

Corporate governance, product market competition and firm performance: evidence from Iran

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Abstract

Purpose – The purpose of this study is to investigate the effect of product market competition and corporate governance on firm's management performance in the Tehran Stock Exchange market. According to the research literature, the governance mechanisms used in this study consist of ownership structure, structure of the board of directors and capital structure. In addition, Herfindahl–Hirschman Index and market size were used to measure the product market competition.

Design/methodology/approach – This study used one selected sample among the firms in the capital market of Iran from 2004 to 2012.

Findings – The results of this study indicated that there is a significant relation among the major governance mechanisms (including ownership concentration, independence of the board of directors and debt ratio) and product market competition and management performance. The findings of this study also showed that product market competition is effective on the relation between corporate governance and the performance, and this is what has been ignored in most of the conducted studies.

Originality/value – In general, the results of this study supported the idea that product market competition is effective on implementation and efficiency of governance mechanisms.

Keywords Performance, Corporate governance, Product market competition

Paper type Research paper

1. Introduction

The current study investigates the relation among firms' strategic mechanisms and the performance of the firms concentrating on the role of product market competition. Several studies investigated the relation between mechanisms of corporate governance and firm performance, and the obtained results often indicated that these mechanisms have a positive effect on the firm performance (Donaldson and Davis, 1991; Coles *et al.*, 2001; Kanellos and George, 2008; Izadinia and Rasaeian, 2010; Moradi and Rostami, 2012; Shahiki Tash and Kazemi, 2012). For example, Kanellos and George (2008) expressed the index for corporate governance considering the former studies and the special economic conditions of Greece in a study under the title of "corporate governance and firm performance". In their study, they classified the firms into three categories from the corporate governance perspective: firms that have a suitable democracy to adopt decisions, firms where democracy is complied with to some extent and firms that do not have democracy in the process of decision-making. The results of their study showed that the firms that have higher democracy enjoy better performance. Also, some of the studies showed that product market competition is one of the effective factors for quality of financial reporting (Qorbani *et al.*, 2013; Khodamipour and



Bazraei, 2013; Khajavi *et al.*, 2013; Datta *et al.*, 2012), shares liquidity (Khajavi and Ebrahimi, 2012), return of shares (Hou and Robinson, 2006; Sharma, 2010; Hashem, 2010; Namazi and Ebrahimi, 2012), reduction of agency costs (Baggs and Bettignies, 2007), management incentives (Scharfstein, 1988; Schmidt, 1997), accounting conservatism (Dhaliwal *et al.*, 2008) and firm performance (Januszewski *et al.*, 2002; Karuna, 2007; Fernandez-Kranz and Santalo, 2010).

Among these, brief studies were made about the effect of interaction of corporate governance and product market competition on firm performance. The vast literature in economy and accounting provides theoretical guidelines in this regard to explain how competition in the market can lead to reduction or intensification of agency problems (Khajavi *et al.*, 2013). According to the research literature, the level of product market competition is known as a factor that could affect the supervision in the firms (Scharfstein, 1988, Schmidt, 1997; Baggs and Bettignies, 2007). According to Karuna, 2008, competition is the degree of attempts that the firms make toward success among their rivals in the industry. The former studies showed that competition is vital to determine the profit of a firm and, as a result, the strategy of the firm (Porter, 1990; Fernandez-Kranz and Santalo, 2010). In this way, according to the obtained results, competition can affect intra-firm supervision (and as a result, the corporate governance).

The goal of this study is to present evidence regarding the interaction effect of corporate governance and structure of product market competition on firms' performance in the capital market of Iran. The evidences of this study can increase our understanding of the effective factors on firms' performance and the research literature of product market competition. This paper also contributes to the research literature of corporate governance by study of the role of product market competition. For this purpose, governance proxies including ownership structure (blockholders), structure of board of directors (including independence and leadership of board of directors) and capital structure (debt ratio) were used. These mechanisms are mainly used in the studies relevant to corporate governance and firm performance in the former studies regularly. The results of this study can be important from several aspects. First, from theoretical aspect, it could assist the existing research literature of corporate governance, product market competition and firm performance. On the other hand, considering the importance of understanding the firm performance by the investors, it seems that a more precise study of the relevant factors to performance can present them more knowledge about identifying more successful firms. According to the conducted studies, this research is the first study that investigates the relation among product market competition and interaction effect of corporate governance and market competition on firms' performance in the capital market of Iran.

This paper consists of the following four sections. In Section 1, the literature and development of research hypotheses is presented. In Section 2, the research method is given. In Section 3, the descriptive statistics and the results of the research are provided, and eventually, the paper is completed by making a conclusion and presenting suggestions in Section 4.

2. Theoretical literature and development of research hypotheses

Some theoretical studies investigate the effect of corporate governance and some effects of competition on the firms' performance. Among these, less attention is paid to the interaction relation of corporate governance and industrial competition on firm performance. The goal of corporate governance is to overcome some motivational issues due to separation of ownership and control in the firms. Meanwhile, corporate governance cannot always be effective. Factors such as ownership concentration, capital structure and structure of board

of directors cause the owners to sustain costs for implementation of effective corporate governance. In case of weak corporate governance, intensive product market competition can bring the directors' goals in line with the efficient production goal (Januszewski *et al.*, 2002).

The main arguments of economics are based on this ground that competition in product market is a suitable mechanism for optimal allocation of resources and has disciplinary effects on the directors' behaviors and their inefficiencies. To support this idea, the recent literature shows how suitable corporate governance mechanisms are required when the markets are at the risk of being demolished or falling apart. Meanwhile, in the absence of suitable governance mechanisms, only market competition could guide the directors toward maximizing the shareholders' wealth without requiring to be controlled (Khajavi *et al.*, 2013).

In this study, using a series of mechanisms of domestic and foreign corporate governance that were selected according to the research literature in connection with firm performance and the institutional environment of the capital market of Iran including ownership structure (blockholders), structure of board of directors (independence and leadership of Board of Directors) and capital structure (debt ratio), as well as criterion of product market competition as a related factor to industry, the effective factors on firm's performance in the capital market of Iran were investigated and the relevant hypotheses are presented and developed further on.

2.1 Corporate governance and firm performance

In the discussion about the firm, the perspective that is mostly raised in financial affairs is that the firm is looked at as a network of contracts, implied or explicit among different groups or beneficiaries (Pergola, 2006). As the structure to compensate the claim made by different beneficiaries is different, coordination (co-arrangement) and meeting the requirements of all are difficult. This leads to potential contradiction among beneficiaries, and these motivational contradictions are known as "agency problem (principl-agent)" (John and Senbet, 1998). On this basis, according to the agency theory, the joint firms are described by separation of ownership and control. Separation of ownership and control happens when the shareholders are not involved in the firm management actively. There is an advantage in separation of ownership and control that allows changing the shares' ownership without affecting the firm's routine activities. The weak point of ownership separation and control is the agency problem that causes the agency costs. Corporate governance is some methods to put the interests of the many groups in one direction and to make sure that the firm is moving toward the investors' interests. Recently, a third aspect was added to this issue, which expresses that the firm has to be responsive to other groups, except shareholders. This issue could be in contradiction with maximizing the shareholders' wealth (Mayer, 1997).

As the mechanisms of corporate governance, ownership and structure of the board of directors affect the method by which the firm is managed and controlled. Thus, this corporate governance could affect its performance. According to Jensen and Meckling (1976), the ownership of the firm's directors in their shares helps putting the investors' interests in line with the directors'. In this relation, Shahiki Tash and Kazemi (2012) showed that there is a positive relation between the firm performance and the ownership of the biggest shareholders and institutional shareholders. Moradi and Rostami (2012) also showed that management and institutional ownership are directly dependent on firm performance. They also found out that there is a positive and significant relation in the controversy existing between leadership and firm's value, but no significant relation was found regarding the firm performance. There are also studies that show that the characteristics of the board of directors are effective on the firm performance, for example, Mashayekhi *et al.* (2008) and

Moradi and Rostami (2012) showed that the presence of independent directors improves the firm performance. Regarding the relation between profitability and financial leverage, the results were mixed. The models based on agency theory present conflict predictions about financial leverage and profitability (Etemadi and Montazeri, 2013). Moqadam and Momeni Yansari, 2012 found out that there is no significant relation between ratio of debt and return of assets. Meanwhile, Arbabian and Safari Greyly (2009) and Mashayekhi *et al.* (2008) showed that there is a negative relation between the level of debts and the firm performance.

Generally, the results of the study showed that the firms that have good governance have roughly a better performance. To support this idea, Gompers *et al.* (2003) showed that the governance indices are connected with higher value of the firm and better operational performance. They used an index called "G-index" to measure the governance. This index consisted of 24 anti-takeover protection clauses and shareholders. According to Gompers *et al.* (2003) and the study conducted by Core *et al.* (2006), it was also shown that weaker governance leads to worse operation, whereas the results of the study conducted by Hassas Yeganeh *et al.* (2008) showed the opposite. Thus, the following hypotheses could be suggested:

- H1. There is a positive and significant relation between independence of board of directors and firm performance.
- H2. There is a positive and significant relation between compound leadership and firm performance.
- H3. There is a positive and significant relation between ownership concentration and firm performance.
- H4. There is a negative and significant relation between debt level and firm performance.

2.2 Product market competition and firm performance

Competition in products market is generally related to allocated efficiency and productivity. Competition encourages the supply of goods and services in the least possible price. The prices reflect the real price of the product. Different studies show that product market competition is more dependent on productivity or growth of productivity (Nickell, 1996; Hou and Robinson, 2006; Sharma, 2010, and Namazi and Ebrahimi, 2012) reported that the more the competition is among industries, the more the return of shares will be. Hashem (2010) showed that the competitive industries have roughly higher expected return of shares in comparison with the concentrated industries. Fernandez-Kranz and Santalo (2010) found out that the firms in more competitive industries have superior environmental performance. The results of Baggs and Bettignies (2007) also showed that competition leads to reduced agency costs. The findings of Anvari Rostami *et al.* (2013) indicated that competition has a positive and significant relation with profit sharing.

Several theoretical models analyzed the use of product market competition for slackness of management and found out that the financial incentives are necessary for the directors (Holmstrom, 1982; Hart, 1983; Giroud and Muller, 2011). In Hart's (1983) model, product market competition reduces the management's slackness. It is assumed that the directors pay attention to reach the pre-determined goals. Thus, although the costs of inputs reduce, the directors will try less. Meanwhile, in a product competitive market, reduced expenses in firms is usual together with reduction of cost price of product. Under such circumstances, directors should try more to achieve the target profit.

In this way, competition could affect management incentive and eventually lead to improvement of firm performance. Increased number of rivals can present additional

information which could be used to reduce the ethical risk (Holmstrom, 1982); Schmidt (1997) studied the effect of competition on the threat of bankruptcy and management endeavors accordingly. He found out that competition increases the possibility of bankruptcy for the inefficient firms. This causes the directors to try hard to protect their jobs and prevent liquidations. In this way, considering the obtained arguments and outcomes, the research hypothesis is as follows:

H5. There is a positive and significant relation between product market competition and firm performance.

2.3 Product market competition: as an interaction mechanism

The goal of corporate governance is to overcome motivational issues created by separation of ownership and control in firms. Meanwhile, it is argued that corporate governance cannot always be effective (Januszewski *et al.*, 2002). Giroud and Muller, 2011 showed that weaker governance is dependent on worse operational performance, but only in non-competitive industries. That is why if corporate governance is weak, intensive product market competition could bring the director's goals in the direction of efficient production (Januszewski *et al.*, 2002). In this connection, Hart (1983) also found out that competition reduces the degree of management slackness. Economists often argue that the firms' directors in competitive industries have strong incentive to compete for reduction of waste of resources and maximized profit; otherwise, they will fade away from the scene of competition. That is why, there is less necessity to motivate the directors through stronger governance methods. In return, the firms in non-competitive industries, where the directors' absent competitive pressure does not lead to better performance, better governance could benefit them (Giroud and Muller, 2011). The presented evidences in the study conducted by Giroud and Muller, 2011 supports this hypothesis that non-competitive firms benefit more from good governance than the firms active in competitive industries. In this study, the researchers studied the role of corporate governance in the firms' performance taking the product market competition into consideration. Their results showed that the firms that are weakly governed have lower stock return, worse operational performance and less value, but only in non-competitive industries.

Experimental studies show that governance and stronger competition could ameliorate the firm's performance by stronger governance and competition together. Udayasankar and Das (2007) found out that competition has an interaction effect on the relation between corporate governance and firm performance. Meanwhile, the experimental evidences and other theoretical analyses show that product market competition reduces agency costs (Leventis *et al.*, 2011), which could improve the firm performance. Karuna (2007) reported that competitive industries provide the managing directors with stronger share incentives in comparison with less competitive industries. In another study by Karuna (2008), the governance mechanisms were found to supplement each other and competition could affect these full-fledged relations. Hence, it could be understood that competition is dependent on corporate governance.

The research literature indicates the positive relation between corporate governance and firm performance and also the fact that the firms with stronger governance are more likely to achieve resources (Udayasankar and Das, 2007). These resources can create a competitive advantage to increase the performance and survival of the firms. That is how in a competitive market, the survival of firms in long-term can be dependent on the ability to achieve and protect higher standards than average of corporate governance (Udayasankar and Das, 2007). Jensen and Ruback (1983) also paid attention to the role of rivals in relation to

the market mechanism to control firms. They indicated that the firms with weak governance standards experience more hostile takeovers.

Nickell *et al.* (1997) studied the effect of product market competition, controlling shareholder and level of debt on growth of efficiency of firms in the UK. Their results indicated the positive effect of product market competition, shareholder having control and financial pressure on growth of productivity. In addition, their results indicated that the product market competition together with financial pressure could replace controlling shareholder. Teng and Li (2011) studied the relation among product market competition and structure of board of directors and quality of disclosure. The results from their study showed that the product market competition has a significant effect on quality of disclosure and strengthens the relation between structure of board of directors and disclosure quality. Meanwhile, the results of Qorbani *et al.* (2013) in the Iran capital market indicate that there is not a significant relation between the percentage of independent members of board of directors and disclosure quality, and that the product market competition does not improve or strengthen the relation between these two variables. Januszewski *et al.* (2002) found out that firms experience higher growth of productivity when they work in the markets with higher competition. Also, the growth of productivity is higher for the firms that are controlled by a strong final owner, unless that firm is a financial institution. They also showed that close competition and control are supplementary so that the positive effect of competition increases despite a final strong owner. Considering the theoretical concepts and obtained results, the relevant hypotheses to this section are presented as follows:

- H6. Product market competition has a significant effect on the relation between ownership concentration and firm performance.
- H7. Product market competition has a significant effect on the relation between independence of board of directors and firm performance.
- H8. Product market competition has a significant effect on the relation between compound leadership and firm performance.
- H9. Product market competition has a significant effect on the relation between capital structure and firm performance.

3. Research method

3.1 Sample selection

The statistical population in the current study is all the firms that have been recognized by Tehran Stock Exchange market since 2004 or before that. From temporal aspect, the term of this study was from 2004 to 2012. To determine the research sample, all available data were used. Meanwhile, the financial firms and institutions were deleted from the final sample of research because of the type of special reporting. Eventually, to eliminate the effect of outliers, the observations having more than three standard deviations from the mean were deleted from the final sample. Considering the above conditions, only 876 observations of the final sample were selected for testing the research hypotheses. They are used further on to study the research hypotheses.

3.2 Research model and method to test hypotheses

The goal of this study is to investigate the relation among corporate governance and product market competition criteria and firm performance. Thus, the following models are used to test the research hypotheses:

- *Model 1:* This is the study of relation between corporate governance and firm performance mechanisms (H1-H4):

$$\text{Perform}_{it} = \alpha + \beta_1 \text{Block}_{it} + \beta_2 \text{Indep}_{it} + \beta_3 \text{Lead}_{it} + \beta_4 \text{Gear}_{it} + \beta_5 \text{Liq}_{it} + \beta_6 \text{Size}_{it} \\ + \beta_k \sum_{k=7}^{15} \text{Years} + \beta_j \sum_{j=16}^{29} \text{Industries} + \varepsilon.$$

- *Model 2:* This is the study of relation between product market competition and firm performance (H5):

$$\text{Perform}_{it} = \alpha + \beta_1 \text{PMC}_{it} + \beta_2 \text{Liq}_{it} + \beta_3 \text{Size}_{it} + \beta_k \sum_{k=4}^{12} \text{Years} + \beta_j \sum_{j=13}^{26} \text{Industries} + \varepsilon.$$

- *Model 3:* This is the study of the interaction relation between corporate governance and competition mechanisms and firm performance (H6-H9):

$$\text{Perform}_{it} = \alpha + \beta_1 \text{PMC}_{it} \times \text{Block}_{it} + \beta_2 \text{PMC}_{it} \times \text{Indep}_{it} + \beta_3 \text{PMC}_{it} \times \text{Lead}_{it} \\ + \beta_4 \text{PMC}_{it} \times \text{Gear}_{it} + \beta_5 \text{Liq}_{it} + \beta_6 \text{Size}_{it} + \beta_k \sum_{k=7}^{15} \text{Years} \\ + \beta_j \sum_{j=16}^{29} \text{Industries} + \varepsilon.$$

Using the above models, the relation between relevant factors to corporate governance and competition separately, as well as in form of interaction and firm performance, is specified.

3.3 Research variables

3.3.1 Dependent variable. In this study, the firm's performance is the dependent variable which is measured by three criteria of return of asset (ROA), return of shareholders' equity (ROE) and return on sales (gross profit margin ratio) (ROS).

3.3.2 Independent variables. They are as follows:

- *Ownership structure (Block):* In this study, the concentration of ownership is measured through total percentage of the blockholders' ownership (owners of more than 5 per cent shares of the firm).
- *Structure of board of directors:* The used variables with regard to the characteristics of board of directors in this research are independence and leadership of board of directors. Independence of board of directors (Indep) is also measured based on the number of independent members of the board of directors and leadership of board of directors (Lead) through dummy variable. If the managing director of the firm is the same as the chairman of the board of directors, it is defined by number 1; otherwise, 0.
- *Capital structure (Gear):* To measure the capital structure, the debt ratio in the capital structure of the firm is used. For this purpose, the total debts are divided by the total assets of the firm.
- *Product market competition:* In this study, like the former studies (Cheng *et al.*, 2013; Khajavi *et al.*, 2013; Anvari Rostami *et al.*, 2013), the two proxies of

Herfindahl–Hirschman Index (HHI) and market size index (MKSize) are used to measure product market competition.

First, the HHI index is calculated by adding the second power of market shares (according to firms' sale criterion) of all the active firms in the industry:

$$HHI_{jt} = \sum_{i=1}^{N_j} S_{ijt}^2$$

in which S_{ijt} is the market share of i firm in j industry during t year. The market share of every firm is calculated by dividing the firm's net sale by total net sale of industry, which is calculated for each industry separately every year. This index measures the degree of concentration by industry. The bigger this index is, the more the concentration and the less the competition in that industry will be, and vice versa.

The second proxy to measure product market competition is the market size. The market size shows the population of customers in a market or industry. The increased volume of demand leads to increased market size and, as a result, increased competition, because as long as there is still demand, there will also be the necessary incentive for the new firms to enter into the market. This variable is measured through natural logarithm of sale of industry, which is the total sale of all firms as follows:

$$MKSIZE = \text{Log} \left(\sum S_{ij} \right),$$

where S_{ij} indicates the sale of i firm in j industry (it is worth mentioning that classification of industries in this study was made according to the first letter of their logo presented by the stock exchange organization).

In this study, in addition to the studied variables, a series of other variables according to the former studies were used as control variables, including firm size, current ratio, year and industry. [Moradi and Rostami \(2012\)](#) showed a direct and significant relation between firm size and firm performance. Also, [Nikbakht et al. \(2010\)](#) understood that out of the total used variables in the study, only the firm size determines the firms' performance ranking. It is expected that the performance in big firms (size) is better than that in small ones. To measure this variable, natural logarithm of total sales of firms is used. [Hassas Yeganeh et al. \(2008\)](#) showed that there is a positive and significant relation between ratio of liquidity and firm performance. In this way, a positive relation for this variable is also expected. The ratio of liquidity (Liq) is calculated through dividing the current assets by the current debts.

In the current study, the test of significance in the regression model consists of a significant test of regression and significant test of coefficients. Also, the test of pre-assumptions using the regression model, including Watson–Durbin test, multicollinearity test and normality test of errors, was conducted.

4. Analysis of results

4.1 Descriptive statistics

Table I shows the descriptive statistics of the research variables. In this table, the minimum, maximum and average standard deviation of observations is presented. According to the observations of this study, the ownership mean of over 5 per cent is 74 per cent in the capital market of Iran. Also, 9 per cent of the observations (104 cases) have mixed leadership. In addition, the minimum and maximum degrees of competition concentration (according to HHI/HHI) among

Table I.
Descriptive statistics

Variable	Minimum	Maximum	Mean	SD
ROA	-0.347	0.567	0.10	0.122
ROE	-3.396	22.332	0.34	1.019
ROS	-0.676	0.994	0.14	0.204
Block	0.00	99.90	74.12	18.511
Indep	1	5	3.27	0.963
Lead	0	1	0.09	0.284
Gear	0.187	1.667	0.68	0.222
Liq	0.202	3.386	1.20	0.464
Size	9.414	16.825	12.72	1.253
HHI	0.062	0.672	0.21	0.136
MKSize	12.250	19.196	16.08	1.440

firms are about 6 and 60 per cent, respectively, that could have been the maximum figure of 1 (or 100 per cent). The mean of this index is about 22 per cent that shows the low concentration of product market competition (more competition) in the capital market of Iran.

4.2 The results

This study has three main models to investigate the effect of corporate governance mechanisms, product market competition and their interaction effect on firm performance. In this section, the obtained results are separately discussed in connection with each of the research models in details. In each of the presented tables as follows, each of the variables that are significant at error level of 10 per cent was bolded. Also, because of the importance of normality of data distribution, the normality of research models was studied using the Kolmogorov-Smirnov test. The results showed that the estimated models are normal at an acceptable level. Also, the estimated models became significant using *F*-statistics with the significance level of less than 5 per cent. It could be concluded that the used models of the research are significant. Also, considering the amount of Durbin-Watson statistic of the models as presented in the table of results, it could be understood that the estimated models do not have a correlation problem. Further, on considering the confirmed model of statistics, the research hypotheses were studied.

4.2.1 Results of the first model. In the first part, the results relating to the first model of the study are presented. According to this model, there is a significant relationship between the governance mechanisms including blockholders, independence of board of directors, leadership of board of directors, capital structure and corporate performance (using proxies of ROA, ROE and ROS). Results relevant to governance mechanisms and each of the dependent variables (firm performance) are presented in Tables III-V, and the summary of these evidences is observed in Table II. According to the obtained results, among governance

Table II.
Results of
H1-summary

Variable	Predicted sign	Real sign	ROA	ROE	ROS
Block	+	+	✓	✓	✓
Indep	+	×	✓	✓	×
Lead	+	+	×	×	×
Gear	+	×	✓	×	✓
Liq	+	+	✓	✓	✓
Size	+	+	✓	✓	✓

variables, only the variable of leadership of board of directors is not significant. As it is noticed, there is not a significant relation between any of the variables of firm performance and the variable of leadership of board of directors according to the findings of Nikbakht *et al.* (2010) and Rajabi and Ganji (2010). Meanwhile, the sign of this variable is positive, as it was predicted. With regard to the concentration of ownership, according to the research literature, most of the obtained results showed that there is a positive relation (Jensen and Meckling, 1976; Moradi and Rostami, 2012; Shahiki Tash and Kazemi, 2012), and the results of the study support these evidences and the hypothesis is in the same direction of the blockholders' interests.

Among the governance variables, there is a significant relation among the capital structure, independence of board of directors with the firm performance, whereas their sign is not similar regarding substitute dependent variables. According to the research prediction, despite relatively controversial results regarding relation between debt in capital structure and firm performance, a significant relation for them was found. Although the sign of this variable is not similar among alternative performance variables, this could be one of the reasons for conflict in the obtained results of the old studies. According to the obtained results in this study, there is a negative relation between the amount of debt in capital structure of firms and ROA (according to Arbabian and Safari Greyly, 2009; Mashayekhi *et al.*, 2008) and ratio of the profit margin. Regarding the independence of board of directors, Mashayekhi *et al.* (2008) and Moradi and Rostami (2012) showed that the presence of independent directors improves the firm performance. The results of this study show the opposite of these evidences. This is while Qalibaf and Rezaei (2007) did not find a significant relation between ratio of independent members of board of directors and firm performance. Regarding the control variables of cashability and firm size, the results corresponded with the research literature and predictions. In other words, performance in bigger firms having higher liquidity is better (Tables III-V).

4.2.2 Results of the second model. According to this hypothesis, there is a significant relationship between product market competition criterion (using two proxies of the HHI and MKSize) as a factor at the level of industry and firm performance. In this hypothesis, the three performance criteria of ROA, ROE and ROS were used as alternative dependent variables. The obtained results are shown in Tables VII-IX, and a summary of them is observed in Table VI.

According to prediction, there should be a negative relation between product market competition and firm performance using HHI, because this index shows the concentration of competition, and its opposition shows the higher competition of the product market. With regard to this index, there are different evidences. The obtained sign for this index is positive for ROA and ROE variables and is negative for ROS variable. The results show that

ROA-dependent variable	β	<i>t</i> -statistic	<i>p</i> -value
α	-0.097	-2.708	0.007
Block	0.000	1.617	0.053
Indep	-0.005	-2.309	0.011
Lead	0.003	0.347	0.364
Gear	-0.270	-16.613	0.000
Liq	0.063	9.212	0.000
Size	0.019	9.900	0.000
R^2	R^2_{adj}	D-W	<i>F</i> -statistic
0.656	0.645	2.003	59.787
			<i>p</i> -value
			0.000

Table III.
Results of H1-ROA

H 33,1	ROE-dependent variable	β	<i>t</i> -statistic	<i>p</i> -value	
	α	-0.572	-6.511	0.000	
	Block	0.001	2.336	0.010	
	Indep	-0.021	-3.532	0.000	
	Lead	0.020	1.017	0.155	
48	Gear	0.049	1.133	0.129	
	Liq	0.134	8.004	0.000	
	Size	0.043	8.910	0.000	
Table IV. Results of <i>H1</i> -ROE	R^2 0.510	R^2_{adj} 0.493	D-W 1.993	<i>F</i> -statistic 29.873	<i>p</i> -value 0.000

	ROS-dependent variable	β	<i>t</i> -statistic	<i>p</i> -value	
	α	0.091	2.277	0.011	
	Block	0.000	-1.719	0.043	
	Indep	0.001	0.476	0.317	
	Lead	0.007	0.890	0.187	
	Gear	-0.297	-15.496	0.000	
	Liq	0.030	3.825	0.000	
	Size	0.011	5.131	0.000	
Table V. Results of <i>H1</i> -ROS	R^2 0.771	R^2_{adj} 0.763	D-W 1.976	<i>F</i> -statistic 92.752	<i>p</i> -value 0.000

	Variable	Predicted sign	Real prediction	ROA	ROE	ROS
	HHI	-	×	×	×	✓
	MKSize	+	+	✓	✓	×
	Liq	+	+	✓	✓	✓
	Size	+	+	✓	✓	✓
Table VI. Results of <i>H2</i> -summary						

according to the predictions, there is a negative and significant relation between this index and ROS. With regard to the MKSize, the results are according to the MKSize and the results correspond with the research predictions. The results show that according to the research literature (Nickell, 1996; Fernandez-Kranz and Santalo, 2010), there is a positive and significant relation between product market competition using the index of market size and firm performance (ROE and ROA). Regarding the control variables, the results are also like the evidences of testing the first hypothesis (Tables VII-IX).

4.2.3 Results of the third model. Eventually, in the third main hypothesis, the interactional effects of corporate governance mechanisms (main ownership, independence and leadership of board of directors and capital structure) and the product market competition criteria (HHI and MKSize) on firm performance are studied. According to the research literature, the governance mechanisms are considered as a supplementary instrument for product market competition. In other words, it is expected that the industries with less competition possess

ROA-dependent variable		β	<i>t</i> -statistic	<i>p</i> -value
α		-0.417	-12.276	0.000
HHI		0.025	0.588	0.278
Liq		0.138	23.411	0.000
Size		0.022	9.975	0.000
R^2	R^2_{adj}	D-W	<i>F</i> -statistic	<i>p</i> -value
0.543	0.531	2.003	42.208	0.000
ROA-dependent variable		β	<i>t</i> -statistic	<i>p</i> -value
α		-0.744	-5.479	0.000
MKSize		0.018	2.520	0.006
Liq		0.137	23.419	0.000
Size		0.022	9.771	0.000
R^2		D-W	<i>F</i> -statistic	<i>p</i> -value
0.547		1.995	42.756	0.000

Table VII.
Results of *H2*-ROA

ROE-dependent variable		β	<i>t</i> -statistic	<i>p</i> -value
α		-0.548	-7.442	0.000
HHI		0.091	0.992	0.161
Liq		0.117	9.264	0.000
Size		0.043	8.985	0.000
R^2	R^2_{adj}	D-W	<i>F</i> -statistic	<i>p</i> -value
0.495	0.480	1.990	31.811	0.000
ROE-dependent variable		β	<i>t</i> -statistic	<i>p</i> -value
α		-1.004	-3.393	0.000
MKSize		0.026	1.656	0.049
Liq		0.116	9.204	0.000
Size		0.043	8.840	0.000
R^2	R^2_{adj}	D-W	<i>F</i> -statistic	<i>p</i> -value
0.496	0.481	1.997	31.956	0.000

Table VIII.
Results of *H2*-ROE

more suitable governance criteria. Tables XI-XIII are relevant to the reciprocal effect of these factors on firm performance, as summarized in Table X.

As it is noticed in Table X, the relevant results to control variables are according to evidences of *H1* and *H2*. But, regarding the governance proxies, the evidences show that there is no significant relation among the interaction variables of leadership and product market competition with firm performance at all (according to *H1*). There is a direct relation between interactional effect of blockholders and product competition indexes (according to *H1*), and there is a different relation among other interaction variables (including the interaction effect of independence of board of directors and competition, as well as capital structure and competition) and the proxies of firm performance. Among these, there is a positive relation among the interaction variables of independence of board of directors and competition and ROA and ROS and a negative relation of those and ROE. The relation is reverse as far as the interaction variable of capital structure and competition are concerned.

H 33,1	ROS-dependent variable		β	<i>t</i> -statistic	<i>p</i> -value
	α		-0.248	-6.504	0.000
	HHI		-0.057	-1.307	0.096
	Liq		0.117	17.746	0.000
	Size		0.013	5.207	0.000
50	R^2	R^2_{adj}	D-W	<i>F</i> -statistic	<i>p</i> -value
	0.693	0.684	1.929	70.205	0.000
	ROS-dependent variable		β	<i>t</i> -statistic	<i>p</i> -value
	α		-0.407	-2.961	0.001
	MKSize		0.008	1.108	0.138
	Liq		0.117	17.751	0.000
	Size		0.013	5.082	0.000
Table IX.	R^2	R^2_{adj}	D-W	<i>F</i> -statistic	<i>p</i> -value
Results of <i>H2</i> -ROS	0.693	0.683	1.950	70.140	0.000

Variable	Predicted sign	Real prediction	ROA	ROE	ROS
Liq	+	+	✓	✓	✓
Size	+	+	✓	✓	✓
HHI&Block	-	+	✓	✓	×
HHI&Indep	-	×	✓	✓	✓
HHI&Lead	-	×	×	×	×
HHI&Gear	-	×	✓	✓	✓
MKSize&Block	+	×	✓	✓	✓
MKSize&Indep	+	×	✓	✓	×
MKSize&Lead	+	+	×	×	×
MKSize&Gear	+	×	✓	✓	✓

Table X.
Results of
H3-summary

It means that there is a positive relation between this interaction variable and ROE and a negative relation with ROA and ROS (Tables XI-XIII).

5. Discussion and conclusion

In this study, according to the research literature, three relevant hypotheses to the relation among governance mechanisms, product market competition and their interaction effects on firm performance were tested and analyzed. With regard to *H1*, the results showed that there is a significant relation between governance mechanisms and performance. In this connection, the ownership concentration showed a positive relation, and independence of board of directors and the debt ratio in capital structure showed a negative relation. Regarding *H2*, the results showed that the product market competition (using MKSize) is dependent on firm performance positively. In other words, increased product market competition improves the firm performance. Eventually, in *H3* related to interaction effect of governance mechanisms and product market competition and the firm performance, the results showed that competition is effective on the relation between some governance

Interaction variable		β	<i>t</i> -statistic	<i>p</i> -value	
α		-0.337	10.276	0.000	
HHI&Block		0.001	3.386	0.000	
HHI&Indep		0.019	2.116	0.017	
HHI&Lead		-0.013	-0.312	0.377	
HHI&Gear		-0.420	-9.253	0.000	
Liq		0.111	17.571	0.000	
Size		0.021	9.825	0.000	
R^2	R^2_{adj}	D-W	<i>F</i> -statistic	<i>p</i> -value	
0.585	0.572	1.987	44.331	0.000	
Interaction variable		β	<i>t</i> -statistic	<i>p</i> -value	
α		-0.113	-3.020	0.001	
MKSize&Block		0.000	1.896	0.029	
MKSize&Indep		0.000	-1.707	0.044	
MKSize&Lead		0.000	0.318	0.375	
MKSize&Gear		-0.015	-15.276	0.000	
Liq		0.070	10.108	0.000	
Size		0.020	10.136	0.000	
R^2	R^2_{adj}	D-W	<i>F</i> -statistic	<i>p</i> -value	
0.642	0.631	2.012	56.325	0.000	

Table XI.
Results of *H3*-ROA

Interaction variable		β	<i>t</i> -statistic	<i>p</i> -value	
α		-0.548	-7.399	0.000	
HHI&Block		0.001	1.395	0.081	
HHI&Indep		-0.077	-3.742	0.000	
HHI&Lead		0.102	1.055	0.145	
HHI&Gear		0.257	2.026	0.021	
Liq		0.132	9.178	0.000	
Size		0.042	8.802	0.000	
R^2	R^2_{adj}	D-W	<i>F</i> -statistic	<i>p</i> -value	
0.506	0.489	1.989	29.376	0.000	
Interaction variable		β	<i>t</i> -statistic	<i>p</i> -value	
α		-0.600	-6.651	0.000	
MKSize&Block		0.001	2.396	0.008	
MKSize&Indep		-0.001	-3.115	0.001	
MKSize&Lead		0.001	1.233	0.109	
MKSize&Gear		0.004	1.421	0.078	
Liq		0.136	8.256	0.000	
Size		0.043	8.909	0.000	
R^2	R^2_{adj}	D-W	<i>F</i> -statistic	<i>p</i> -value	
0.506	0.492	1.995	29.782	0.000	

Table XII.
Results of *H3*-ROE

Interaction variable	β	t -statistic	p -value	
α	-0.189	-5.149	0.000	
HHI&Block	0.000	-0.737	0.230	
HHI&Indep	0.035	3.887	0.000	
HHI&Lead	0.008	0.196	0.422	
HHI&Gear	-0.379	-7.613	0.000	
Liq	0.091	12.701	0.000	
Size	0.013	5.455	0.000	
R^2	R^2_{adj}	D-W	F -statistic	p -value
0.721	0.711	1.909	71.055	0.000
Interaction variable	β	t -statistic	p -value	
α	0.0180	1.940	0.026	
MKSize&Block	-0.001	-1.695	0.045	
MKSize&Indep	0.000	0.922	0.177	
MKSize&Lead	0.000	0.838	0.201	
MKSize&Gear	-0.017	-14.495	0.000	
Liq	0.039	4.896	0.000	
Size	0.012	5.493	0.000	
R^2	R^2_{adj}	D-W	F -statistic	p -value
0.764	0.756	1.948	89.053	0.000

Table XIII.
Results of $H3$ -ROS

mechanisms and performance. Although the independence of board of directors and the debt ratio in $H1$ have a negative relation with the firm performance, they showed in this hypothesis a positive relation interacting with the product market competition. This shows that efficiency and effectiveness of governance mechanisms could be different depending on the degree of product market competition. Generally, the results of this study supporting the former studies (Mayer, 1997; Januszewski *et al.*, 2002; Giroud and Muller, 2011) emphasize on the supplementary role of product market competition with regard to governance mechanisms and firm performance.

Special concentration of this study is on interaction among competition, corporate governance and firm performance. This interaction is important from different aspects. First, according to the conducted studies, the efficiency of different governance mechanisms can be affected by the degree of product market competition. For example, competition in product markets can make encouragement of good governance performance necessary where there is limited competition in the capital markets for firm ownerships. Second, the shape of different corporate governance systems can be affected by the degree of product market competition. The studies have shown that competition in financial markets can analyze the ability of firms and financial institutions to establish long-term relations. Attempt to expand competition, for example, through lifting the ban from rules can affect the governance methods.

From a theoretical aspect, according to the conducted studies, few experimental studies have already been made on the interaction relations of corporate governance and product market competition to determine profitability at a firm level. This study adds the determining factors of firm productivity with concentration on governance role and product market competition to the research literature. Product market competition is one of the determining factors related to industry, which is often ignored in relevant studies. It is suggested to investigate this issue more deeply and to use different proxies of corporate governance and product market competition in the future studies to investigate the issue. It

is also suggested that in the studies relevant to performance, the relevant criteria to industry, including product market competition, should be also taken into account, in addition to macro-economic factors and proxies at the firm level.

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