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Article

The impact of product market competition on firm performance through the mediating of corporate governance index: empirical of listed companies in Vietnam

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

The impact of product market competition on firm performance through the mediating of corporate governance index: empirical of listed companies in Vietnam

Thach Xuan Ha¹ and Thu Thi Tran^{1*}

Abstract: Over the past decade, Vietnam has opened the market and attended in large economic organization like ASEAN Free Trade Area, ASEAN Comprehensive Investment Agreement, Regional Comprehensive Economic Partnership, Comprehensive and Progressive Agreement for Trans-Pacific Partnership. Therefore, the increasing of product market competition has a significant impact on businesses. In order for businesses to improve firm performance, the solution needed today is to improve corporate governance system. Corporate governance not only helps to limit agency problem but also increases the role of inspection, control, and orientation for the development of business activities. The study examines the influence of product market competition on firm performance through the mediating role of corporate governance. Our data collected from Thomson—Reuters DataStream and finance report of 180 listed non—finance companies in Vietnam from 2015 to 2019. The research model and hypotheses were tested by Maximum Likelihood with Structural Equation Model method in Stata 14 software. The results showed that product market competition has positive effect firm performance



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PUBLIC INTEREST STATEMENT

In developing countries like Vietnam, businesses are facing with the increasing product market competition because governance enhances to open the market. While corporate governance system is still in its infancy, it is not yet complete, so it's very difficult to maintain and control activities in business. We demonstrate that product market competition positively affects firm performance through the mediating role of corporate governance. Moreover, the research indicates that business strategy is negative effect to between product market competition and firm performance. The results have contributed to profound governance implications for managers, which is the need to improve the efficiency of corporate governance system that can increase the ability to control, regulate and improve firm performance. At the same time, firms need to build business strategy based on product market competition and resources to have a good impact on firm performance.

through the mediating of corporate governance. Besides, the study revealed that business strategy negatively and significantly effects on product market competition and firm performance. Research results provide theoretical and administrative implications for improving firm performance.

Subjects: Accounting; Strategic Management; Corporate Governance

Keywords: business strategy; corporate governance; product market competition; firm performance

JEL: G34; L25

1. Introduction

Nowadays, corporate governance plays an essential role for businesses such as the reconcile conflicts of interest between owners and managers, increase management's control over behavior through the role of parties such as board membership and supervisory board (Akbar et al., 2016; Jensen & Meckling, 1976). Empirical studies in the world have fully confirmed that corporate governance has a positive effect firm performance because it has not only the controlling role but also directions and solutions for business development (Bhagat and Bolton, 2019; Mardnly et al., 2018; Mishra et al., 2021). Therefore, a number of recent studies have searched for factors contributing to improve corporate governance, such as the study of De Almeida and Dalmácio (2015), Yeh and Liao (2020), stating that product market competition is a prime example. Indeed, when businesses operate in a higher competition level, it will require corporate governance to change to support the management system to increase the ability to fend off competitors. From agency theory, it argued that product market competition and corporate governance are two complementary factors, because product market competition is an objective factor that minimizes agency problem. Besides, product market competition promotes effective corporate governance and will have a stronger impact on managers and direct them to work for the common goal of the business.

From the above argument, it shows that the research gap needs to examine the mediating role of corporate governance in the relationship between product market competition and firm performance. At the same time, in the context of constantly increasing competition due to the openness of cooperation and extensive exchanges between countries, there is no small pressure on businesses. In order for businesses to survive and develop, it is necessary to have a suitable business strategy to chart the direction in the future. However, according to Porter (1985), a business strategy is a substantial role, especially when product market competition is increasingly high, but the business strategy needs to be evaluated on many aspects to decision. Therefore, the study wants to explore the moderating role of business strategy in the relationship between product market competition and firm performance to add more knowledge on this issue.

Research on context selection at listed companies in Vietnam because Vietnam is a developing country and has many advantages to attract investors in the world. At the same time, in recent years, the State has actively expanded trade relations with countries around the world, joining many large economic organizations such as ASEAN Free Trade Area, ASEAN Comprehensive Investment Agreement, Regional Comprehensive Economic Partnership. So, the increasing pressure of product market competition among businesses, which has a great impact on small and medium-sized enterprises because of the weakness in corporate governance, limited capital, and human resources. With the economic context of Vietnam once again affirming the significance of the research when it comes to implementation, the obtained results give appropriate recommendations to help improve firm in particular and contribute to the economy of the country.

Following the introduction, the research includes the background theory and hypothesis development, research methods, results, and conclusions.

2. Background theory and hypothesis development

2.1. Background theory

2.1.1. Concepts

2.1.1.1. Product market competition. Product market competition is where the buying and selling of products and services takes place, thereby creating competition between businesses (Haw et al., 2015; Jaroenjitrkam et al., 2020). Or it's a concentration of firms with the same product or service (Hou & Robinson, 2006). The study is based on the views of Hou and Robinson (2006) with the aim of assessing when the concentration of firms is high or low and impact it on firm performance.

2.1.1.2. Corporate governance. Corporate governance is the process that firms respond to the rights and desires of their stakeholders (Demb & Neubauer, 1992). Buallay et al. (2017) argue that corporate governance is a combination of policies, legislation, governance guidelines, and controls, including a regulatory framework designed to aim at transparency and accountability related to the business. According to the Organization for Economic Cooperation and Development (OECD, 2004) mentioning corporate governance should be present in all organizations, corporate governance includes regulations of the government and economic organizations to control all activities, and create the trust of related parties. Research approaches this concept of the OECD (2004). Corporate governance is recognized by countries around the world as a tool to control all activities of enterprises in order to minimize agency problem, make financial data transparent, and create trust for investors.

2.1.1.3. Firm performance. Epstein (2004) considers that firm performance is an efficiency finance, customers, employees, initiatives, improvements in production or efficiency in leadership. Performance is also shown through indicators on financial statements and non-financial indicators that are information about the business (Kaplan & Norton, 2001; Lebans & Euske, 2002). Peng and Lin (2019) point out that firm performance is achieved when ensuring the value of profitability, market, and operating results. We use financial-oriented indicators to measure firm performance. This is because the collected data is taken from the reports of enterprises, bringing high confidence to the stakeholders, not depending on the judgment of the interviewee like the data collection survey (Bøgh et al., 2016).

2.1.1.4. Business strategy. Miles and Snow (Miles et al., 1978) approach the perspective of business strategy through building a theoretical model by analyzing technical, business, and management in order to point that is focused on when building business strategy. Another explanation of business strategy according to Porter (1996) is that this is a synchronous combination of activities in the enterprise. Business strategy helps firm to change product market competition, therefore increasing firm performance. The study chooses the view of Porter (1996) to see business strategy in the key role connecting the components in the business and creating the competitive ability of firm in industry.

2.1.2. Agency theory

Agency theory discussed issues surrounding the conflict between owners and managers (Jensen & Meckling, 1976). This conflict increases when owner does not directly manage the business, but they rent manager to do it. However, the manager can use agency to look personal interests and not for the goal of owner. Some typical evidence such as the financial scandal of Enron and WorldCom has made businesses pay more attention to build a corporate governance system. It can help owners control and regulate the behavior of managers, through improving firm performance. Research evidence found in previous studies confirms the role of corporate governance such as the study of Bhatt and Bhatt (2017), Arora and Bodhanwala (2018), and Ciftci et al. (2019). Another factor that is also considered as a tool to help limit agency problem in the business is product market competition. This is an objective factor formed from the pressure of the market, which poses challenges for managers to do to achieve firm performance, through the managers can also prove their ability in the labor market. So, the goal of

the owner and the manager is one, the conflict is resolved and thereby also contributes to improving firm performance. In summary, agency theory supports the influence of product market competition and corporate governance on firm performance.

In addition, agency theory suggests that product market competition can improve corporate governance system. Many later studies confirmed this argument such as Rennie (2006), Yeh and Liao (2020). The authors argued that product market competition requires the corporate governance system to constantly change to cope with the pressure of competitors and the market. Based on the above arguments, agency theory supports the relationship between product market competition and firm performance through the mediating role of corporate governance.

2.1.3. Theory of competitive advantage

Competitive advantage is something that enterprises always aim to maintain and develop production and business, it can be the value gained when enterprises use business strategy that are difficult for competitors to imitate (Barney, 1991). Or the added value advantage that products and services create for consumers far exceeds the expectations of businesses (Porter, 1985). In the context of constantly increasing product market competition, businesses always try to develop effective business strategy to dominate the market, affirm their comparative position, and improve firm performance. For example, Walmart has chosen a cost leadership strategy by minimizing overall costs, focusing on building technology in sales to bring benefits to consumers. This strategy helps Walmart to become the leading company in the retail business. Coca-Cola is a leading company in the beverage industry with product differentiation strategy by focusing on product diversity, products that are different from competitors in the same industry. Therefore, this strategy brings Coca-Cola to increase product market competition compared to competitors, thereby improving firm performance. Stemming from practical evidence that competitive advantage theory supports the moderating role of business strategy to the relationship between product market competition and firm performance.

2.2. Hypothesis development

2.2.1. Product market competition and corporate governance

Many previous studies suggested that product market competition is a negative significant corporate governance, for example, Chou et al. (2011) stated when higher product market competition will affect corporate governance system weaker because product market competition is a tool to replace corporate governance, putting pressure on managers to force them to economic benefits are created. Similar results are found in the study of Ko et al. (2016), Chhaochharia et al. (2017), and Noghani and Noghanibehambari (2019). However, according to agency theory, product market competition is increasing that requires corporate governance must constantly improve to cope with market change, to increase firm performance. A number of recent studies proved this point, for example, De Almeida and Dalmácio (2015) examine the role of product market competition and corporate governance affecting analysts' forecasts. The results showed when the increasing of product market competition, stakeholders need accurate information about firm performance, so corporate governance has to improve the role of inspection, control, and transparency of information about the business. Another study by Yeh and Liao (2020) makes a similar statement, but this relationship has an impact on the choice of future successors in Taiwan's family businesses.

From the above analysis, it can be seen that the relationship between product market competition and corporate governance is not consistent. When choosing the research context in Vietnam, the characteristics of market and enterprises are similar such as Taiwan and China because the market operates under the regulation of government. The government has passed regulations and laws on governance and securities laws, so the impact of product market competition will force state management agencies to change corporate governance mechanism to regulate timely business. Therefore, the study proposes the following hypothesis:

H₁: Product market competition has a positive influence on corporate governance.

2.2.2. *The relationship between product market competition and firm performance*

From the perspective of agency theory, the conflicting relationship between owners and managers comes from interests, so to resolve this conflict, some studies find factors of product market competition can do, but this approach can cause an increase or decrease firm performance. Specifically, research L. Liu et al. (2018) using data of listed companies in China from 2001 to 2016 confirmed that when increasing product market competition will put pressure on managers and requires them to improve firm performance. At that time, the solution that managers implement is to reduce the selling prices of products and services on the market, but corporate governance system and management stage are still weak, making it difficult to control and maintain operations. This is the reason to reduce firm performance. Another study by Thu and Minh (2022) that used the data of 555 listed companies in Vietnam from 2011 to 2019 also gave similar results. Contrary to these results, the study of Moradi et al. (2017) collected the data of listed companies in Iran, showing that product market competition positively affects firm performance. They explained that product market competition can help to limit agency problem, reduce manager's behavior by strict requirements on the operating results. Besides, product market competition also helps to effectively allocate resources when carrying out production and business activities. Oh and Shin (2020) conducted in the US with data collected from 1990 to 2011 in listed companies also stated that when the product market competition increased, the company offered entrenchment provisions with managers that will motivate them to improve firm performance in the future. In summary, through previous studies, it has been shown that it is necessary to test this relationship and when the difference in space and time will give new results in line with reality, we propose hypothesis:

H₂: Product market competition has a positive influence on firm performance.

2.2.3. *The relationship between corporate governance and firm performance*

Corporate governance is a topic that attracts the attention of researchers and administrators because it can be used to improve firm performance. In the early stages, the role of corporate governance was well known when a series of financial frauds occurred at world leading companies such as Enron and WorldCom. They believe that businesses commit fraud due to the lack of internal and external inspection and supervision mechanisms, so the quality of information and the transparency of financial data are not verified, causing internal research consequences for the related parties. The later studies examined the impact of corporate governance on firm performance, but there are still many conflicting views. Most studies confirmed that corporate governance positively affects firm performance (Aktan et al., 2018; Arora & Bodhanwala, 2018). Meanwhile, the study of Gupta and Sharma (2014), Dao and Nguyen (2020) found that corporate governance negatively affects firm performance. According to agency theory, corporate governance not only contributes to limiting conflicts between owners and managers but also strengthens the role of corporate control everything activities, thereby increasing firm performance. In Vietnam, the role of corporate governance is known later than in other countries in the world, but its influence on listed companies is not small because to attract investment capital (especially foreign ownership) that are often interested in governance, information transparency issues and only corporate governance built into the enterprise can help do this well. Based on experimental evidence, theoretical basis and considering the research context, the author develops a research hypothesis for this issue as follows:

H₃: Corporate governance has a positive influence on firm performance.

Through the arguments and hypotheses H₁, H₂, H₃ have built, the author proposes to explore the relationship between product market competition and firm performance through the mediating role of corporate governance as follows:

H₄: Product market competition has a positive influence on firm performance through the mediating role of corporate governance.

2.2.4. Business strategy moderates the relationship between product market competition and firm performance

Business strategy represents the decisions and actions that managers use to achieve firm performance compared to competitors in the industry (Parthasarthy, 2007). At the same time, competitive strategy is considered as a determining factor to improve firm performance (Barton & Gordon, 1988; O'Brien, 2003). According to Porter (1985), the choice of competitive strategy will change product market competition compared to competitors as well as advantages that other businesses are difficult to imitate. Based on the theory of competitive advantage, businesses that exist in the context of an open market face a lot of pressure, like competitors, customers and so on. So businesses need to choose a business strategy that can help to create its own position as well as improve its firm performance. Porter (1985) identified two main strategies to help businesses create competitive advantages: cost leadership strategy and product differentiation strategy. However, he also noted that the choice of strategy is very important and needs to analyze the actual conditions of the business as well as the market to bring the best results.

In Vietnam, business strategy developed and implemented is mainly concentrated in large companies such as Vinamilk, Ti Ki Joint Stock Company, Coca-Cola Company, etc. This can be a cost leadership strategy and a product differentiation strategy depending on each stage, competitor characteristics, and market characteristics in order to create competitive advantages in the product market. However, the results are different between enterprises. Some enterprises such as Ti Ki Joint Stock Company and Coca-Cola Company have chosen cost leadership strategy by reducing selling prices compared to competitors, which has increased product market competition but it entails an increase in production costs, thus making firm performance not good. Meanwhile, businesses pursuing a product differentiation strategy such as Vinamilk and TH True Milk get a variety of designs and product quality by investing in research and development costs for similar products. This strategy gives businesses a leading advantage in products, but in the short term, firm performance will be affected. Therefore, based on the characteristics of the research context and theory, we propose the following hypothesis:

H₅: Business strategy positively moderates the relationship between product market competition and firm performance.

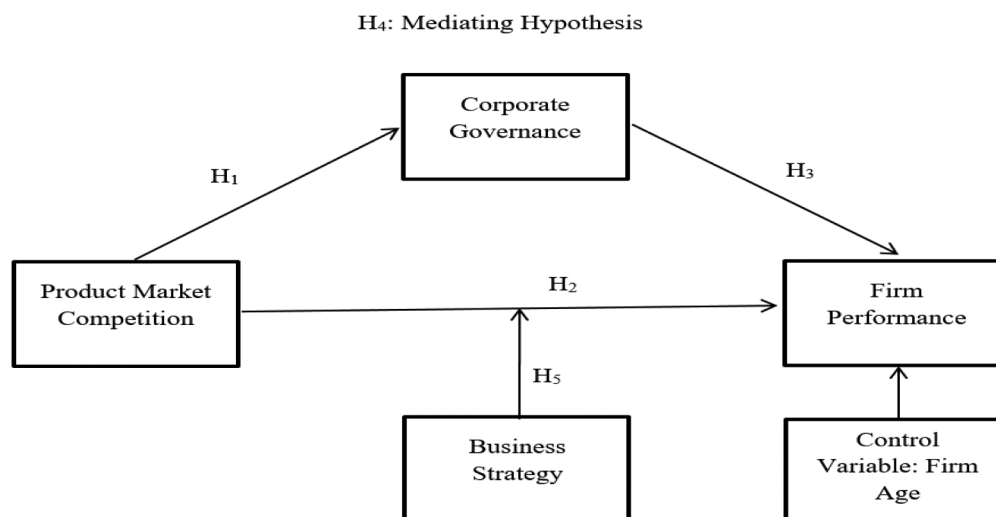
The research model and corresponding hypotheses are shown in Figure 1.

3. Methods

3.1. Data collection and variable measurement

In Vietnam, the number of listed companies is increasing over the years and up to now, that number is 2,192 companies (State Securities Commission of Vietnam, 2021). The fields of enterprises are also very diverse and are classified according to the Global Industry Classification Standard developed by MSCI and S&P Dow Jones Indexes including Industrials, Real Estate, Consumer Discretionary, Consumer Staples, Energy, Financials, Utilities, Materials, Health Care, Information Technology, and Telecommunication Services. When selecting sample size, we base on the criteria that the sample size is large enough to be representative of the population, suitable for the structural equation model, and includes all types of non-finance business because financial firm has differences in production and management compared to other types of enterprises. According to Hair Joseph et al. (2017a), the minimum sample size to be achieved must be greater than 10 times the maximum number of causal observed variables measured for a concept or 10 times the maximum number of paths affecting a concept in the model. In our model, the largest

Figure 1. Research model.



number of paths is 3 that affect the dependent variable of firm performance, so the sample size is $3 * 10 = 30$ companies. However, the sample size needs to ensure reliability and fit with the structural equation model, so it should be in the range of 100–200 units (Hoyle, 1995). Stemming from the above reasons, the study proposes to select a sample of 180 non-finance companies listed on Vietnam's stock market. The details of the size and number of enterprises in the business fields are summarized in Table 1 as follows:

Data on product market competition, firm performance, business strategy, and firm age are obtained from Thomson Reuters—DataStream. The data of corporate governance index in Vietnam are not available, so we have to manually collect it through reports such as financial statements and governance reports that the company officially publishes on the stock exchange. Details of how to choose a measurement index for the research variable are presented below:

3.1.0. Product market competition

Product market competition variable has many measures such as the Herfindahl–Hirschman index (HHI—market share), numbers of competitors, and market size (Giroud & Mueller, 2010, 2011; Tian & Twite, 2011). Or measure product market competition through product substitutability as

Table 1. Sample size

No	Industries	Sample size	Percentage
1	Industrials	72	40
2	Real Estate	21	11.67
3	Consumer Discretionary	21	11.67
4	Consumer Staples	20	11.11
5	Materials	14	7.77
6	Energy	13	7.22
7	Utilities	8	4.44
8	Health Care	7	3.89
9	Information Technology	3	1.67
10	Telecommunication Services	1	0.56
	Total	180	100

Sources: Authors collected.

measured by Lerner Index, total industry sales (Sharma, 2011). In the article, the author chooses the HHI index to measure product market competition because:

- HHI index most clearly shows the level of competition in the same industry;
- Most recent studies use HHI index when considering the influence of product market competition on firm performance like the study of De Almeida and Dalmácio (2015), Singla and Singh (2019), Q. Liu et al. (2021), and Rakestraw (2022).

3.1.1. Firm performance

The study uses financial indicators to measure firm performance variable. It can measure both book values such as ROA, ROE, ROI..., and market value including Tobin's Q, P/E, EPS, MBVR ... According to Dalton et al. (1999) says that firm performance only measures by accounting value that it would be limited because the data could be manipulated, changed accounting methods and consolidated financial statements. However, if the researcher only evaluates based on market value of firm performance, it may be biased due to investor's information hype (Muller, 2014). Therefore, current studies use accounting value and market value simultaneously when measuring firm performance like the study of Bhagat and Bolton (2008), Abdallah and Ismail (2017), Bhatt and Bhatt (2017), Buallay et al. (2017), and Shehata et al. (2017), and Saidat et al. (2019). They focus on ROA, ROE, and Tobin's Q. For Tobin's Q, this is considered as a parameter that gives investors confidence in the market because it is determined based on the difference between the market value of the enterprise and the book value (Hoon & Prather, 2001). Therefore, we use ROA, ROE, and Tobin's Q indicators to measure firm performance.

3.1.2. Business strategy

Business strategies are built in many forms such as Miles and Snow (Miles et al., 1978) includes 4 strategies Defender, Prospector, Analyzer, and Reactor. Porter (1985) builds a business strategy including cost leadership strategy, product differentiation strategy, and concentration. Meanwhile, Treacy and Wiersema (1995) consider the strategy of effective operation, cost leadership, and customer intimacy. Research approaches business strategy according to Porter (1985) because:

- According to Anwar and Hasnu (2016) argue that Porter (1985) is widely accepted and used in academic research. At the same time, Wu et al. (2015) further emphasize that Porter's point of view is applied to business practices in many economies around the world.
- In Vietnam, many large enterprises have been applying this strategy into practice such as Vinamilk, TH Joint Stock Company ...

3.1.3. Corporate governance index (CGI)

It has many ways to build CGI such as Gompers et al. (2003), Gillan et al. (2003), and Singareddy et al. (2018). Each construction method is aimed at evaluating the effectiveness of corporate governance system in the role of controlling and regulating operations in the business. Our study chooses the approach according to Singareddy et al. (2018) because:

- The information of CGI is collected directly on financial statements, management reports that is higher reliability;
- The collected contents are consistent with the guidance on corporate governance such as information about the board of directors, the supervisory board, and the audit unit issued by the Ministry of Finance in Vietnam.

Table 2 shows how to measure variables in the study inherited from previous studies:

Table 2. Measure the variables in the model

No	Variables	Operationalization	Related reasearch
1	Product Market Competition (COMP)	Herfindahl—Hirschman Index = $HHI = \sum_{i=1}^N (s_{ij}^2)$ 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 the total net sale of an industry which is calculated for each industry separately every year.	Singla and Singh (2019), Babar and Habib (2020)
2	Firm Performance (FP)	ROA = Net income divided by total assets TOBINQ = (Market value of equity + Book value of short term liabilities) ÷ Book value of total assets ROE = Net income divided by total equity	Hassan et al. (2016), Abdallah and Ismail (2017), Bhatt and Bhatt (2017), Buallay et al. (2017), Saidat et al. (2019)
3	Coporate Governance Index (CGI)	CGI = Sum of the binarised corporate governance attribute value. Value ranges from 0 to 5. CGI includes: - Board size: Number of directors on the board. Value greater than or equal to >5 is 1; 0 otherwise. - Diversity of board: Number of females on the board. Value greater than or equal to >1 is 1; 0 otherwise. - CEO duality: CEO holds the position of chairman of the board. No is 1, otherwise 0. - Size of audit committee: The number of members in the audit committee. Value greater than or equal to >3 is 1; 0 otherwise. - Audit firm: Audit firm is Big 4 or non-Big 4. Yes is 1, otherwise 0.	Singareddy et al. (2018)
4	Business Strategy (BS)	Asset Utilization Efficiency (AUE) = Total Sales/Total Assets Premium Price Capability (PPC) = Selling and Administrative Expenses/ Total sales	Porter (1985), Singh and Agarwal (2002), Jermias (2008)
5	Firm Age (AGE)	The number of years since the company was established.	Buallay et al. (2017)

Sources: Author's summary from previous research.

3.2. Data analysis

The study builds the structural equation model, secondary data, so we choose the Maximum Likelihood Estimation method (Maximum Likelihood with SEM: ML-SEM; Allison et al., 2017) to measure the proposed relationship. This method has many advantages such as:

- (1) Estimating the model when the data is missing;
- (2) Solve the problem of endogeneity and autoregressive, the change of data time—variant variables (Allison et al., 2017);
- 3) Unlimited time and number of variables in the model (Williams et al., 2018);
- (4) Measure many direct and indirect relationships at the same time and model fit (Siddika & Haron, 2019).

The ML-SEM method was used by Mehmetoglu (2018) to develop the Medsem technique running Stata software to measure the impact of direct and indirect variables in the model. This technique has been applied in a number of fields such as healthcare and accounting as studied by Langvik et al. (2019), Dang et al. (2019), and Betti et al. (2020).

4. Research results

4.1. Descriptive statistics

Table 3 indicates the descriptive statistics for our sample. Average COMP that is measured by HHI is approximately 0.047. According to Vietnam's Ministry of Industry and Trade, when HHI is from 0.01 to 0.1, it indicates product market competition is a high level. The value of CGI is based on six components, the average value is about 3.086 showing that companies have focused to build CGI in the control and management stage. ROE fluctuates significantly from -596.9% to 194.8%, but the average value is about 7.6%. Similarly, average ROA is 5.8%. It can be seen that ROA and ROE measure the company's book value showing the feasibility of outputs of businesses. The market value of companies measured by Tobin's Q (TOBINQ) with the mean value of about 0.805, the standard deviation of 0.847 shows that the enterprise value is always valued higher than the book value.

Business strategy is measured by AUE and PPC. First, average AUE is 1.114, with the lowest value being 0 because there are companies in the financial year that have no sale such as Vegetable Oil Packaging Joint Stock Company (Stock code: VPK). Meanwhile, the highest value of AUE is 9.365 belonging to Petrol and Supplies Joint Stock Company in 2015. Similarly, average PPC is 0.141, with fluctuating from 0.132 to 20.223. Through this parameter, it partly shows the level of capital investment to implement business strategy in listed companies in Vietnam.

AGE ranged from 1 to 13 years with a mean value of about 9.11. The value indicates Vietnam's firm age is so long that it demonstrates the ability of firms so good. From that, firm age can affect firm performance.

4.2. Evaluation of model defects

Before going into the regression test between the variables in the research model, the author evaluates the fit of the model, specifically the independent variables do not have multicollinearity. According to the result of table 4 with VIF value <2 less than the allowable threshold is 5 (Hair Joseph et al., 2017a).

Through the results of Table 5, there are some problems such as:

- (1) There is no correlation between the independent variable COMP and AGE;

Table 3. Descriptive statistics of the variables

Variable	Obs.	Min	Max	Mean	Std. Dev.
COMP	900	0.0006	0.397	0.047	0.077
CGI	900	0	6	3.086	0.985
ROA	900	-0.87	0.732	0.058	0.081
ROE	900	-5.969	1.948	0.076	0.340
TOBINQ	900	0.015	10.867	0.805	0.847
AGE	900	1	13	9.111	2.239
AUE	900	0	9.365	1.114	1.103
PPC	900	0	20.223	0.141	0.701

Sources: Export from Stata's software.

Table 4. Test of multicollinearity

Variable	VIF	1/VIF
CGI	1.03	0.97
COMP	1.02	0.98
AGE	1.00	0.99
Mean VIF	1.02	

Sources: Export from Stata's software.

(2) The variable ROA is strongly correlated with ROE and TOBINQ at the 1% statistical significance level, so it should be separated when measuring the model;

(3) The moderator variable measured through COMP*AUE and COMP*PPC is correlated with each other at the 5% statistical significance level, so it must be separated when measuring the model. We will consider the first model with other variables constant, which considers the moderating role of COMP*PPC. Similarly, the second model with the COMP*AUE moderator variable. This approach has been studied by Thuy et al. (2021) to avoid multicollinearity, making the prediction of the relationship between variables inappropriate. At the same time, this approach will help to evaluate in detail the role of product differentiation or cost leadership on the relationship between product market competition and firm performance in Vietnam's list companies.

4.3. Regression results

4.3.1. Regression results when considering the moderating role of product differentiation strategy

Table 6 shows the regression results considering the mediating role of corporate governance and the moderating role of product differentiation strategy (COMP*PPC), first hypothesis H_1 is supported with a value of $\beta = 0.065$ with a significance level of $p\text{-value} = 0.000$, showing that product market competition has a positive influence on corporate governance. This result is consistent with the previous research of Rennie (2006), Yeh and Liao (2020). At the same time, this result is consistent with Vietnamese market context. Because according to the results of descriptive statistics, product market competition is constantly increasing, which has put pressure on firms to have an effective corporate governance system that helps to control and regulate all business activities. Similarly, product market competition has a positive effect on firm performance (measured by TOBINQ) at $\beta = 0.041$ with $p\text{-value} = 0.004$ significance level but there is no statistical significance with ROA, ROE. Hence, hypothesis H_2 is accepted. The obtained results are similar to the study of Sharma (2011), Moradi et al. (2017), Q. Liu et al. (2021). It can be seen that with the pressure of product market competition, it not only helps to improve corporate governance, but also increases firm

Table 5. Pearson correlation matrix

	TOBINQ	ROE	ROA	COMP	CGI	AGE	COMP*PPC	COMP*AUE
TOBINQ	1							
ROE	0.051 0.124	1						
ROA	0.179 0.000***	0.488 0.000***	1					
COMP	0.097 0.003	0.041 0.219	0.013 0.688	1				
CGI	0.101 0.002	0.047 0.158	0.007 0.832	0.134 0.000	1			
AGE	0.0727 0.0291	0.016 0.615	0.022 0.511	0.046 0.165	0.031 0.354	1		
COMP*PPC	-0.053 0.108	0.366 0.000	0.317 0.000	0.047 0.157	0.014 0.671	-0.024 0.467	1	
COMP*AUE	0.021 0.519	-0.103 0.002	-0.154 0.000	-0.397 0.000	0.099 0.003	-0.036 0.277	-0.083 0.012**	1

Sources: Export from Stata's software.

*, **, *** indicate significance at 10%, 5%, and 1% levels, respectively.

Table 6. Regression results between variables when considering the mediating role of CGI and the moderating of COMP*PPC									
Hypothesis		CG		TOBINQ		ROA		ROE	
		β	p-value	β	p-value	β	p-value	β	p-value
H ₁ ; H ₂	COMP	0.065	0.000***						
H ₃	CG			0.041	0.004***	0.000	0.976	0.003	0.498
H ₄	COMP -> QTCT -> FP			0.074	0.009***	0.0001	0.962	0.013	0.221
				0.004	0.029**	0.0004	0.962	0.000	0.242
H ₅	COMP*PPC			-0.037	0.081*	0.019	0.000***	0.095	0.000***
Control Variable: Age				0.029	0.019**	0.001	0.350	0.004	0.396
Model Fit				χ^2 (3) (Prob > χ^2) = 0.409 RMSEA = 0.000 CFI = 1.000 TLI = 1.000 SRMR = 0.010		χ^2 (3) (Prob > χ^2) = 0.409 RMSEA = 0.000 CFI = 1.000 TLI = 1.007 SRMR = 0.010		χ^2 (3) (Prob > χ^2) = 0.409 RMSEA = 0.000 CFI = 1.000 TLI = 1.005 SRMR = 0.010	

Sources: Compilation author.

*, **, *** indicate significance at 10%, 5%, and 1% levels, respectively.

Table 7. Regression results between variables when considering the mediating role of CGI and the moderating of COMP*AUE

Hypothesis		CG		TOBINQ		ROE		ROA	
		β	p-value	β	p-value	β	p-value	β	p-value
H ₁ ; H ₃	COMP	0.065	0.000***	0.044	0.004***	0.016	0.009***	0.003	0.013**
H ₂	CG			0.075	0.008***	0.016	0.145	0.001	0.167
H ₄	COMP -> QTCT -> FP			0.004	0.028**	0.001	0.171	0.000	0.683
H ₅	COMP*AUE			-0.003	0.475	-0.007	0.000***	-0.002	0.000***
Control Variable: Age				0.029	0.017**	0.002	0.570	0.000	0.486
Good of Fit				χ^2 (3) (Prob > χ^2) = 0.123 RMSEA = 0.035 CFI = 0.936 TLI = 0.778 SRMR = 0.014		χ^2 (3) (Prob > χ^2) = 0.123 RMSEA = 0.035 CFI = 0.931 TLI = 0.760 SRMR = 0.014		χ^2 (3) (Prob > χ^2) = 0.123 RMSEA = 0.022 CFI = 0.946 TLI = 0.812 SRMR = 0.014	

Sources: Compilation author.

*, **, *** indicate significance at 10%, 5%, and 1% levels, respectively.

performance. This result is different with the research of Thu and Minh (2022) conducted in Vietnam. However, this difference comes from the fact that Thu and Minh (2022) consider the moderating role of state ownership on the relationship between product market competition and firm performance. When state ownership is high, product market competition is negatively correlated with firm performance because currently Vietnamese enterprises with a state ownership rate are being assessed for operation ineffective. Next, CGI has positively and significantly influenced TOBINQ ($\beta = 0.074$, p -value = 0.009) but has no relationship with ROA, ROE. This result is consistent with many previous studies such as Aktan et al. (2018), Arora and Bodhanwala (2018). At the same time, the results are also found in many studies conducted in Vietnam such as Le and Thi (2016), Dao and Nguyen (2020). Therefore, developing countries like Vietnam constantly adjust and supplement regulations on corporate governance in order to promote its role in improving firm performance. Besides, CGI works effectively, it will attract more foreign investors because they believe that corporate governance is a tool to help them control and ensure working capital (Bell et al., 2012). The most interesting point in the study is to examine the mediating role of corporate governance through the influence of product market competition on firm performance, which has achieved $\beta = 0.004$ with the significance level. p -value = 0.029, so hypothesis H_4 is supported. The result has great practical significance for Vietnamese firms today because product market competition is a high threshold, it requires CGI to build and operate more effectively. In addition, CGI helps increase the ability to deal with competitors. At the same time, the majority of research in Vietnam focuses on examining the influence of product market competition and corporate governance on firm performance, but has not considered the mediating role of corporate governance. Therefore, this result has brought more insights into the relationship between research variables. Besides, hypothesis H_5 is supported with $\beta = -0.037$ with p -value = 0.081 significance when firm performance is measured through TOBINQ but not statistically significant with ROA, ROE because of the evaluation index. The fit of the TLI model >1 does not guarantee the allowable threshold (Schumacker & Lomax, 2016). The results show that the product differentiation strategy when applied in Vietnamese enterprises is causing negative impacts on the relationship between product market competition and firm performance. This result can be explained because most Vietnamese enterprises are small and medium-sized, so the level of investment in business strategy is still limited (statistical results are described in Table 3). At the same time, investment in research and development of new and differentiated products takes a long time and large scale to make a difference in the market. Therefore, the increasing of product market competition is not good effect on firm performance. Finally, firm age has positive influence on TOBINQ but not ROA, ROE. This shows that the longer the company operates, the more management experience and good development orientation help increase the strength as well as firm performance.

4.3.2. Regression results when considering the moderating role of cost leadership strategy

Regression results in Table 7 show that when examining the relationship between variables with the dependent variable TOBINQ and ROE, good of fit index is not guaranteed with the TLI index <0.8 (Hair et al., 2010) so we only consider correlation variables with ROA. Firstly, product market competition has a positive effect ROA with $\beta = 0.03$ and p -value = 0.013. So, H_3 is accepted. After that, the moderating role of cost leadership strategy negatively and significantly effects on the relationship between product market competition and firm performance. H_5 is supported. Through the results, it can be seen that cost leadership strategy does not bring good business results when product market competition is high. The reason can be to gain market share in the long run will cause pressure on increasing costs, reducing revenue, thereby decreasing firm performance. The practical evidence from TiKi Joint Stock Company has used the strategy of cost leadership by deeply reducing selling prices to attract customers and expand market share. The results achieved up to now, TiKi has captured a large market share (product market competition), but firm performance is not good. The theory of competitive advantage when mentioned also noted that the use of business strategy should consider the time, market, and ability of the enterprise to promote its role when applied.

5. Conclusion

Research has confirmed the influence of product market competition on firm performance through the mediating role of corporate governance. This result is a new discovery in the context of Vietnam when previous studies focused on examining the influence of product market competition on firm performance such as Thu and Minh (2022), the influence of corporate governance to firm performance such as Le and Thi (2016), Dao and Nguyen (2020). The study has managerial implications that in the context of constantly increasing product market competition in Vietnam have set a requirement for businesses to focus on improving the role of the corporate governance system in order to contribute to control, regulate as well as improve firm performance. At the same time, the study proves that the moderating role of competitive strategy has a negative effect on the relationship between product market competition and firm performance of listed companies in Vietnam. This result adds new awareness about the relationship between variables when considering listed companies in Vietnam. Through the results, enterprises need to analyze competitive pressures in the market to come up with appropriate strategies to bring better firm performance.

The study still has some points such as a limited sample size of 10 companies listed on the Vietnamese stock market, while the total number is up to 2,192 companies as of 31 December 2021 (State Securities Commission of Vietnam, 2021). The collected data on corporate governance lack some information such as the professional qualifications of board directors and supervisory board, which are incomplete in the reports published by listed companies. Future research may aim to expand the research scale, add more information when building corporate governance, and add new variables to the model.

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