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Product Market Competition and Companies' Investment

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Abstract

Purpose: Perhaps one of the most critical economic discussions worldwide is the debate on competitiveness and the improvement of the status of various industries for survival and growth in the turbulent arena of global markets. On the one hand, the importance of investment for economic and social growth and development is so significant that it has become one of the powerful levers for achieving development. However, it should be remembered that as much as attention to this matter can lead to economic growth and prosperity, neglecting it can result in economic decline. Therefore, long-term economic growth and increased public welfare are not possible without considering investment and the important influencing factors in its environment. This research examines the relationship between product market competition and the investment of companies listed on the stock exchange.

Design/method/methodology: The statistical sample of the study includes 82 companies during the period from 2018 to 2022. Panel regression analysis is employed to analyze the data and test hypotheses.

Findings: The research findings indicate a significant relationship between product market competition and investment, as well as a significant moderating role of company sales growth in the above relationship.

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1. Introduction

The environment in which companies operate today is a growing and highly competitive one. Companies, in order to survive, are compelled to compete with various factors at the national and international levels and expand their activities through new investments. To sustain life and investment, they need financial resources. The primary goal of most companies is to maximize shareholder wealth. One of the most important objectives that financial managers must consider to maximize shareholder wealth is the optimal composition of the company's financial resources or capital structure. Today, with the expansion of the qualitative level of activities and the extensive development of economic affairs, financial decisions of companies seem to be one of the complex issues that arise in the pursuit of performance and desirability under the best conditions. In this regard, since the

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primary responsibility for these decisions falls on financial managers, they are always seeking to establish international relationships among influential factors in companies. One of these issues is investment decisions (Aoun and Hadang, 2008).

It seems that making desirable and profitable investment decisions is a sensitive and important issue, consistently addressed by researchers as an inherently unobservable variable that does not occur spontaneously. Instead, they must be identified or created. Given that investment opportunities lead to the allocation of financial resources by companies for income generation or cost reduction, it is possible that companies implement systematic and principled financial policies for investment decisions (Vidhan and Lehn, 2001)

There are various perspectives regarding the relationship between product market competition and investment, indicating that the company's manager, when making investment decisions, should also consider the existing competition in the product market. Financial and industrial economists have increasingly explored the connections between product market competition and corporate investment decisions (Ghani et al., 2011).

According to the definition of some economists, competitiveness seems to refer to a company's ability to survive in the business market, protect various assets, achieve (return) capital, and ensure future employment. Therefore, based on this definition, it can be stated that product market competition significantly influences the activities and initiatives of a company, and investment is an activity involving the deployment of funds to create a profitable future stream, as defined.

Researchers believe that what distinguishes companies and organizations in today's world from a few decades ago is the unstable and complex environment, increasing competition, rapid changes and developments, and the continuous advancement of technology and communications. In such a world, there is no place for companies that remain stagnant in their own cocoon. According to Martinez's definition, competitiveness equals the economic power of a unit against its competitors in a market where goods, services, skills, and ideas are easily supplied beyond geographical boundaries (Pejouyan & Nasiri, 2009).

Competitiveness means the ability to achieve a favorable and stable position in global markets. Competitiveness implies gaining competitive power in the market, and competitive power has different interpretations by individuals, organizations, and various global institutions. Recently, scientists have started studying and examining how globalization affects the investments of large companies, and globalization is understood as an increase in competition.

Organizational complexities and the expansion of business activities in most countries have led organizational managers to place more emphasis on decision-making in order to achieve organizational goals and ensure the proper guidance of all resources. Investment can be considered one of the fundamental pillars of the economy of countries. There is no doubt that increasing production, which is one of the first steps in the development process, requires an increase in investment. Investment is an activity involving the deployment of funds that can create a profitable future stream, and investment decisions indicate the potential of a company in investing and profitability.

It is often said that the relationship between market competition and the investment of large companies in a specific industry is particularly significant (Gilbert and Harris, 1984).

A detailed study of investment opportunities appears to lead to better management and increased shareholder wealth. Financial investment in various assets is only part of the overall decision-making and financial planning that individuals often undertake. Research has shown that investors are always seeking higher returns and examine the relationship between risk and return on investment. According to Jensen (1968), as investment opportunities increase, most surplus funds are used to increase shareholder and investor wealth through investment in available opportunities, and an increase in surplus funds leads to a reduction in these funds.

2. Literature Review and Formulation of Hypotheses

2.1 Investment

Investment is a fundamental concept in economics,

playing a prominent role in both the demand and supply sides of the economy, as well as in the dynamics of economic growth. Therefore, a sound analysis of macroeconomics requires a proper understanding of investment. Until now, there has been no consensus or agreement among theorists regarding investment. Some consider investment as a function of interest rates, while others introduce expectations and business confidence as determinants of investment. Some believe that fiscal policies and the overall income level significantly impact effective investment. Thus, theorists have not been able to reach a comprehensive theory that accurately explains external realities in this regard. Investment can be broadly categorized into three main groups.

a) Based on the investment subject, investments are divided into two categories: real investment and financial investment. Real investments involve sacrificing value in the present to acquire a real asset. Essentially, the subject of real investment is tangible assets. Purchasing property or an apartment is an example of this type of investment. In financial investment, an individual sacrifices present value to obtain a financial asset, the result of which usually involves a stream of cash flows. Financial investments, such as stocks or participation certificates, where an individual, in exchange for payment, is entitled to receive a stream of cash flows in the form of dividends, are considered financial investments.

In traditional economies, most investments have been of the real type. However, in advanced economies, the majority of investments are focused on financial assets, and the development of financial investment institutions makes real investment more feasible. These two forms of investment are not only not opposed to each other but also complement each other.

b) Based on the time or duration of investment, it can be classified as short-term (up to one year) or long-term (more than one year).

c) Based on the risk of investment: Since the benefits of investment accrue in the future, and there is uncertainty about realizing these benefits, different types of investments face varying degrees of the risk of not achieving the desired benefits, or in other words, risk. Depending on the level or probability of not realizing

future benefits or risk, three types of investments can be distinguished: proportional risk investment, relatively higher risk investment, and high-risk or speculative investment. Proportional or simply proportional investment is a type of investment where the risk is proportional to the expected return (Oluwaseyi and Petersen, 2023).

Investing with relatively higher risk, or speculation, is a type of investment in which the investor accepts higher risk for potential returns. Finally, highly risky investment is a type of investment in which the individual bears a very high level of risk for minimal potential returns.

The models related to company investments are explained below. Each of these models plays a crucial role in corporate investment decisions, and by combining them, companies can choose the best strategies for competing in product markets.

Cash Flow Model: This model examines how a company can maintain its liquidity and provide financial resources when needed to pay debts or invest in new opportunities.

Return Model: This model provides an evaluation of the returns on investments. By calculating the ratio of profit to investment, companies can make financial decisions based on the expected return.

Risk Model: This model identifies, evaluates, and manages the risks associated with investments. It includes an analysis of financial, operational, and strategic risks.

Innovation Model: This model examines how investments in research and development and product innovation can increase competitiveness and company revenue.

Value-Added Model: This model investigates how investment can create value for the company and lead to improved financial performance and shareholder value.

Hierarchy of Investment Model: This theory explores how investments are distributed across different levels of the company hierarchy and which sectors are prioritized.

2.2 Product market Competition

A competitive market is one where a considerable number of informed buyers and sellers operate in a way that none of them can influence prices. In competitive markets, companies are compelled to employ production methods that are cost-effective and have the highest efficiency. This allows them to provide consumers with higher quality products at lower prices. In this scenario, the entire economic resources are utilized in a more efficient manner, leading to overall economic gain.

2.2.1 Competition and Competitiveness

Competition is a fundamental term in the dynamics of markets, referring to the contradiction and interaction between companies and organizations. It is considered essential dynamism in attracting customers, improving the quality of products and services, and innovating for the survival and growth of companies. Competitiveness, in reality, is the ability of a company or industry to attract and maintain a competitive advantage in the market. This concept refers to a company's ability to compare with competitors, provide products and services with added value, adapt flexibly to market changes, and manage resources effectively.

Competition and competitiveness have a significant impact on the investment decisions of companies. Smart, innovative, and environment-adapted investments can lead to the creation and maintenance of a competitive advantage and the enhancement of competitiveness. Investments in research and development, process improvement, and product quality are crucial tools in the progress of companies' competitive capabilities. This connection between competition and investment not only aids in optimizing the performance of companies but also has a significant impact on the formulation of strategies and financial decisions (Mariana, 2023).

2.2.2 Porter's Five Forces Theory

Porter's Five Forces theory, presented by Michael Porter, is an analytical model for understanding the competitive environment of industries. This theory identifies five influential forces in intra-industry competition, which are elaborated below:

1. Intra-Industry Competition: Refers to the intensity of competition among existing companies in an industry, often due to a high number of competitors, industry growth, or shared markets.

2. Threat of Substitute Products or Services: The likelihood of threats from substitute products or services with similar features and applications that could significantly impact customer attraction.

3. Threat of New Entrants: The probability of new companies entering the industry, posing a threat to increased competition and reduced profitability.

4. Bargaining Power of Suppliers: Signifies the negotiating power of suppliers concerning prices, supply terms, and other factors related to the materials and services needed.

5. Bargaining Power of Buyers: Signifies the negotiating power of buyers regarding prices, sales conditions, and other factors related to the services or products offered by companies.

2.3 Product market Competition and Investment

Product market competition, as one of the dimensions of Porter's Five Forces theory, can have a significant impact on companies' investment decisions. Indeed, increased competition in the product market will lead to noticeable changes in the investment patterns of companies. This impact can be observed through the need for continuous innovation and improvement in products, pricing pressures, and changes in marketing strategies. Product market competition directly and indirectly affects investment decisions of companies. These effects are as follows:

1. Competitive Pressure: In a competitive environment, companies compete to maintain and expand market share and attract customers. This pressure may encourage companies to invest in innovation, research and development, and continuous product improvement.

2. Need for Innovation: In a competitive environment, rapid developments and changes in demand may increase the need for innovation. Companies may need to invest in technology, processes, or their products to attract new customers and retain existing ones.

3. Costs and Pricing: Product market competition may lead to pricing pressures. To attract customers, companies may be compelled to offer competitive prices. This can impact investment decisions in production or marketing costs.

4. Suppliers and Customers: The negotiating power of

suppliers and customers may play a significant role in investment decisions. In a competitive environment, the negotiating power of these entities can be influential, urging companies to make investment decisions in the supply of raw materials or improving customer services.

Based on the presented information, the following hypotheses are formulated:

Hypothesis 1: Product market competition, based on the Herfindahl-Hirschman Index, significantly influences investment.

Hypothesis 2: Product market competition, based on the Tobin-q Index, significantly influences investment.

Hypothesis 3: Product market competition, based on the Lerner Index, significantly influences investment.

Hypothesis 4: Product market competition, based on Gross National product, significantly influences investment.

Hypothesis 5: Product market competition, based on the ratio of labor to capital, significantly influences investment.

Hypothesis 6: Product market competition, based on Industry Leadership, significantly influences investment.

Hypothesis 7: Sales growth moderates the relationship between product market competition, based on the Herfindahl-Hirschman Index, and investment.

Hypothesis 8: Sales growth moderates the relationship between product market competition, based on the Q-Tobin Index, and investment.

Hypothesis 9: Sales growth moderates the relationship between product market competition, based on the Lerner Index, and investment.

Hypothesis 10: Sales growth moderates the relationship between product market competition, based on Gross National product, and investment.

Hypothesis 11: Sales growth moderates the relationship between product market competition, based on the ratio of labor to capital, and investment.

Hypothesis 12: Sales growth moderates the relationship between product market competition, based on Industry Leadership, and investment.

3. Research methodology

The present research, given its use of past empirical data and the application of regression methods and econometric models, is considered, in terms of its objective, practical, and falls under the category of descriptive correlational. The statistical population of the research includes all the accepted companies in the Tehran Stock Exchange. The research period covers the years from 2017 to 2022. The process of selecting sample companies is illustrated in Table 1.

TABLE 1 - PROCESS OF COMPANY SELECTION

Company Category	Firm	Firm-year
Total number of listed companies	678	4068
Fiscal year different from 19 March	(157)	(942)
Changes in the fiscal year during the research period	(82)	(492)
Trading suspension during the research period	(16)	(96)
Delisting from the stock exchange during the research period	(52)	(312)
Inaccessibility to information or incomplete data for variable measurement	(204)	(1224)
Financial and credit institutions, banks, financial intermediary companies, and investment companies	(85)	(510)
Final Sample	82	492

To examine and test the hypotheses one through six of the research, the following statistical model has been developed.

$$INV_{it} = \beta_0 + \beta_1 HHI_{it} + \beta_2 TobinQ_{it} + \beta_3 LI_{it} + \beta_4 HICGR_{it} + \beta_5 DIFF_{it} + \beta_6 LEADER_{it} + \beta_7 ROA_{it} + \beta_8 MTB_{it} + \beta_9 MKTSize_{it} + \beta_{10} Size_{it} + \varepsilon_{it} \qquad (1)$$

In order to examine and test the seventh to twelfth hypotheses of the research, the following statistical model was developed.

$$INV_{it} = \beta_0 + \beta_1 HHI_{it} * FGrowth_{it} + \beta_2 TobinQ_{it} * FGrowth_{it} + \beta_3 LI_{it} * FGrowth_{it} + \beta_4 HICGR_{it} * FGrowth_{it} + \beta_5 DIFF_{it} * FGrowth_{it} + \beta_6 LEADER_{it} * FGrowth_{it} + \beta_7 ROA_{it} + \beta_8 MTB_{it} + \beta_9 MKTSize_{it} + \beta_{10} Size_{it} + \varepsilon_{it} \qquad (2)$$

where:

INV: is the company's investment and represents the change in net fixed assets and depreciation at the end of the period compared to the beginning of the period.

Product market competition: to measure the product market competition from the three Herfindahl-

Harishman, Tobin-q and modified Lerner indexes; are used, which are mentioned below and how to calculate them.

HHI: Herfindahl index, which is calculated as follows

$$Herfindahl - Hirschman\ Index\ (HHI) = \sum_{i=1}^{n}\left(\frac{S_i}{S}\right)^2 \quad (3)$$

Where; S_i is the sales revenue of company i, S is the total sales revenue of companies in the industry in which company i operates, and n is the number of companies in the desired industry.

TQ: Qotubin index is obtained from the ratio of market value to total assets. If the company's market value is more than its total assets, this company has been able to use its assets in an optimal way. In this case, the real value of the company's shares is more than its current value.

LI: Lerner's index is modified, which directly expresses the characteristics of the company's market competition (Namazi and Ebrahimi, 2010). The Lerner index is calculated as follows.

$$LI = \frac{Sales - COGS - SG\&A}{Sales} \quad (4)$$

Where, Sales is sales revenue, COGS is cost of goods sold, and SG&A is general and administrative expenses.

The above measure does not isolate firm-specific factors that affect product market pricing power from industry-wide factors. Therefore, this measure may fluctuate due to industry-specific cues that are unrelated to the firm's market pricing power. Therefore, in the present research, as in the study of Sharma (2010) the adjusted Lerner index of the industry was used to calculate the competitive strength of the company's product market, and the calculation method is as follows.

$$Market\ Power = LI_{IA} = LI_i - \sum_{i=1}^{N} w_i LI \quad (5)$$

Where LI_{IA} adjusted Lerner index or product market competition strength, LI_i Lerner index for the company i, w_i ratio of the company's sales ito the total sales of the industry and N the total number of companies in the industry

In this regard, measuring the competition in the market is essential to understand the market power that each firm possesses. Investors and analysts assess a company's ability to compete in the market by examining its market share relative to the entire industry. To evaluate the competitiveness of a firm, various financial ratios are considered. By comparing a firm's specific sales ratio to the overall industry, a relative measure of market competition is obtained.

DIFF: The ratio of working capital to the capital of the company

LEADER: The sales ratio of companies that are more than 15 Include % of industry sales.

ROA, which stands for Return on Assets, is a crucial measure from the shareholders' perspective, indicating a company's profitability. Higher profitability signifies greater access to resources for distribution. It serves as a fundamental criterion for judging the effectiveness of management in utilizing assets to generate profits. ROA is calculated by dividing the annual net profit by the average total assets.

MTB, or Market-to-Book Ratio, represents the growth opportunity for a company. It indicates a company's ability to grow in the future based on its past investment performance. MTB is calculated using the following formula.

$$MTB = \frac{Publication\ of\ shares, number \times market\ shares, price}{shares\ of\ owners\ of\ collective\ rights}$$

MKTSIZ: is industry sales and is obtained through the natural logarithm of industry sales.

SIZ: Company size obtained through the natural logarithm of total assets.

FGrowth: The company's sales growth. This variable is calculated based on the amount of sales of the company compared to the sales of the previous year, so that if the sales have increased compared to the previous year, the sales have grown and otherwise the company has not sold. Therefore, the sales growth variable will be an imaginary variable with zero and one values.

4 .Findings

4.1 Descriptive Statistics

The findings of descriptive statistics are presented in Table 2.

TABLE 2- DESCRIPTIVE STATISTICS OF RESEARCH VARIABLES

Variable	Average	Median	maximum	minimum	SD
INV	188.12	944.64	9094	8770.9	5.54
HHI	0.011	0.061	0.000	0.898	0.000
TQ	5.891	6.490	0.000	9.418	0.854
M.P	0.123	0.498	-6.28	0.875	0.118
LEADER	0.366	1.830	0.152	18.58	0.023
HICRG	8638.5	2865.5	4796.8	13144	8285
DIFF	0.638	1.305	0.000	14.581	0.295
ROA	2.259	14.188	-4.55	196.4	0.067
MTB	0.021	0.147	0.005	2.269	0.002
MKTSIZ	18.189	1.410	14.134	20.041	18.136
SIZ	13.971	1.469	11.253	18.455	13.674

To examine and test the hypotheses one through six of the research, the following statistical model has been developed.

4.2 Regression Model Identification Tests

4.2.1 Limer's Test

Using F-test of Limer, it is possible to select panel or pooled model methods. The statistical rule of this decision is as follows.

$H_0:\beta_i = \beta_j$ All slopes are equal from the origins.

$H_1:\exists i \neq j \Rightarrow \beta_i \neq \beta_j$ At least one of the intercepts is different from each other.

For decision-making in this test, if the calculated significance level for each model is less than %5, the panel method will be chosen; otherwise, the pooled method will be used to fit the appropriate model.

TABLE 3- SIGNIFICANCE LEVEL (P-VALUE) FOR THE RESEARCH MODEL

F statistic	DF	P-value	Result
2.019	81.400	0.000	The panel model is suitable
7.428	81.369	0.000	The panel model is suitable

Based on the results of the table 3 and considering that the calculated significance level (P-value) for the research model is less than 5%, it can be concluded that the panel model is suitable for the studied models.

4.2.2 Hausman Test

After selecting the panel model, the best pattern among fixed effects and random effects models must be chosen for model fitting. For this purpose, the Hausman test is employed with the following statistical rule.

H_0 : The model is suitable with the random effects pattern.

H_1**:** The model with fixed effects model is suitable.

Table 4 shows the results of this test.

TABLE 4- HAUSMAN TEST RESULTS FOR RESEARCH MODELS

χ^2	DF	P-value	Result
24.812	10	0.000	A fixed effects model is appropriate
47.528	10	0.000	A fixed effects model is appropriate

According to the results of the Hausman test, the values of the chi-square statistic and the corresponding significance value, it can be seen that the significance for the research model is much less than the error of 0.05. Therefore, the null hypothesis is rejected for this model. Therefore, based on the decision rule of this test, the appropriate model for fitting the research models is the fixed effects model.

4.2.3 Appropriate Model Tests

Lagrange coefficient tests, likelihood ratio tests, and multivariate normality plots are used to examine and identify the autocorrelation of error terms, heteroscedasticity of error terms, and the normality of error terms (to investigate the fundamental assumptions of regression). Error terms in the regression model fitting refer to the difference between the actual values of the dependent variable and the values predicted by the regression model for the dependent variable. These error terms should be independent, have constant variance, and follow a normal distribution. Fulfilling these conditions ensures the validity of the results obtained from the fitted regression model.

A) Autocorrelation Test of Error Terms

The autocorrelation test of error terms is a generalized test that considers serial correlation from the first order to the rth order. The results of this test for each research model are presented in Table 5.

TABLE 5- THE RESULTS OF THE AUTOCORRELATION TEST OF ERROR SENTENCES

F statistic	DF	P-value	Result
0.948	181.300	0.000	Absence of serial autocorrelation
1.385	41.440	0.000	Absence of serial autocorrelation

As can be seen in Table 5, the null hypothesis of the autocorrelation test indicates that there is no problem of serial correlation. According to the results, the significance level of this test for the research models is greater than 0.05. Therefore, the null hypothesis is accepted with 95% confidence. Consequently, it can be claimed that there is no issue of autocorrelation.

B) Test of Heteroscedasticity:

The nature of mixed data necessitates addressing the issue of heteroscedasticity in studies based on such data, especially when the number of cross-sections exceeds the number of time periods under consideration. Considering the significant impact of heteroscedasticity on estimating standard deviations of coefficients and statistical inference, it is necessary to investigate the existence or non-existence of heteroscedasticity before any estimation. To assess and test homoscedasticity or heteroscedasticity in panel data, the Likelihood Ratio (LR) test has been conducted. The results of this test are reported in Table 6.

TABLE 6 - LR TEST RESULTS FOR HETEROSCEDASTICITY DETECTION

χ^2	DF	P-value	Result
0.237	1	0.627	There is no heterogeneity of variance problem
0.822	1	0.433	There is no heterogeneity of variance problem

The null hypothesis of the likelihood ratio test is based on homoscedasticity, and its alternative hypothesis is heteroscedasticity. Given the significant values obtained from this test for the research model, as their significance level is greater than 0.05, the null hypothesis is accepted for the model. Therefore, the residuals' variances of the research models are homogeneous, and in other words, there is no issue of heteroscedasticity.

c) Checking the normality of error sentences

To examine the normality of error terms, the quantile-quantile plot (Q-Q Plot) and the Jarque-Bera statistical test can be utilized. If the points plotted on the Q-Q plot are distributed around a 45-degree line, the error terms are considered normal. Additionally, if the significance level corresponding to the Jarque-Bera test statistic is greater than 0.05, the distribution of error terms is normal. The normal quantile-quantile plot and the histogram are presented in Figure 1. The Jarek-Berra normality test for error sentences is given in Table 7. Based on the fact that the Jarque-Bera statistic is not significant for both research models, it can be concluded that the error terms are normally distributed.
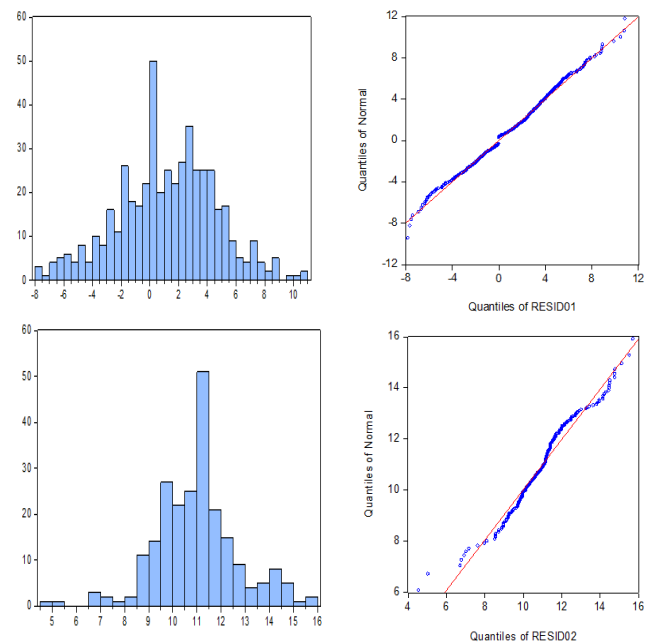

Figure 1- Normality histogram diagram of error term

TABLE 7- THE RESULTS OF THE JARAK TEST FOR THE ERROR SENTENCES OF THE MODELS

Average	Median	SD	Jarque-Bera	Prob.
1.182	1.310	3.432	0.536	0.764
10.99	11.06	1.722	0.762	0.851

4.3 Inferential statistics

4.3.1 The fit of the first research model

In the first model, the impact of product market competition indices (Herfindal-Hirschman, Qutobin, Modified Lerner, Gross National Product, and the ratio of labor to total capital) on the investment of 82 companies listed on the stock exchange was examined. Considering the results of the pre-tests conducted, the first model of the research should be fitted as a panel least squares regression with fixed effects. The fitting results of the first model are presented in Table 8.

Given the regression R-squared of approximately

66.7%, which is nearly equal to the adjusted R-squared of 59.7%, it can be stated that 67% of the variation in the dependent variable (investment) is explained by the independent variables and control variables in the model. Therefore, the fitted model exhibits high explanatory power. To assess the absence of autocorrelation between error terms, the Durbin-Watson (D-W) statistic is utilized. If this statistic falls between 1.5 and 2.5, it indicates no autocorrelation. According to the findings in the table above, the Durbin-Watson statistic for the research model is calculated as 2.049, confirming the absence of autocorrelation in the model.

TABLE 8- RESULTS OF FITTING THE FIRST RESEARCH MODEL

Dependent variable: investment				
Variable	Coefficient	SD	t statistic	sig
C	2.330	0.276	8.439	0.000
HHI	-0.332	0.128	-2.594	0.010
TQ	-0.002	0.000	-5.785	0.000
LI	0.122	0.022	5.603	0.000
HICRG	0.000	0.000	6.849	0.000
DIFF	0.034	0.009	3.811	0.000
LEADER	0.002	0.005	0.495	0.621
ROA	0.001	0.000	5.802	0.000
MTB	-0.002	0.040	-0.048	0.962
MKTSIZ	0.006	0.018	0.347	0.729
SIZ	0.031	0.011	2.939	0.004
R2	0.677			
Adj. R2	0.597			
D-W	2.049			
F	8.498			
Sig.	0.000			

Additionally, considering the t-statistics for each independent variable and their corresponding p-values, the following results are obtained:

The t-statistic for the Herfindal-Hirschman index is -2.594, with a significance level of 0.010, less than 0.05. Thus, for the first hypothesis of the research, it can be confidently stated that

product market competition based on the Herfindal-Hirschman index has a significant impact on investment.

The t-statistic for the Qutobin index is -5.785, with a significance level of 0.000, less than 0.05. Therefore, for the second hypothesis, it can be confidently stated that product market competition based on the Qutobin index has a significant impact on investment.

The t-statistic for the Modified Lerner index is 5.603, with a significance level of 0.000, less than 0.05. Hence, for the third hypothesis, it can be confidently stated that product market competition based on the Modified Lerner index has a significant impact on investment.

The t-statistic for Gross National Product is 6.894, with a significance level of 0.000, less than 0.05. Therefore, for the fourth hypothesis, it can be confidently stated that product market competition based on Gross National Product has a significant impact on investment.

The t-statistic for the ratio of labor to total capital is 3.811, with a significance level of 0.000, greater than 0.05. Thus, for the fifth hypothesis, it can be confidently stated that product market competition based on the labor-to-capital ratio has a significant impact on investment.

The t-statistic for company sales in the industry is 0.495, with a significance level of 0.621, greater than 0.05. Therefore, for the sixth hypothesis, it can be confidently stated that product market competition based on industry-leading sales does not have a significant impact on investment.

Moreover, among the control variables, the profitability variable and company size are statistically significant in the first model, while the growth opportunity and industry size variables are not significant.

In the second research model, the effect of product market competition indices, taking into account the role of the sales growth adjustment factor, on the investment of listed companies on the stock exchange during the research period is investigated. Given the results of the previous tests, the second model of the research should be fitted as a panel least squares regression with fixed effects. The fitting results of the second model are presented in Table 9.

Based on the results in Table 9, the F-statistic value, which examines the significance of the fitted model, is 2.392, and its corresponding significance is 0.000,

which is smaller than the error of 0.05. Therefore, with 95% confidence, it can be claimed that the fitted panel least squares regression model with fixed effects is statistically significant.

Considering the regression R-squared of 0.352, which is nearly equal to the adjusted R-squared of 0.205, it can be stated that 35% of the variation in the dependent variable (investment) is explained by the independent variables and control variables in the model. Therefore, the fitted model exhibits a relatively high level of explanatory power. To assess the absence of autocorrelation between error terms, the Durbin-Watson (D-W) statistic is utilized. If this statistic falls between 1.5 and 2.5, it indicates no autocorrelation. According to the findings in Table (9), the Durbin-Watson statistic for the research model is calculated as 2.073, confirming the absence of autocorrelation in the model.

TABLE 9- RESULTS OF FITTING THE SECOND RESEARCH MODEL

Dependent variable: investment			
Variable	**Coefficient**	**The standard deviation**	**t statistic**	**sig**
c	-1.688	0.911	-1.853	0.065
HHI* FGrowth	0.099	0.046	2.153	0.032
TQ* FGrowth	0.000	0.001	0.035	0.972
LI* FGrowth	-0.034	0.016	-2.076	0.039
HICRG* FGrowth	0.000	0.000	0.063	0.950
DIFF* FGrowth	-0.013	0.005	-2.406	0.017
LEADER* FGrowth	0.008	0.013	0.639	0.523
ROA	1.536	2.781	0.552	0.581
MTB	-438.8	622.8	-0.705	0.482
MKTSIZ	-0.000	0.002	-0.098	0.922
SIZ	135.37	65.04	2.081	0.038
R^2	0.352			
Adj. R^2	0.205			
DW	2.073			
F	2.392			
Sig.	0.000			

Moreover, considering the t-statistics for each independent variable and their corresponding p-values, the following results are obtained:

The t-statistic for the Herfindal-Hirschman index times

sales growth is 2.153, with a significance level of 0.032, less than 0.05. Therefore, for the seventh hypothesis, it can be confidently stated that sales growth plays a moderating role in the relationship between product market competition based on the Herfindal-Hirschman index and investment.

The t-statistic for the Tobin-q index times sales growth is 0.035, with a significance level of 0.972, greater than 0.05. Thus, for the eighth hypothesis, it can be confidently stated that sales growth does not play a moderating role in the relationship between product market competition based on the Tobin-q index and investment.

The t-statistic for the Modified Lerner index times sales growth is -2.076, with a significance level of 0.039, less than 0.05. Hence, for the ninth hypothesis, it can be confidently stated that sales growth plays a moderating role in the relationship between product market competition based on the Modified Lerner index and investment.

The t-statistic for Gross National Product times sales growth is 0.063, with a significance level of 0.950, greater than 0.05. Therefore, for the tenth hypothesis, it can be confidently stated that sales growth does not play a moderating role in the relationship between product market competition based on Gross National Product and investment.

The t-statistic for the ratio of labor to total capital times sales growth is -2.406, with a significance level of 0.017, less than 0.05. Thus, for the eleventh hypothesis, it can be confidently stated that sales growth plays a moderating role in the relationship between product market competition based on the labor-to-capital ratio and investment.

The t-statistic for company sales in the industry times sales growth is 0.639, with a significance level of 0.523, greater than 0.05. Therefore, for the twelfth hypothesis, it can be confidently %95 stated that sales growth does not play a moderating role in the relationship between product market competition based on industry-leading sales and investment.

Among the control variables, profitability and industry size are not statistically significant in the second model, while company size is significant.

5. Discussion and conclusion

The phenomenon of market competition for products has captured significant attention from academic circles and professionals in recent years. One of the characteristics of successful companies today is having competitive power. Since competition in the product market is measurable by different criteria, it can be said that the relationship between product market competition and investment is confrontational. In other words, it can be positive (companies with high investments to eliminate competitors) or negative (companies that conservatively invest). However, research has shown that globalization can reduce the investment of large companies.

The results of hypothesis testing indicated that in the competition of the product market, the variation in the Herfindahl-Hirschman Index, which measures the product diversity, has a significant impact on investment. In other words, as product diversity decreases, investment in the market may decrease. This may be because in competitive markets, product diversity can help companies compete with others and attract customer attention. On the other hand, a reduction in product diversity may lead investors to perceive market saturation and increased investment risk. Therefore, the negative relationship between the Herfindahl-Hirschman Index and investment indicates the significant impact of product diversity in the competition of product markets.

The results of the second hypothesis testing showed a significant negative impact of product market competition based on the Kyoto Bin Index, which measures the stability and flexibility of products, on investment. This suggests that in a competitive environment, increasing product stability and flexibility may lead to a decrease in investment. This may be because, in competitive conditions, companies may reduce investment in stable and fixed projects and move towards processes and products with greater flexibility, given the need for faster adaptation to market changes. Therefore, the result suggests that in a competitive market, rapid changes and the need for quicker adaptation to customer demands and changes lead companies to invest in projects and products with greater adaptability, even if it results in a reduction in investment in stable projects.

The third hypothesis testing result indicated a significant positive effect of the Lerner Index, which measures product acceptance by customers, on investment. This shows that in a competitive environment, an increase in product acceptance by customers may lead to an increase in investment. This may mean that in competitive conditions, companies, aiming to attract more customers and increase sales, are inclined to invest in projects and strategies that create higher acceptance in the market. This result highlights the importance of paying attention to the needs and preferences of customers in a competitive environment.

The fourth hypothesis testing result showed a significant positive relationship between product market competition based on the Gross National Product (GNP) Index, which is a symbol of the overall economic performance of the country, and investment. This result indicates that in competitive conditions, an increase in overall economic performance may lead to an increase in investment. This may mean that in a competitive environment, the growth and economic development can encourage companies to invest more and improve their production activities.

Finally, the result of testing the moderating relationship of sales growth on the relationship between product market competition and investment showed that sales growth can have a moderating effect on this relationship. This may mean that in the face of market competition, an increase in sales growth allows companies to make the highest investment by increasing revenue, even in a competitive environment with an increase in the Herfindahl-Hirschman Index, which indicates product diversity.

Based on the results and findings of the research, the following recommendations are proposed:

1. Providing Necessary Infrastructure for Creating a Competitive Market Environment: The relevant economic policymaking institutions and legislative bodies can use the industry's characteristics as an idea to create motivation and incentives for managers. This can contribute to increasing economic growth and prosperity in industries, ultimately helping to improve the country's economic situation.

2. Focus on Factors Leading to Company Growth:

Given the significant and meaningful positive relationship between product market competition and investment, companies are advised to focus more on factors that contribute to company growth to take advantage of increased investment opportunities.

3. Examine the Relationship in Specific Industries, Companies, or Environmental Factors: The relationship between product market competition and investment can be further explored in specific industries, specific companies, or under specific environmental factors. This targeted examination can provide more nuanced insights.

4. Reconsider the Notion of Industry Leaders and Hasty Competition: The research indicates that leading companies in the industry do not necessarily engage in hasty competition. Being an industry leader does not necessarily play a role in the level of investment in competitive conditions. Therefore, companies are encouraged to reevaluate the significance of being a leader in the industry in terms of investment decisions.

5. Utilize More Control Variables for Comparison: Given that, according to research results, industry sales and growth opportunities do not have a significant role in investment in competitive markets, it is recommended to use more control variables for comparison. This can provide a more comprehensive understanding of the factors influencing investment.

6. Examine Factors Affecting Company Profitability: Since profitability has a direct role in company investment in a competitive market, it is suggested to investigate the factors influencing company profitability. Developing strategies to increase company profitability can be crucial in competitive markets.

7. Consider Investment Factors for Stock Market Investors: Individuals interested in investing in stock market companies are advised to pay attention to factors such as investment opportunities, leverage ratios, and company size. These factors, based on research results, can contribute to increased cash flows for investors.

These recommendations aim to provide practical insights for policymakers, managers, and investors to make informed decisions in the context of competitive markets and investment.

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