.
3. There is a significant relationship between market size and stock returns
4. There is a significant relationship between entry barriers and returns.
5. There is a significant relationship between the Indices Tobin Q and returns.

Therefore, to test the research hypothesis the Research hypothesis testing models are as follows:

$$R_{it} = \beta_0 + \beta_1 HH_{it} + \beta_2 MBV_{it} + \beta_3 Size_{it} + \varepsilon_{it} \quad (1)$$

$$R_{it} = \beta_0 + \beta_1 PCM_{it} + \beta_2 MBV_{it} + \beta_3 Size_{it} + \varepsilon_{it} \quad (2)$$

$$R_{it} = \beta_0 + \beta_1 SS_{it} + \beta_2 MBV_{it} + \beta_3 Size_{it} + \varepsilon_{it} \quad (3)$$

$$R_{it} = \beta_0 + \beta_1 PPE_{it} + \beta_2 MBV_{it} + \beta_3 Size_{it} + \varepsilon_{it} \quad (4)$$

$$R_{it} = \beta_0 + \beta_1 Q_{it} + \beta_2 MBV_{it} + \beta_3 Size_{it} + \varepsilon_{it} \quad (5)$$

Rit: stock returns
HH it: Herfindahl-Hirschman index
PCMit: the substitution of goods
SS it: Market Share
PPEit,: Barriers to Entry
Value Qit: the business unit
MBV it: Ratio of market to book value
Size it: Size Enterprises

Definition of variables in the research

Independent variables

A) The substitution of goods - This variable is calculated based on the Lerner index

PEC = LI = $\frac{Sales-COGS-SG\&A}{Sales}$

This relationship "Sales" represents the total sales, COGS cost of goods sold and SG&A is cost of sales, general and administrative.

B) Market size - this variable is measured by the average of the past three years, total sales of all firms.

$$SSj = \sum_{i=1}^{I} salesij$$

$Sales_{ij}$ is " I" company's sales in "j" industry and "I" represents the number of firms in the industry" j".

C) Focus on the industry - this variable is measured using the Herfindahl - Hirschman index:

$$HHj = \sum_{i=1}^{I} sij^2$$

In this relation, S ij the market share of firm i in industry j, and I j is the number of firms in the industry.

D - The index (Q) Tobin

Q-Tobin Index is a useful indicator for measuring the level of competition in the product market. In other words, firms that rate high product competition than firms with low competition levels are lower Tobin Q-index. In other words, we can say high Q - Tobin shows high competition in the product market. When the market is full of competition Q - Tobin of all companies is one. So the company's book value to market value is equal. Such as Pandey (2004) and Guney et al (2011) this study used Q-index as a criteria of the competition.

$$\mathrm{Q} - \mathrm{Tobin} = \frac{Book\ value\ of\ debt\ +\ market\ value\ of\ equity}{\mathrm{Book\ value\ of\ assets}}$$

D - Barriers to entry (PPE)

Requires a large amount of funds for the initial investment in the business when entering a competition, it creates a barrier to entry into the industry. Especially when investing a lot of non-current assets, especially fixed assets and intangible assets is required. In this study, the sum of fixed assets and invisible to total assets is used to calculate the barriers to entry. In other words, when product market entry barriers are low, the level of competition in the product market is high and competitive strength of the company's products will be lower and the opposite is also possible. The barrier to entry is high when product market competition is less threatening and shows the competitiveness of companies (Heydari, 2011).

$$\text{Barriers to entry } = \frac{\text{Total fixed assets} - \ invisible\ assets|}{total\ assets}$$

Dependent variables

A) stock return: stock returns is the sum of the difference between the stock price, cash profit per share, and stock right awarded in a fiscal period divided by the price of the first fiscal period(Sharma, 2010).

Control variables

A - Size - Due to inflation in Iran, the three most common measures of size (total assets, sales and market shares), size is considered as a measure of stock market value (Dan et al, 2007).

B - The ratio of market value to stocks book value: One of the criteria to investors is the ratio of market value to book value. This increase can be attributed to encourage investors and shareholders representing more than expected to get the most return on stocks (Dan et al, 2007).

Area of the study

Considering the importance of subject, area of the subject matter is the time and place and is as follows:

Time domain: the domain of the study is 2003 to 2011

Spatial domain: the realm where research is Tehran Stock Exchange.

Thematic domain**:** domain subject is the effect of some measure of competition, including "Focus on industry", "replace the goods", "market size", "Index-Q Tobin," "barriers to entry" (capital intensity) on returns of the company.

Research population and sample

Population of this research is all companies listed in Tehran Stock Exchange since 2003 to 2012 in a period of 9 years. Systematic elimination method was used to determine statistical sample in which firms that their fiscal year ended March 19 or 20 has been removed. Then, banks and holding companies because of their different nature were eliminated. At the end of outlier observations (the first percentile and 99 percentile of all observations) are excluded. Also, at this stage, companies during the period under review, their data were unavailable for selection has been removed. Applying these conditions, only 87 companies were chosen in order to estimate the model and test the research hypotheses.

Data collection

In this study, the hypothesis and literature parts have been studied using special reference to the relevant library resources including books, magazines, weekly, monthly, quarterly and research centers and research publications, academic theses and Search websites. The company's required data has been studied, extracted and concluded using databases as Tadbirsaz software, financial statements, explanatory notes and reports of the General Assembly.

Data analysis methods

Table 1. Descriptive statistics for the variables

significance level	Jark bra statistic	Elongation	Skewness	Standard deviation	Min	max	Median	Mean	variable
0.000	857.301	6.030	2.067	0.127	5.0918	5.546	5.186	5.202	$Size_{it}$
0.000	274.186	4.165	1.327	0.050	1.007	1.194	1.066	1.072	MBW_{it}
0.000	137.211	2.357	0.973	0.003	0.003	0.012	0.005	0.006	SS_{it}
0.000	187.532	3.609	1.159	0.079	0.182	0.449	0.255	0.263	PPE_{it}
0.000	186.208	2.644	1.181	5.330	1.490	0.000	3.263	5.580	HH_{it}
0.000	221.105	2.753	1.295	0.068	-0.104	0.078	-0.88	-0.52	PCM_{it}
0.000	861.982	6.020	2.79	0.238	0.927	1.745	1.028	1.102	Q_{it}
0.000	261.191	4.500	1.199	29.423	-46.580	69.050	-6.400	-2.624	R_{it}

Descriptive statistics of the variables are included in the table above. Jark bra statistic makes the assumption of normality of variable. The null hypothesis of this test is that the variable follows a normal distribution. Regarding to the significant level of the test, in all variables, the significance level is less than 0.05. So, the variables of research are not normal. Because of high volumes of data, as well as the central limit theorem, the data can be used to estimate the regression model for panel data.

Regression Analysis

F-stat statistic is used for testing the significance of regression. T-statistic estimate the significance of the coefficients separately for each variable but the statistic F tests are used for the significance of coefficients simultaneously. Null hypothesis and hypothesis against the null are as follows:

H0: all coefficients are simultaneously equal to zero.

H1: At least one of the coefficients is not zero.

To test, the reported probability must be considered. If Prob <0.05, we reject the null hypothesis and conclude regression is significant. The results show that probability is equal 0.000 and less than 0.05. So, the null hypothesis is rejected and the estimated regressions are significant.

Durbin Watson test

DW statistic is used for residual autocorrelation test model. Null and against Hypothesis of this test is as follows:

H0: model residuals are auto correlated.

H1: model residuals are not auto correlated.

DW statistic for the test must be considered. If the value of this statistic is close to 2 can be said to reject the null hypothesis and model residuals are not auto correlated.

Fixation of research variables

To evaluate variables fixation, the unit root tests Phillips - Perron (PP)and unit root test of Dickey Fuller (ADF) will be used.

Table 2. The results of ADF and PP unit root test

Dickey Fuller test - finding (ADF)		Philips-prone test		Variable
Sig.	t	Sig.	t	
0.0039	227.688	0.0000	408.593	R_{it}
0.0000	415.530	0.0000	688.058	Q_{it}
0.0000	813.760	0.0000	1024.33	PCM_{it}
0.0000	557.238	0.0000	760.713	HH_{it}
0.0000	417.864	0.0000	660.014	PPE_{it}
0.0000	518.421	0.0000	823.578	SS_{it}
0.0000	283.378	0.0000	490.365	MBV_{it}
0.0000	715.169	0.0000	964.294	$Size_{it}$

Table 3. General findings of the five models

Model 5	Model 4	Model 3	Model 2	Model 1	Variable
0.8877	0.8214	1.239	1.0111	1.1581	C
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
				-0.5992	HH_{it}
				(0.0000)	
			-0.3994		PCM_{it}
			0.0094		
		-0.7285			SS_{it}
		(0.0137)			
	0.4137				PPE_{it}
	0.0734				
-0.2047					Q_{it}
(0.0001)					
0.2296	0.27960	0.2186	0.2081	0.2512	MBV_{it}
(0.0046)	(0.0181)	(0.0031)	(0.0107)	(0.0001)	
0.3112	0.3244	0.3348	0.4137	0.03677	$Size_{it}$
(0.0000)	(0.0000)	(0.0986)	0.0734)	(0.0532)	
14.225	11.900	15.036	17.486	14.96	statictic F
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
0.2650	0.2799	0.3129	0.2263	0.2572	R^2
0.2427	0.2613	0.2435	0.1908	0.2385	R^2 balanced
2.014105	2.026153	2.025251	2.024593	2.025501	D.W

The null hypothesis of unit root tests is that the variable has a unit root and opposite hypothesis is that the series has a unit root and is stationary. For the conclusions about the tests, the probability should be noticed. If the value is less than 0.05, the null hypothesis is rejected and the series is fixed. According to test results, the following is noted that all of the variables PP and ADF tests is less than 0.05 so the variables are fixed.

In the table above, the estimated coefficients and their significance levels are visible. According to the estimation results of the models, it can be seen that most of the estimated coefficients are significant at the 5% level.Or, the coefficients of determination R2 model, is represented by a few percent of the variability of the independent variables are significant. The highest coefficient of determination and the lowest rate is estimated in the third model, and the second model.

Table 4. Results of Model 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.158195	0.192319	6.022260	0.0000
HH	-0.599294	0.058733	-10.20370	0.0000
MBV	0.251216	0.061583	4.079325	0.0001
SIZE	0.367759	0.189229	1.943456	0.0532
R-squared	0.257213	Mean dependent variable		-2.624444
Adjusted R-squared	0.238565	S.D. dependent variable		29.42388
S.E. of regression	65.99830	Akaike info criterion		11.22368
Sum of squares	2635244.	Schwarz criterion		11.25266
Log probability	-3413.611	Hannan-Quinn criterion		11.23495
F-statistic	14.09689	Durbin-Watson stat		2.025501
Prob(F-statistic)	0.000000			

Table 5. Results of Model 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.011161	0.070933	14.25516	0.0000
PCM	-0.399420	0.152482	-2.619460	0.0094
MBV	0.208197	0.080880	2.574133	0.0107
SIZE	0.413713	0.229960	1.799067	0.0734
R-squared	0.226308	Mean dependent variable		-2.624444
Adjusted R-squared	0.190818	S.D. dependent variable		29.42388
S.E. of regression	66.02395	Akaike info criterion		11.22446
Sum of squares	2637293.	Schwarz criterion		11.25344
Log Probablity	-3413.848	Hannan-Quinn criterion		11.23573
F-statistic	17.48689	Durbin-Watson stat		2.024593
Prob(F-statistic)	0.000000			

Table 6. Results of Model 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.239045	0.062823	19.72279	0.0000
SS	-0.728561	0.292982	-2.486711	0.0137
MBV	0.218682	0.073025	2.994632	0.0031
SIZE	0.334858	0.201799	1.659365	0.0986
R-squared	0.312953	Mean dependent variable		-2.624444
Adjusted R-squared	0.243554	S.D. dependent variable		29.42388
S.E. of regression	66.01060	Akaike info criterion		11.22405
Sum of squares	2636226.	Schwarz criterion		11.25303
Log probability	-3413.724	Hannan-Quinn criterion		11.23533
F-statistic	15.03689	Durbin-Watson stat		2.025251
Prob(F-statistic)	0.000000			

Table 7. Results of Model 4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.239045	0.062823	19.72279	0.0000
SS	-0.728561	0.292982	-2.486711	0.0137
MBV	0.218682	0.073025	2.994632	0.0031
SIZE	0.334858	0.201799	1.659365	0.0986
R-squared	0.312953	Mean dependent variable		-2.624444
Adjusted R-squared	0.243554	S.D. dependent variable		29.42388
S.E. of regression	66.01060	Akaike info criterion		11.22405
Sum of squares	2636226.	Schwarz criterion		11.25303
Log probability	-3413.724	Hannan-Quinn criterion		11.23533
F-statistic	15.03689	Durbin-Watson stat		2.025251
Prob(F-statistic)	0.000000			

Table 8. Results of Model 5

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.888731	0.013875	64.05260	0.0000
Q	-0.204753	0.051538	-3.972873	0.0001
MBV	0.229621	0.080196	2.863238	0.0046
SIZE	0.311267	0.070342	4.425048	0.0000
R-squared	0.265034	Mean dependent variable		-2.624444
Adjusted R-squared	0.242763	S.D. dependent variable		29.42388
S.E. of regression	63.85208	Akaike info criterion		11.15756
Sum of squares	2466639.	Schwarz criterion		11.18654
Log probability	-3393.478	Hannan-Quinn criterion		11.16883
F-statistic	14.22534	Durbin-Watson stat		2.014105
Prob(F-statistic)	0.000000			

Conclusion

In the first hypothesis of the study, the focus was on the competitiveness of the industry as the first and then we tested it with stock returns. To test this hypothesis, the model results indicate that there is a negative and significant relationship between industry concentration and yield stocks

due to lower rates of 5%. The result indicates that as the concentration of the industry increases, its efficiency is lower.

In the second hypothesis of the study, successor product was introduced as the second quality competitiveness index and its relationship with stock returns was examined. The result shows that there is a negative correlation between the ratio of operating profit to sales (increase in this ratio indicates the company's ability to lower commodity substitution), and stock returns of companies. In other words, the companies with high profit margin ability have less replacement of the goods. In conclusion, the risks are low and investors expect fewer returns.

In the third hypothesis, the relationship between market size and stock market has been examined. The results show that there is a significant negative relationship between these variables, confirming the third hypothesis. The results are the same results of first and second hypothesis.

In the fourth hypothesis, the relation between barriers to entry and stock returns has been examined. In the level statistic of %5, this variable is not significant. So, there is no significant relation between barriers to entry and stick return and the fourth hypothesis is rejected.

In fifth hypothesis, the relation between Q- Tobin and stock return has been examined. The results indicated that there is a significant and negative relation between these two.

Practical recommendation

The results generally show that there is a negative significant relationship between the competitive aspects of the product including industry concentration, the substitute goods, market size index Q-Tobin and stock returns. In other words, companies with stable cash flows can be highly competitive because they often have internal financing to external supply. The risk is so low that investors expect lower returns. On the other hand, if the investors want more returns, they should invest in the industry with high competition to earn more. The results of the study conform to Sharma (2010), Ignatieva and Gallagher (2010). The result does not conform to Dan et al (2007).

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