

NATIONAL GOVERNANCE QUALITY, COMPETITION AND FIRM INVESTMENT

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Received 04.10.2024. | Sent to review 25.10.2024. | Accepted 12.02.2025.

Original article



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JEL Classification: G31, G32

Doi: 10.2478/eoik-2025-0021

UDK: 658.511:005.914.3

ABSTRACT

This study investigates how market competition affects firm investment and the moderating effect of national governance quality (CGI) on the relationship between competition and firm investment in research and development (R&D) and tangible assets. The sample consists of 16,493 observations from World Bank Enterprise Surveys (WBES) in 88 countries in 2016 – 2022. The regression results show that both the competition and the level of market competition encourage firms to invest more in R&D and tangible assets. The quality of national governance also adjusts the relationship between competition and firm investment. Notably, the better quality of national governance strengthens the relationship between competition and firm investment. However, it weakens the relationship between a higher degree of competition and firm investment. In addition, the marginal effects examination suggests that variations in the quality of national governance influence the relationship between competition and investment in R&D investment, which is more pronounced than tangible investment in the presence of at least one competitor. In conclusion, the relationship between competition and investment is moderated by changes in CGI, the starting level of CGI score, and the market structures. The empirical results propose some implications for firm managers and policymakers to boost investment and a transparent environment for firm investment.

Keywords: *competition; firm investment; national governance quality; research and development; tangible assets*

1. INTRODUCTION

Competition is a fundamental driver of economic growth (de Guevara & Maudos, 2011; Hatfield & Kosec, 2013) and essential for firm investment (Akdoğan & MacKay, 2008; Schmutzler, 2013). In a competitive market, firms are incentivized to use resources effectively and increase productivity to explore their market share by providing lower-cost products (Stiglitz & Dasgupta, 1982). Consumers also benefit from a wide range of products and services with better quality and lower costs. In addition, competition also influences the cost of bank debt (Valta, 2012) and firm performance (Ma, 2000; Pant & Pattanayak, 2010), encourages firms to innovate and invest in research and development (Gilbert, 2006) to introduce new products and improve the quality of existing products.

National governance quality is essential for economic development (Cooray, 2009; Fayissa &

Nsiah, 2013; Rivera-Batiz, 2002). Good governance, marked by transparency, the rule of law, stability, and property rights protection, promotes environmental sustainability and fosters a competitive environment to improve businesses' performance (Chen & Hsu, 2009; Pant & Patanayak, 2010; Wang & Fu, 2024; Kostić & Radukić, 2021), attracting domestic and foreign investment (Agyemang et al., 2015; Farooq et al., 2021, 2022; Zatonatskiy & Lavrentiev, 2023). The improvement of national governance quality can boost firm investment (Hillier et al., 2011; Malesky et al., 2015) since the better quality of governance often leads to a more transparent and predictable regulatory environment, may reduce corruption and bureaucratic processes, and enhance strong protection of property rights. Based on the important role of competition and the quality of national governance for the economy and economic agents, this study aims to address several questions. Does competition help firms enhance investment in fixed assets and research and development? Does the country-level institutional quality affect firm investment and the interaction between competition and firm investment? Does the improvement of national governance quality adjust the relationship between competition and firm investment?

This study obtained the dataset of 16,493 observations from WBES in 88 countries in 2016–2022. The regression results show that both the competition and the level of market competition encourage firms to invest more in R&D and tangible assets. The quality of national governance also adjusts the relationship between competition and firm investment. Notably, the better quality of national governance strengthens the relationship between competition and firm investment. However, it weakens the relationship between a higher degree of competition and firm investment. In addition, the marginal effects examination suggests that variations in the quality of national governance influence the relationship between competition and investment in R&D investment, which is more pronounced than tangible investment in the presence of at least one competitor. The findings of this study make an essential contribution to managers and policymakers. Understanding the relationship between competition and firm investment can give managers valuable insights to inform strategic decision-making and improve overall business outcomes. In addition, managers can assess the political and regulatory risks associated with a country's governance quality. Policymakers can design policies that enhance national governance quality, creating a transparent business environment.

Our study contributes to the literature in several ways. Previous studies have focused separately on competition and investment or innovation (Lestage et al., 2013; Schmutzler, 2013) or national governance quality and investment (Agyemang et al., 2019; Farooq et al., 2022). Meanwhile, economic relationships between the enterprise and market levels are highly complex and influenced by different external factors, such as environment and structure (Nandakumar et al., 2010) and economic and institutional contexts (Krammer, 2022). Therefore, our study aims to clarify how market competition affects firm investment and how this relationship would be challenged within the different institutional contexts. The moderating effect of national governance quality has been assessed in several prior studies on different corporate issues (Nguyen et al., 2021; Phan, 2024).

Moreover, our approach and measurement of competition differ from the previous studies. Gilbert (2006) developed a theoretical framework to discuss the effect of competition and firm innovation. Lestage et al. (2013) measured competition by the different reforms implemented in the frameworks of liberalization on policies. Akdoğu and MacKay (2008) proxied the level of competition by identifying three industry groups: unconcentrated, moderately concentrated, and highly concentrated. This study provides empirical evidence by utilizing the large firm-level dataset of 88 countries from WBES. The dataset allows for evaluation of the degree of competition directly observable through two measurements: competition is a binary outcome where the presence of competition with at least one or no competitor is measured, and the number of

competitors measures the degree of competition. The advantage of cross-country datasets is that they allow for examining the effect of national institutional quality. The country-level governance quality (CGI) was obtained from six dimensions of governance measurements: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. CGI provides insights into the institutional environment, which impacts economic stability, investment climates, and sustainable development. The remainder of this study are organized as follows: Section 2 provides a concise overview of the literature on national governance quality, competition, and firm investment. Section 3 outlines the model and data. Section 4 presents the findings. Finally, Section 5 offers the conclusion.

2. LITERATURE REVIEWS

2.1. COMPETITION AND FIRM INVESTMENT

In a competitive market, firms may invest in strategies to differentiate themselves, such as product innovation, unique marketing approaches, or enhanced customer experiences. Many studies have explored the relationship between market structure and firm investment (Cooper & Ejarque, 2001; Galeotti & Schiantarelli, 1991; Hay & Liu, 1998; Sakellaris). These studies have focused on optimization frameworks designed for situations of imperfect competition.

One stream of literature related to this study is the impact of different perspectives on competitors and the market structure on firm-specific decisions. For example, Wen et al. (2022) investigated Chinese A-share listed companies in the new energy industry for the 2007 – 2019. The findings showed that product market competition reduces the adverse effect of fiscal policy uncertainty on innovation investment. Autor et al. (2020) quantified how foreign competition affects domestic innovation in the U.S. They showed that U.S. patent production declines in sectors facing greater import competition. Durnev and Mangen (2020) explored the role of competition in the relation between spillover effects and investment. Using the dataset of the Management Discussion and Analysis disclosures, the results showed that competition moderates the positive relationship between spillover effects and firm investment. This relationship is more robust when firms operate in industries with lower entry costs, are more prominent, and have fewer substitutable products. Grieser and Liu (2019) examined the correlation between investment behavior and the financial constraints of competitors. By utilizing interfirm patent citations and text-based assessments of product market similarities, they confirmed that firm investment tends to increase if constraints imposed by competitors become more binding. Tang and Tang (2016) argued that environmental strengths and concerns have varying effects on the power dynamics between competitors and firms, as well as on the financial performance. Using the dataset of Chinese Small and Medium Enterprises, the results of surveys indicate that the divergence in power between competitors and firms is positively related to environmental strengths, while no such relationship exists between this power divergence and environmental concerns..

Regarding competition and investment relationships, the literature has documented that competition's direct effect on investment behavior is mixed and sensitive in particular circumstances. For instance, Ali et al. (2024) investigated the impact of market competition on investment efficiency. The sample consists of 260 listed firms in Pakistan from 2010 to 2022. The results showed that market competition decreases investment efficiency. On the contrary, Schmutzler (2013) used a general two-stage framework to identify the circumstances under which increasing competition leads to more capital expenditures. The framework argued that competition positively affects the investment of firms with higher efficiency. Lestage et al. (2013)

obtained the dataset of countries in the Organization for Economic Cooperation and Development (OECD) between 1994 and 2008 in the telecommunications sector to test the influence of competition pressure on investment. They concluded that more significant competitive pressure fosters infrastructure investment by state-owned firms but reduces investment by private firms. Akdoğu and MacKay (2008) investigated how industry structure affects corporate investment patterns in U.S. manufacturing firms. They showed that firm investment in less competitive industries is about half as sensitive to changes in Tobin's Q as firm investment in highly competitive industries. Firms in oligopolistic industries invest more than firms in competitive or monopolistic industries. Meanwhile, Gilbert (2006) developed a theoretical model to extend the idea of how competition affects innovation. He argued that an innovation in the production process reduces the consistent marginal cost of manufacturing a product. Then, he proposed how a monopoly could optimize investment in R&D and the innovation process by considering exclusive and non-exclusive intellectual property rights.

Overall, based on the theoretical review, we believe that competition significantly affect firm investment. Specifically, the presence of competition and higher level of competition could encourage firm investment.

Hypothesis 1: Competition boosts firms to invest more in research and development and tangible assets

2. 2. COUNTRY-LEVEL GOVERNANCE QUALITY, COMPETITION AND FIRM INVESTMENT

Governance quality refers to a country's institution's effectiveness, transparency, efficiency, and mechanisms for decision-making and implementation. First, high-quality governance often implies a well-functioning regulatory environment (Topić – Pavković, 2024). A transparent and efficient regulatory system can ensure fair competition and prevent monopolistic practices that might hinder firm investment. At the aggregate level, Mariotti and Marzano (2021) developed a comparative framework to investigate how pro-enforcement reforms lead to a change in competition policy regimes that attract Foreign Direct Investment (FDI) in host countries. They employed the sample of 63 countries over the 1980–2017 period. The results showed that a high-quality regulatory institutional environment is crucial for attracting FDI by effectively enforcing competition policies, especially in host countries where such an environment exists alongside a lack of trust.

At the firm level, good governance provides stability and predictability in the regulatory environment, reducing uncertainties and encouraging firms to enter the market with confidence in the rule of law. Indeed, many studies have shown that institutional quality significantly impacts the number of new firm entries (Aidis et al., 2008; Bruno et al., 2013; Estrin & Prevezer, 2010). For instance, Estrin and Prevezer (2010) explored how institutions and regulations influence the firm entry rate. They used a comparative case study method to confirm the importance of institutions for firm entry. Furthermore, property rights are protected in countries with strong governance. Firms are more willing to invest when they have confidence that their intellectual property and assets will be protected, even in a competitive market. An (2013) used the Chinese Industrial Enterprises Database from 2000 to 2007 to evaluate the relationship between property rights and investment. Using the difference-in-differences approach, they found that private property rights security boosts investment in fixed and intangible assets.

Examining the moderating impact of national governance quality on various firm relationships is crucial for understanding how institutional factors shape and influence business (Agyemang et al., 2015; Ernstberger & Grüning, 2013; Gerged et al., 2023; Martins et al., 2017; Nguyen

et al., 2022; Nguyen et al., 2021; Phan, 2024; Zeng, 2019). For instance, Phan (2024) explored the impact of country-level governance quality on the relationship between foreign ownership and firm investment. Using the WBES dataset from 2016 to 2022, the findings showed that the country-level governance quality positively influences the relationship between foreign ownership and firm investment. Good governance quality can create a better environment for foreign-owned firms to invest and significantly impact investment activities. Oh and Oetzel (2011) investigated how country governance quality moderates the relationship between exogenous disaster risk and subsidiary investment by multinational corporations (MNCs). Using the panel dataset of 71 large European MNCs and their subsidiaries over the 2001–2006 period, they found that the reduction of investment in subsidiaries by MNCs is less likely in the high-quality governed countries. Nguyen et al. (2022) investigated the moderating effect of national governance quality on the corporate governance-capital structure decision relationship. Using an instrumental variable estimation technique to analyze a multinational dataset of 3,270 firms in 59 economies from 2004 to 2014, they found that national governance quality has a positive effect on the corporate governance-capital structure decision relationship. Nguyen et al. (2021) examined how national governance quality moderates the board gender diversity–firm performance relationship across nations. Applying a multi-hierarchical modeling technique on a dataset of 2,931 companies in 46 countries, the results showed that the relationship between board gender diversity and performance varies with the level of national governance quality.

Based on the literature review, we believe that country-level governance quality shapes the relationships within a firm and between firm-specific issues and external factors. National governance quality would encourage both competition and investment since countries with better governance quality provide a stable and safe business environment, transparent investment climate, and efficient investment procedures.

Hypothesis 2: Country-level governance quality strengthen the relationship between competition and firm investment.

3. DATA AND MODEL DESCRIPTION

3.1. DATA

The dataset is obtained from three sources: the World Bank Enterprise Survey (WBES), the Worldwide Governance Indicators (WGI), and the World Bank Development Indicators (WBDI). The WBES dataset is used in several studies in corporate innovation and investment (Chundakkadan & Sasidharan, 2020; Fombang & Adjasi, 2018; Lin & Man-lai Wong, 2013; Phan, 2024; Phan, Nguyen & Nguyen, 2024; Reddy et al., 2021) since it provides detail information on investment, innovation, finance, sales, labor, and competitors across firms and countries. We start the data from 2016 because the data on firm investment of previous years were collected in different structures; some countries collect investment in currency amount according to the reported figures by respondents, and some other countries collect the Yes/No answers. After excluding all missing observations, the final sample consists of firm-level 16,493 observations in 88 countries over the 2016–2022 period.

3.2. MODEL

The model aims to investigate the effect of country-level governance on the relationship between competition and firm investment. Our model as follows:

(1) where the dependent variable is firm investment (INV), proxied by R&D investment (R&D) and tangible investment (Asset), the independent variables include competition (COM) proxied by the presence of competition (DUMCOM) and the degree of competition, measured by

the number of competitors (NUMCOM). The other firm-level controlled variables are firm ownership (FO), firm size (SIZE), firm sales (SALE), free cash flow (CFL). The country-level independent variable of interest is national governance quality (CGI), including six dimensions of governance: voice and accountability (VA), political stability and absence of violence (PV), government effectiveness (GE), regulatory quality (RQ), rule of law (RL), and control of corruption (CC). The other country-level controlled variables are GDP growth rate (GDP), private credit provided by banks (CREDIT), inflation (INF).

We consider the coefficients of α and β since they reflect the influence of competition and the adjustment of competition – investment relationship by national governance quality.

Table 1. Variable description

Variable name	Abbreviation	Measurement	Source
Firm investment	INV		
	R&D	1 if a firm invested in research and development last year, 0 otherwise	WBES
	Asset	1 if a firm bought new asset last year; 0 otherwise	WBES
Competition	COM		
	DUMCOM	1 if a firm reports that there no competitors	WBES
	NUMCOM	the natural logarithm of number of competitors	WBES
Country-level governance quality	CGI	Average score of six dimensions (CC+GE+PV+RL+RQ+VA)/6	WGI
Foreign ownership	FO	1 if a firm has foreign ownership, 0 otherwise	WBES
Firm size	SIZE	is the natural logarithm of number of full-time workers	WBES
Firm sales	SALE	is the natural logarithm of total annual sales	WBES
Cash flow	CFL	get the value of 1 if firm has checking and/or saving accounts; 0 if otherwise	WBES
Economic growth	GDP	Growth rate of GDP	WBDI
Private credit provided by banks	CREDIT	The ratio of private credit provided by banks to GDP	WBDI
Inflation	INF	Growth rate of CPI	WBDI

Source: Authors' compilation

3. 3. METHODOLOGY

We employ the marginal effect and ordinary least square (OLS) regression to test the interaction effect of national governance quality on the relationship between competition and firm investment. Due to the nature of the survey, the dependent variable is binary. However, binary logistic regression makes interpreting the results in economic meaning with the interaction term challenging. Thus, [Karaca-Mandic et al. \(2012\)](#) suggested that the marginal effect test predicts the probabilities of outcomes for each level of the explanatory variable while holding the other variables at their mean. Later studies have employed marginal effects in nonlinear models (e.g., [Aghamolla & Thakor, 2022](#); [Cenni et al., 2015](#); [Fabrizi, Guarini, & Meliciani, 2018](#)). In addition, [Gomila \(2021\)](#) recommended that linear regression can be used to estimate treatment effects on binary outcomes.

4. THE RESULTS AND DISCUSSIONS

4. 1. DATA DESCRIPTION

Table 2. Data distribution

Countries	Obs.	Percentage	Countries	Obs.	Percentage
Albania	24	0.15%	Latvia	36	0.22%
Armenia	67	0.41%	Lesotho	53	0.32%
Austria	172	1.04%	Liberia	64	0.39%
Azerbaijan	16	0.10%	Lithuania	18	0.11%
Bangladesh	497	3.01%	Luxembourg	19	0.12%
Belarus	83	0.50%	Madagascar	66	0.40%
Belgium	190	1.15%	Malaysia	601	3.64%
Benin	55	0.33%	Mali	31	0.19%
Bolivia	47	0.28%	Malta	20	0.12%
Bosnia and Herzegovina	20	0.12%	Mauritius	112	0.68%
Bulgaria	52	0.32%	Moldova	26	0.16%
Cameroon	76	0.46%	Mongolia	61	0.37%
Chad	52	0.32%	Montenegro	5	0.03%
Colombia	407	2.47%	Morocco	54	0.33%
Cote d'Ivoire	46	0.28%	Mozambique	215	1.30%
Croatia	33	0.20%	Myanmar	300	1.82%
Cyprus	8	0.05%	Netherlands	289	1.75%
Czechia	113	0.69%	Nicaragua	81	0.49%
Denmark	449	2.72%	Niger	13	0.08%
Dominican Republic	16	0.10%	North Macedonia	14	0.08%
Ecuador	95	0.58%	Paraguay	53	0.32%
Egypt	858	5.20%	Peru	244	1.48%
El Salvador	194	1.18%	Poland	6	0.04%
Estonia	48	0.29%	Portugal	73	0.44%
Eswatini	37	0.22%	Romania	72	0.44%
Finland	324	1.96%	Russian	63	0.38%
France	606	3.67%	Rwanda	111	0.67%
Gambia	52	0.32%	Serbia	12	0.07%
Georgia	32	0.19%	Sierra Leone	62	0.38%
Germany	894	5.42%	Slovak Republic	34	0.21%
Greece	127	0.77%	Slovenia	58	0.35%
Guatemala	88	0.53%	South Africa	306	1.86%
Guinea	6	0.04%	Spain	241	1.46%
Honduras	104	0.63%	Suriname	28	0.17%
Hungary	72	0.44%	Sweden	241	1.46%
India	5079	30.79%	Togo	11	0.07%
Iraq	208	1.26%	Tunisia	20	0.12%
Ireland	144	0.87%	Turkey	109	0.66%
Italy	81	0.49%	Ukraine	158	0.96%
Jordan	11	0.07%	Uruguay	39	0.24%
Kazakhstan	123	0.75%	Uzbekistan	74	0.45%

Countries	Obs.	Percentage	Countries	Obs.	Percentage
Kenya	358	2.17%	West Bank and Gaza	22	0.13%
Kosovo	12	0.07%	Zambia	140	0.85%
Kyrgyz Republic	19	0.12%	Zimbabwe	243	1.47%
Total				16,493	100.00%

Source: Authors' calculation

Table 2 shows the distribution of the dataset. The sample consists of 16,493 observations from 88 countries. The nominated contribution is from India, with 5,079 observations, accounting for one-third of the dataset. The following places are Egypt and Germany, with 5.2% and 5.42%, respectively. The other countries, including Bangladesh, Columbia, Denmark, France, Kenya, and Malaysia, contribute from 2.17% to 3.67%.

Table 3 shows the statistical descriptions of all variables. The mean values of R&D and tangible investment are 0.2288 and 0.3265, respectively. 22.48 percent of enterprises in the sample have new funds for R&D, and 32.65 percent of firms bought new assets in the previous year. Secondly, 94.85 percent of firms reported that they have competitors in this sector, and 849 firms do not have any competitors. 9.12 percent of firms with foreign ownership. In general, 99.58 percent of firms reported having cash in their savings accounts. On average, macroeconomic variables dramatically vary across countries. The average CGI score ranges from -1.5275 to 1.7812. The number of observations for NUMCOM is 15,643 instead of 16,493 because we dropped the observations that reported no competitors in their sectors.

Table 3. Data description

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
R&D	16,493	0.2488	0.4323	0.0000	1.0000
Asset	16,493	0.3265	0.4689	0.0000	1.0000
DUMCOM	16,493	0.9485	0.2211	0.0000	1.0000
NUMCOM	15,643	4.4750	4.6796	0.0000	12.61154
FO	16,493	0.0912	0.2879	0.0000	1.0000
SIZE	16,493	3.6889	1.3759	1.3863	7.0901
SALE	16,493	17.1627	2.6957	10.8967	23.7190
CFL	16,493	0.8858	0.3181	0.0000	1.0000
GDP	16,493	3.9480	4.5988	-11.3254	10.5078
CREDIT	16,493	58.6568	34.3224	0.0000	163.7249
INF	16,493	4.3828	3.7160	-2.4310	21.9969
CGI	16,493	0.0971	0.8156	-1.5275	1.7812

Source: Authors' calculation

4. 2. THE RESULTS

In this section, we test how country-level governance quality moderates the relationship between competition and firm investment using linear regression with interaction term and margin effects approach after logit regression. Firstly, we run a linear regression to capture the coefficient for the interaction term between COM and CGI. The significant coefficients will show the influence of CGI on the competition-firm investment relationship. Then, we use margins to predict the probabilities for each level of CGI while holding the other variables at their means to see how the likelihood of firm investment decision changes according to each level of CGI increase.

4. 2. 1. THE BASELINE RESULTS

Table 4 shows the result of the OLS regression with investment (INV) proxied by investment in Research and Development (R&D) and investment in fixed assets (Asset). Competition (COM) is proxied by the presence of competitors (DUMCOM) and number of competitors (NUMCOM), respectively. The significant coefficients for the interaction term between COM and CGI indicate that the level of governance quality moderates the relationship between competition and firm investment.

The positive significant coefficients for COM indicate that the presence and higher degree of competition encourage firms to invest more in R&D and fixed assets. The findings are consistent with the previous studies (Akdoğan & MacKay, 2008; Lestage et al., 2013). High competition boosts firms to innovate and differentiate themselves from competitors. Investing in R&D allows firms to develop new products, technologies, or processes that can give them a competitive edge in the market, while investing efficiently in fixed assets, such as machinery and equipment, can enhance productivity and reduce costs.

Table 4. National governance quality, competition, and firm investment

Variables	Presence of competition (DUMCOM)		Level of competition (NUMCOM)	
	R&D (1)	Asset (2)	R&D (3)	Asset (4)
COM	0.0588*** (5.2750)	0.0593*** (4.4327)	0.0015* (1.9727)	0.0018* (2.3030)
CGI*COM	-0.0138 (-0.6275)	0.0746** (2.8809)	-0.0058*** (-6.1456)	-0.0021* (-2.0793)
CGI	0.1878*** (8.2739)	0.1122*** (4.2278)	0.1993*** (21.9275)	0.1995*** (20.3246)
FO	0.1076*** (8.3898)	0.1348*** (10.5131)	0.1006*** (7.6686)	0.1292*** (9.8258)
SIZE	0.0425*** (13.7384)	0.0116*** (3.4638)	0.0449*** (14.0742)	0.0140*** (4.0698)
SALE	0.0072*** (4.3792)	0.0164*** (8.9812)	0.0079*** (4.6400)	0.0161*** (8.5768)
CFL	0.0298*** (3.7298)	-0.0139 (-1.3890)	0.0374*** (4.4728)	-0.0107 (-1.0221)
GDP	-0.0255*** (-30.2949)	-0.0302*** (-32.0124)	-0.0246*** (-27.7554)	-0.0291*** (-29.3579)
CREDIT	-0.0017*** (-9.1022)	-0.0017*** (-8.7522)	-0.0015*** (-8.3418)	-0.0017*** (-8.6066)
INF	0.0018 (1.6492)	0.0008 (0.6181)	0.0010 (0.8808)	-0.0000 (-0.0121)
Intercept	0.0494 (1.8363)	0.1422*** (4.7107)	0.0641* (2.4602)	0.1840*** (6.3183)
Observations	16,493	16,493	15,643	15,643
Adjusted-R squared	0.200	0.198	0.200	0.197

Notes: *, **, *** shows significance at 10%, 5% and 1% respectively. t-statistics are given the parentheses. Please see Table 1 for variable description. Column (1) and (2) report the regression when COM is measured by dummy variable. Column (3) and (4) report the regression when COM is measured by the natural logarithm of number of competitors.

Source: Authors' calculation

The significant coefficients for the interaction term between COM and CGI indicate that national governance quality moderates the relationship between competition and firm investment. Better national governance quality can support enhancing the positive effects of competition on fixed asset investment but diminishing the effects of competition on R&D investment. The positive effect of national governance quality on firm-level connections is found in prior studies (Nguyen et al., 2015; Phan, 2024). The possible explanation is as follows: for the monopolistic market, better governance quality encourages more firm entry (Estrin & Prevezer, 2010). Simultaneously, the competitive threats force the monopoly to expand its production to maintain its market share. As a result, better governance quality strengthens the link between competition and firm investment in tangible assets. Regarding R&D investment, Firms may feel less compelled to innovate aggressively because strong governance ensures fair market conditions and protects their current competitive position, leading them to divert resources toward meeting compliance requirements. This focus on stability might diminish the role of competition as a driver of R&D investment. With less pressure from competition, firms may prioritize meeting regulatory standards over pursuing innovation-driven strategies.

In terms of competition level, better national governance quality weakens the relationship between competition and firm investment. In a highly competitive market, firms face intense pressure to invest and innovate to maintain or improve their market positions. Moreover, information about competitors' strategies and market conditions is more readily available when national governance quality is improved. Less uncertainty may lead firms to make more informed and strategic investment decisions. In addition, good governance often implies robust protection of property rights that incentivize firms to invest in long-term projects (He et al., 2022). The stability allows businesses to engage in long-term strategic planning. Rather than reacting to short-term market fluctuations, firms can focus on developing sustainable business models and making investments that yield returns over an extended period. In addition, strong institutional quality can provide a framework for fair competition (Bologna, 2017) and ensure that the market operates efficiently. Therefore, better governance quality can mitigate the encouragement for firms to engage in excessive short-term investments to gain a competitive edge.

The positive significant coefficients for CGI indicate that the quality of country-level governance has a positive effect on firm investment. Better governance quality promotes foreign, private, and firm investment (Aysan et al., 2007; Malesky et al., 2015). Good governance provides stability and predictability in the business environment. When a country has well-established institutions and practical regulatory frameworks, it reduces uncertainty for firms and encourages long-term investment. Good governance also positively affects financial market development (Li et al., 2018). Countries with good governance quality provide firms with better access to capital, enabling firms to fund expansions, research and development, and other strategic initiatives. Moreover, improving national governance quality contributes to enhanced financial reporting quality for firms (Bonetti et al., 2016), facilitating their access to external loans for investment.

For the other controlled variables, the positive significant coefficients for FO, SIZE, and SALE imply that foreign shareholders, firm size, and turnover encourage firms to invest more in R&D and fixed assets while macroeconomic factors (GDP and CREDIT) do not stimulate firm investment. We also do not observe the significant impact of inflation on firm investment. Lastly, cash flow (CFL) only matters R&D investment.

4. 2. 2. MARGINAL EFFECT OF NATIONAL GOVERNANCE QUALITY

In this subsection, we employ the marginal effects approach to see how the change in CGI score influences the link between competition and firm investment. The average CGI score ranges

from -1.5275 to 1.7812. First, we predict the probability of deciding investment for the values of CGI from -2.000 to 2.0000 in increments of 0.2000 while holding COM at its mean value of 0.9485 (DUMCOM) and 4.4750 (NUMCOM). Second, we predict the probability of deciding investment for the values of CGI from -2.000 to 2.0000 in increments of 0.2 while holding DUMCOM=0 (monopolistic market) and DUMCOM=1 (competitive market).

Table 5. Marginal effect of CGI

CGI level	Presence of competition (DUMCOM)		Level of competition (NUMCOM)	
	Asset (1)	R&D (2)	Asset (3)	R&D (4)
1	0.1084***	0.0133***	0.0570***	0.0242***
2	0.1207***	0.0175***	0.0681***	0.0302***
3	0.1341***	0.0230***	0.0812***	0.0375***
4	0.1488***	0.0303***	0.0965***	0.0466***
5	0.1647***	0.0397***	0.1144***	0.0578***
6	0.1821***	0.0520***	0.1352***	0.0714***
7	0.2008***	0.0677***	0.1590***	0.0879***
8	0.2209***	0.0878***	0.1861***	0.1078***
9	0.2424***	0.1130***	0.2166***	0.1315***
10	0.2653***	0.1444***	0.2506***	0.1596***
11	0.2895***	0.1827***	0.2880***	0.1923***
12	0.3150***	0.2285***	0.3285***	0.2298***
13	0.3417***	0.2818***	0.3718***	0.2723***
14	0.3694***	0.3420***	0.4172***	0.3193***
15	0.3980***	0.4077***	0.4640***	0.3703***
16	0.4273***	0.4769***	0.5115***	0.4244***
17	0.4571***	0.5471***	0.5587***	0.4803***
18	0.4872***	0.6154***	0.6050***	0.5368***
19	0.5174***	0.6794***	0.6494***	0.5923***
20	0.5475***	0.7373***	0.6914***	0.6456***
21	0.5773***	0.7881***	0.7304***	0.6955***

Notes: *, **, *** shows significance at 10%, 5% and 1% respectively. Collum (1) and (3) show the predicted probability for Investment in fixed assets. Collum (2) and (4) show the predicted probability for R&D investment.

Source: Authors' calculation

Table 5 shows that the link between the competition and firm investment in R&D is more sensitive to a change in CGI score compared to tangible asset. Specifically, in the presence of competition, the value of CGI increases the probability of a firm deciding to invest in fixed assets, ranging from 0.1084 to 0.5773. In contrast, the probability of a firm investing in R&D ranges from 0.0133 to 0.7881. For the increase in competition degree, the value of CGI increases the probability of a firm deciding tangible investment from 0.0570 to 0.7304, while the probability of a firm deciding R&D investment ranges from 0.0242 to 0.6955. In general, this suggests that variations in the quality of national governance influence the relationship between competition and investment in R&D, which is more pronounced than in tangible investment. R&D investments are uncertain, with outcomes that are less predictable than tangible investments like machinery or infrastructure. High-quality governance reduces this uncertainty by protecting in-

tellectual property and ensuring fair competition, thus influencing the decision to invest in R&D more significantly. On average, for the presence of competition, each 0.2000 score increase in CGI score is associated with a 0.0387 higher probability of R&D investment, compared with a 0.0234 higher probability of tangible investment. On the other hand, we do not observe much difference in the impact of CGI increases on the competition – firm investment relationship in highly competitive markets. Each 0.2000 score increase in CGI is associated with a 0.0337 higher probability of R&D investment and a 0.0336 higher probability of tangible investment. However, the role of national governance quality in the relationship between competition and investment is different regarding the quality of governance. In countries with positive CGI scores, on average, each 0.2000 score increase in CGI score is associated with a 0.0605 higher probability of R&D investment, compared with 0.0169 in countries with negative CGI scores. For tangible assets, each 0.2000 score increase in CGI score is associated with a 0.0288 higher probability of investment in countries with positive CGI scores, compared with 0.0181 in countries with negative CGI scores. The interaction between market dynamics and firm investment are more sensitive to each increase in CGI score in country with higher baseline CGI score. In conclusion, the relationship between competition and investment is moderated by changes in CGI and the starting level of CGI score.

Table 6. Marginal effect of CGI between monopoly and competitive markets

CGI score	Monopoly market		Competitive market	
	Asset (1)	R&D (2)	Asset (3)	R&D (4)
1	0.0811***	0.0073***	0.1101***	0.0137***
2	0.0906***	0.0097***	0.1225***	0.0181***
3	0.1010***	0.0128***	0.1361***	0.0238***
4	0.1126***	0.0169***	0.1510***	0.0313***
5	0.1252***	0.0222***	0.1671***	0.0410***
6	0.1391***	0.0292***	0.1847***	0.0536***
7	0.1542***	0.0383***	0.2036***	0.0698***
8	0.1707***	0.0502***	0.2239***	0.0904***
9	0.1885***	0.0654***	0.2456***	0.1163***
10	0.2077***	0.0848***	0.2687***	0.1485***
11	0.2283***	0.1093***	0.2931***	0.1876***
12	0.2503***	0.1399***	0.3188***	0.2343***
13	0.2736***	0.1772***	0.3456***	0.2884***
14	0.2983***	0.2220***	0.3734***	0.3493***
15	0.3242***	0.2743***	0.4021***	0.4156***
16	0.3513***	0.3336***	0.4315***	0.4851***
17	0.3793***	0.3988***	0.4614***	0.5551***
18	0.4082***	0.4677***	0.4916***	0.6230***
19	0.4377***	0.5378***	0.5218***	0.6865***
20	0.4676***	0.6065***	0.5519***	0.7436***
21	0.4978***	0.6713***	0.5815***	0.7935***

Notes: *, **, *** shows significance at 10%, 5% and 1% respectively. Collum (1) and (3) show the predicted probability for Investment in monopolist market. Collum (2) and (4) show the predicted probability for investment in competitive market.

Source: Authors' calculation

Table 6 reports the marginal effect of the increase in each 0.2000 CGI score on the relationship between competition and firm investment in monopolistic and competitive markets. First, the sensitivity of the relationship between competition and R&D investment to changes in CGI score is higher than that of the relationship between competition and tangible investment. In a monopolistic market, the value of CGI increases the probability of a firm deciding to invest in fixed assets from a probability of 0.0811 to 0.4978. In contrast, the probability of a firm deciding on R&D investment ranges from 0.0073 to 0.6713. In a competitive market, the value of CGI increases the probability of a firm deciding on tangible investment, ranging from 0.1101 to 0.5815. In contrast, the probability of a firm deciding on R&D investment ranges from 0.0137 to 0.7935. The results align with those shown in Columns (1) and (2) in Table 5.

Secondly, the role of national governance quality in the relationship between competition and investment is different regarding the quality of governance and market structure. In a monopoly market, each 0.2000 score increase in CGI score is associated with a 0.0208/0.0236 higher probability of investment in tangible asset/R&D, compared with 0.0332/0.0390 in a competitive market. In a competitive market, on average, each 0.2000 score increase in CGI score is associated with a 0.0562/0.0606 higher probability of investment in fixed assets/R&D in countries with positive CGI scores, compared with 0.0102/0.0174 in countries with negative CGI scores.

In conclusion, the relationship between competition and investment is moderated by CGI changes, the starting level of CGI score, and market structures.

5. CONCLUSION

This study investigates how market competition affects firm investment and the moderating effect of national governance quality (CGI) on the relationship between competition and firm investment in research and development (R&D) and tangible assets. The sample consists of 16,493 observations from WBES in 88 countries over the 2016 – 2022 period. The regression results show that both the competition and the level of market competition encourage firms to invest more in R&D and tangible assets. Secondly, the quality of national governance also adjusts the relationship between competition and firm investment. Notably, the better quality of national governance strengthens the relationship between competition and firm investment. However, it weakens the relationship between a higher degree of competition and firm investment in tangible assets. Thirdly, the marginal effects examination suggests that variations in the quality of national governance influence the relationship between competition and investment in R&D investment, which is more pronounced than tangible investment in the presence of at least one competitor. Fourthly, the adjustment of national governance quality varies with the relationship between competition and investment, the starting level of CGI score, and the market structures. In countries with positive CGI scores, the relationship between competition and firm investment is more sensitive with each increase in CGI score than in countries with negative CGI scores. Alternatively, for countries with good governance, any improvement in governance quality would affect the competition – firm investment relation more than in countries with poor governance.

Based on empirical results, some implications may be proposed to firm managers and policymakers. Firstly, firms should invest more to maintain their position and market. Even in a competitive market, they must improve the quality of products and services to differentiate themselves and explore production to capture market share. Moreover, the higher competition requires firms to invest more efficiently to use optimal resources and reduce costs to improve profit margins. Country-level governance quality also plays a vital role in shaping investment decisions. In a country with better governance quality, firms tend to invest more efficiently since strong legal frameworks would protect intellectual property, reducing the risk of unauthorized

use or theft of innovations. This protection may encourage firms to make significant investments even in a less competitive markets. However, the effect of national governance depends on the interaction among market dynamics, regulatory policies, and firm-level strategies. For example, the profit margin become more sensitive in a highly competitive market as firms fight to capture and retain market share. Therefore, firms may be less willing to invest under the pressure of a decrease in profit margin. Similarly, in a less competitive market, firms lack of motivation of investment since they may feel secure in their market position and use strong governance structures to channel resources toward innovation, infrastructure, or market expansion.

For policymakers, enhancing governance quality is crucial for attracting more firm investment. On the one hand, the government can take several steps to create a secure and transparent environment. A strong framework for protecting property rights is essential, as it reassures firms that their assets will be secured from unauthorized use. A low level of corruption builds investor trust and minimizes costs and risks associated with operating in the country. Secondly, policymakers should consider implementing reforms that improve the legal and judicial systems, ensuring they are accessible and efficient. A robust legal system includes an efficient dispute resolution process, giving businesses confidence that conflicts will be addressed. Alongside legal reforms, a comprehensive regulatory framework is necessary to help businesses operate sustainably. A stable and reasonable regulation system allows firms to plan long-term investments without fear of sudden policy changes. On the other hand, the effect of national governance depends on how governance interacts with market dynamics, regulatory policies, and firm-level strategies. Therefore, the government should focus on improving the environment and policies in specific industries to boost firm investment, especially in industries with moderate competition. The reason is that in industries with high competition or monopoly, firms have little incentive to focus on research and development and fixed assets, even if the environment and policies improve. Therefore, a transparent environment will motivate businesses in a fairly competitive market to invest more to expand market share while the profit margin is still reasonable.

The limitations of this study come from the nature of the data. The data were collected through surveys of firms in different countries. The investment data only assess whether firms invest but do not assess investment level. Therefore, this study can not evaluate the magnitude of competition on firm investment. Furthermore, this study can not capture the trends in the relationship between governance quality, competition, and investment.

Acknowledgements

We thank the Enterprise Analysis Unit of the Development Economics Global Indicators Department of the World Bank Group for making the data available.

Disclosure statement

The authors report there are no competing interests to declare

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