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Article

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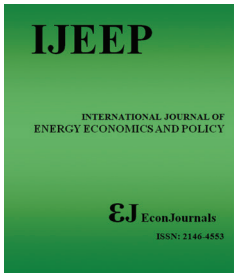

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Competition Determinants of Eurasian Economic Union Oil and Gas Companies

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ABSTRACT

The present study examines the competition determinants of Eurasian Union oil and gas companies for the period of 2012–2020. The study covers a total of 24,813 firm-year observations. This study applied the GMM two-step estimation to capture the endogeneity problem. Our results reveal that leverage, profitability, and efficiency are the main competition determinants. In the Eurasian Union, large oil and gas companies are less competitive. It may be caused by higher corporate bureaucracy and high transaction costs. Oil and gas companies with an efficient level of sales are more competitive in the market. Also, the increase in leverage provides a tax shelter. The price cost margin, the Boone Indicator, and the firm's income total income ratio are confirmed as efficient competition indicators.

Keywords: Competition Determinants, Lerner Index, Energy Markets, Eurasian Union
JEL Classifications: C32; O41; Q43

1. INTRODUCTION

Competitiveness is defined as the ability of national businesses to strongly compete with the same category of industries in different countries (Akhuand and Abbas, 2021). It reflects how countries and firms exploit their resources and competencies to achieve long-term growth and profitability (Bhawsar and Chattopadhyay, 2015). The classical and neo-classical theories of economics encourage the achievement of higher competitive advantages to gain prosperity (Abbas and Waheed, 2017). Therefore, competitiveness is a crucial concept discussed by politicians, academicians, and managers. Competitiveness can theoretically be viewed from both micro and macro perspectives (Waheeduzzaman, 2011). However, the most crucial determinant of the competitiveness of an economy is the competitive advantage of corporations operating within it (Sala-i-Martin et al., 2004). Since the competitive advantage of a country comes from the value added by firms, firms are the root of competitiveness (Bhawsar and Chattopadhyay, 2015). Firm-level competitiveness is the capability of corporations to grow and be profitable in a competitive environment (Dvouletý and Blažková, 2020). It is determined by a vast variety of internal and external influencers (Dvouletý and Blažková, 2020). However, regardless of the large number of competitiveness empirical studies (Bloodgood, 2019; Cetindamar and Kilitcioglu, 2013; Fischer and Schornberg, 2007; Kruja, 2020; Rodríguez-Pose and Hardy, 2017) and multiple literature surveys (Banwet et al., 2002; Bhawsar and Chattopadhyay, 2015), competitiveness and its determinants still lack consensus (Bhawsar and Chattopadhyay, 2015), and remain a topic of interest due to its effects on the economic growth of countries.

Nowadays, the petroleum industry is at the heart of all industries due to the major role that gas and oil play in the world's energy

mixture. Fossil fuels are considered the soul of industrialization and have been considered the top energy sources in the world since the 1950s (UKOG, 2022). Petroleum products support activities in modern societies through heating, electricity, and fuel for the transportation of goods and people around the globe (Gómez et al., 2020). Thus, it is a strategic sector in economies that have an abundance of these resources, such as the KART countries (Kazakhstan, Azerbaijan, Russia, and Turkmenistan). Although the degree of dependence on oil and gas production varies from one country to another, the contribution of oil and gas industries to the KART countries' GDP is considerable (IEA, 2022). The industry requires heavy capital investment, starting from exploration and refining to distributing the products. In addition, the industry is driven by technology and demands consistent enhancements and upgrades to attain competitive advantage. Moreover, the emergence of the organizations such as the Organization of the Petroleum Exporting Countries (OPEC), of which KART countries are not members, has increased the level of competitiveness in the oil and gas markets. Therefore, comprehensive research on the determinants of competition in oil and gas companies in the KART countries is required to offer insights to managers and policymakers to improve the competitive advantage of the aforementioned firms.

2. LITERATURE REVIEW

The concept of competitiveness and competitive advantage of firms might seem simple and easy to grasp, but it still lacks a unified definition. Porter (1990) mentions that the complexity of competitiveness is due to the variety of views and definitions of the term, making it hard to give a comprehensive definition. Nezeys (1993) argues that the concept of competitiveness did not reach the accuracy level expected. Porter (1990) emphasizes that the competitiveness of a country is a consequence of its industries' competitiveness, while the competitiveness of firms is influenced by the business interactions with their environment to create goods and services that increase value. Olmos (2012) defined competitiveness as the ability of an organization to achieve a competitive advantage, which improves the firm's position in the socioeconomic environment. The Organization for Economic Cooperation and Development (OECD) defines competitiveness as the ability of an entity to generate – while being exposed to national and international competition – high-income levels and efficient employment of resources. At the firm level, Martin (2003) defined competitiveness as the ability of the firm to grow, compete, and be profitable. Firms should profitably and consistently produce products that are up to the standards of an open market to gain higher market share.

Competitiveness determinants have been discussed in the theoretical literature with different interpretations in economic theories. The classical theory views investment in capital and trade as the main determinants of competitiveness, as the capital investment would enhance specialization and increase productivity. While the Keynesian economic theory views capital intensity, investment, and government spending as the main influencers. According to the new economic growth theory, R&D expenditures and innovativeness are the primary drivers (Sipa et al., 2015). The theoretical literature is dominated by industrial organization theory and the recourse-based view. The industrial organization theory emphasizes the drivers of competitive advantage of companies in regard to location and industry. Jambor and Babu (2016) highlighted that the industrial organization theory focuses on entry barriers, economies of scale, product differentiation, and market concentration as the most prominent drivers of competition. According to the traditional view of industrial organization theory, external influence is the primary driver of competition, with the company having no effect on the industry's performance or conditions (Bain, 1951). Nevertheless, the updated theory of industrial organization acknowledged the effects of companies on the industry. The competitive advantage of a firm is affected by both the market structure and the decisions made by the company itself (Porter, 2004).

The second theory on the determinants of competitiveness is the resource-based view, which states that performance, internal environment, and competitive advantage of a company are a set of capabilities and recourses (Wernerfelt, 1984). The resource-based view emphasizes the internal resources of a firm and the likelihood of acquiring these resources in the market. Considering, the costs and time that companies invest in obtaining their internal resources alongside the immobile production factors (Barney, 1986). Hence, each firm has a degree of heterogeneity in their obtained tangible and intangible assets throughout the existence of the firm, which cannot be replicated unless undergoing the same process of lengthy learning and investment decisions that the firm went through (Dvouletý and Blažková, 2020). The main resources of firms include financial resources, human resources, intangible assets, organizational resources, and tangible resources. These assets and resources must be unique, scarce, and non-replicable to contribute to the competitiveness of the firm and its performance (Barney, 1991). Based on the resource-based view, researchers developed a new approach called the capability-based perspective approach, focusing on the capabilities of the company, including organizational (Collis, 1994), distinctive (Snow and Hrebiniak, 1980), key (Prahalad and Hamel, 1990), and dynamic capabilities (Eisenhardt and Martin, 2000). Furthermore, it emphasizes knowledge as a critical source of competitiveness (Grant, 1996), as well as buyers and sellers creating new business opportunities and increasing competitive advantage in what is known as a co-creation perspective (Prahalad and Ramaswamy, 2004).

The empirical literature combines the views and perspectives mentioned, emphasizing that there is no single correct view (Pisano, 2017). The dynamics of firms' competitive advantage is a complicated issue as it is thought to be multi-layered and multiple variables should be merged to capture firm performance and competitiveness. Previous empirical literature proxies' competitiveness with multiple market performance, productivity, and profitability indicators (Bhawsar and Chattopadhyay, 2015). Factors contributing to the competitiveness of firms are split into two broad categories: those resulting from the firm's regional environment, with limited influence of the company on these factors, and decisions taken by the company itself (Sipa et al., 2015).

The empirical literature notes the importance of company age as a driver of competitiveness, as it demonstrates the accumulated amount of experience that the firm has acquired (Kipesha, 2013). Because of this accumulated experience, companies are able to specialize, cut their costs, improve the quality of the product, and improve their manufacturing processes (Karadag, 2017). In addition, companies with a higher age might obtain a better reputation, which might increase their sales margins and might increase their profitability (Dvouletý and Blažková, 2020; Loderer and Waelchli, 2010). However, mature firms might result in slow growth, outdated assets, and inflexibility (Hirsch et al., 2014). In addition, matured companies might lag behind with the advancements in the market and the surrounding environment (Sørensen and Stuart, 2000) which is a problem not faced by newly established firms.

Another crucial factor mentioned in the literature is the size of the company. It is well documented in the literature that firm size can significantly influence the financial aspects of companies, which will affect their competitive advantage (Dvouletý and Blažková, 2020; Liargovas and Skandalis, 2010). Size can have both destructive and beneficial effects on the firm's competitive advantage (Dvouletý and Blažková, 2020). Large firms can gain from specialization, economies of scale, economies of scope, better access to capital markets, diversification, better agreements with trading partners, and easier access to human resources (Damoah, 2013; Blažková and Dvouletý, 2019; Serrasqueiro and Nunes, 2008; Faizulayev et al., 2021). However, larger firms might face higher corporate bureaucracy, public scrutiny, and operational and transaction costs (Greve, 2011). Smaller firms have higher flexibility, adaptability, creativity, and innovativeness (Nieto and Santamaría, 2010).

The location of the firm and its surroundings is one of the main drivers of competitiveness as mentioned in the previous literature (Dvouletý and Blažková, 2020; McCann, 2017). Researchers mention how the local system and surroundings can influence the competitive advantage of companies due to market structure, substitution availability, raw material costs, and transportation costs. Firms gain a competitive advantage from their geographical location, which allows firms to use unique local capabilities and resources (Maskell and Malmberg, 1999). The higher population density in local areas is associated with increased innovation and productivity (Combes et al., 2012). Rodríguez-Pose and Hardy (2017) investigated regional determinants influencing competition in firms and found that population density, ease of access, and the natural environment highly impact competitiveness. Other researchers emphasized the importance of choosing a location on a company's competitiveness and productivity (Melo et al., 2017).

Although firm decisions and characteristics are the main drivers for achieving profitability and competitive advantage in the firm (Bhawsar and Chattopadhyay, 2015; Dvouletý and Blažková, 2020), the industry effects that cannot be controlled by the firm should not be ignored (Giuliano et al., 2017). Countries and their economies have substantial differences in industries, which is clear in human capital requirements, technologies, different management styles, industry concentration, access to input and output markets, and capital intensity (Hortoványi and Szabó, 2008; Waring, 1996).

3. DATA AND METHODOLOGY

The Orbis Database was used to obtain data on Eurasian Union oil and gas companies from 2012 to 2020. We carefully gathered all active companies with recent available financial data. A total of 24,813 firm-year observations were collected. It covers a wide range of oil and gas companies that have been studied in research to date. We have gathered the following firm-level variables: the

Table 1: Descriptive statistics

	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis
CR	3.29	1.129	99.831	0	8.728	6.549	53.44
EMP	329.998	16	118000	1	3159.507	30.606	1081.452
FA	212419.41	82.711	86044000	–15.762	2444842.8	20.837	505.257
CAPITAL	11920.213	0.677	6412501.5	–1.584	137267.86	25.525	831.912
TAX	5577.304	0	3283172	–1024550.7	81589.793	21.977	642.394
ROANI	4.233	0.808	100	–100	22.573	0.103	8.287
DR	0.52	0	2835.6	–4.528	22.606	120.395	15057.004
PCM	–18.491	0.181	1811.93	–173698.13	1776.554	–97.711	9552.86
FITI	0	0	0.191	–0.064	0.002	53.267	4147.413
BOON	0.954	0.98	4.836	–5.271	0.403	–0.467	38.586

Table 2: Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) LCR	1.000							
(2) LEMP	0.093* (0.000)	1.000						
(3) LFA	–0.076* (0.000)	0.608* (0.000)	1.000					
(4) LCAPITAL	0.029* (0.002)	0.433* (0.000)	0.589* (0.000)	1.000				
(5) LTAX	0.031* (0.006)	0.745* (0.000)	0.824* (0.000)	0.581* (0.000)	1.000			
(6) LROA	0.206* (0.000)	0.073* (0.000)	0.053* (0.000)	–0.009 (0.424)	0.352* (0.000)	1.000		
(7) LDR	0.014 (0.353)	–0.150* (0.000)	–0.014 (0.346)	–0.058* (0.000)	–0.011 (0.584)	–0.025 (0.194)	1.000	
(8) lPCM	0.093* (0.000)	–0.043* (0.000)	0.141* (0.000)	0.138* (0.000)	0.308* (0.000)	0.339* (0.000)	0.109* (0.000)	1.000

***p<0.01, **p<0.05, *p<0.1

number of employees, current ratio, fixed assets, capital, taxes, return on assets, debt ratio. The competition variable (dependent variable) is calculated by the authors: the Lerner Index. It is our preferred firm competition indicator (Berger et al., 2017), and for robustness purposes, we also use the Boon indicator and the firm's income total income ratio as competition indicators.

4. EMPIRICAL RESULTS AND INTERPRETATION

Table 1 reports the descriptive statistics of the variables used in this study. The mean and median for all independent variables vary, which violates the normality condition. The skewness and kurtosis results indicate this variation. We applied the Jarque-Bera test for normality, which confirmed that our variables are not normally distributed.

Table 2 summarizes the correlation matrix between variables. The highest correlation is between LTAX and LFA (82.4%). The second highest correlation is between LFA and LEMP (60.8%). The correlation level of variables is at an acceptable level that permits us to use LCR, LTAX, LEMP, LFA, LCAPITAL, LTAX, LROA, and LDR in our model. To test for multicollinearity, we applied the variance inflation factors (VIFs) to the independent variables (Table 3). It reveals that VIF values for independent variables are less than 10, and the ratio of 1/VIF values is less than 1. The independent variables are not highly correlated with each other, meaning that no multicollinearity problem is detected.

Table 3: Variance inflation factor

	VIF	1/VIF
LTAX	8.155	0.123
LFA	6.41	0.156
LEMP	2.065	0.484
LROANI	2.035	0.491
LCAPITAL	1.859	0.538
LCR	1.107	0.903
LDR	1.033	0.968
Mean VIF	3.238	

We tested the existence of the endogeneity problem by applying the Durbin-Wu-Hausman test. The results show that the Durbin-Wu-Hausman chi-square is 33.66 and the Chi-square P = 0.00002. It indicates that independent variables are not exogenous, and selected independent variables are correlated with the residual. This suggests that we apply the GMM method to test our model. Taking into account the nature of the firm related variables, that the current state of the company is dependent on the previous value, we applied the dynamic model.

The model 1 in Table 4 illustrates that the Lagged of LPCM is significant at 1 percent level with 0.37 value. It indicates that the speed of adjustment is 63% (1-0.37). This result indicate that the company competition level of the previous year impacts the company competition level of the current year. The coefficient of the LEMP variable is negative and significant at 5% level. It indicates that large oil and gas companies are less competitive in the Eurasian Union. It may be caused because of higher corporate bureaucracy, subjection to public scrutiny, and higher operational and transaction costs (Greve, 2011).

The coefficient of the LTAX variable is positive and significant at a 1% level. The higher the amount of tax paid, the higher the competiveness level of the companies in the industry. Companies are entitled to high tax payments in the event of earning high revenues. Oil and gas companies with an efficient level of sales are more competitive in the market. The positive and significant coefficient of the LROA confirms that efficient management in terms of revenue increase and cost minimization may increase the profit of the oil and gas companies, resulting in a high level of competition. The LDR variable also has a positive sign and is significant at a 10% level. An increase in leverage provides companies with a greater opportunity to expand the business and realize new projects. An increase in leverage also provides a tax shelter when the optimum level of leverage is used.

The diagnostic tests reveal that the model is well-structured and that its coefficients are robust. The Arellano-Bond test (AR2 = 0.652) confirms that the autocorrelation is not persistent in the model. The Hansen test is 0.14, which is between 0.1 and

Table 4: Dynamic panel-data estimation, two-step system GMM

	(1)	(2)	(3)
	PCM	BOON	FITI
L.lPCM	0.3701*** (0.1119)		
L.lBOON		0.276** (0.1273)	
L.lFITI			0.4898*** (0.1238)
LCR	–0.004 (0.0504)	0.0049 (0.053)	0.1222* (0.0683)
LEMP	–0.0857** (0.0425)	–0.0461 (0.0425)	–0.0566 (0.0466)
LFA	–0.0503 (0.0344)	–0.0141 (0.0473)	–0.0624 (0.0407)
LCAPITAL	0.0159 (0.0383)	–0.0165 (0.0377)	–0.0204 (0.0339)
LTAX	0.1255*** (0.0343)	0.1207*** (0.0421)	0.1725*** (0.035)
LROANI	0.1442*** (0.0452)	0.1009** (0.0438)	–0.0553 (0.0371)
LDR	0.0434*** (0.0264)	0.0644*** (0.0216)	0.0705** (0.0281)
CONSTANT	–0.9301** (0.3727)	–1.3594*** (0.3724)	–0.6184* (0.3613)
Time Dummy	Yes	Yes	Yes
Observations	1019	1019	1019
AR2	0.652	0.527	0.374
Hansen test	0.141	0.138	0.167

Robust standard errors are in parentheses; ***P<0.01, **P<0.05, *P<0.1

Table 5: Results of the estimation of model 1 for quantiles of PCM

Variables	(1)	(2)	(3)
	q25	q50	q75
LCR	0.06949 (0.043)	0.03887 (0.033)	0.06806* (0.040)
LEMP	–0.14171*** (0.019)	–0.15760*** (0.020)	–0.15984*** (0.033)
LFA	0.02914 (0.029)	0.05623*** (0.019)	0.06102* (0.031)
LCAPITAL	0.00266 (0.011)	0.01001 (0.008)	0.01547* (0.008)
LTAX	0.09456** (0.037)	0.06616** (0.026)	0.05064 (0.034)
LROANI	0.22324*** (0.047)	0.15152*** (0.028)	0.09550*** (0.036)
LDR	0.08530*** (0.020)	0.08620*** (0.020)	0.03970*** (0.015)
CONSTANT	–2.29150*** (0.211)	–1.62370*** (0.139)	–1.11226*** (0.200)
Observations	1.250	1.250	1.250

Standard errors in parentheses; ***P<0.01, **P<0.05, *P<0.1

0.25. It means that the instruments are correctly specified, and the model is valid.

Table 5 shows the results in the 25%, 50%, and 75% quantiles. Results indicate that firms in low and high quantiles possess on average the same competition determinants.

5. CONCLUSION

This research studies the competition determinants of Eurasian Union oil and gas companies for the period of 2012–2020. The dataset includes the largest coverage of oil and gas companies studied in research to date. The study covers a total of 24,813 firm-year observations. We used the dynamic model by applying the GMM two-step method to capture the endogeneity problem.

Our results reveal that leverage, profitability, and efficiency are the main determinants of competition for oil and gas companies in the Eurasian Union. It indicates that large oil and gas companies are less competitive in the Eurasian Union. It may be caused by higher corporate bureaucracy, subjection to public scrutiny, and higher operational and transaction costs (Greve, 2011). Oil and gas companies with an efficient level of sales are more competitive in the market. An increase in leverage provides companies with a greater opportunity to expand the business and realize new projects. An increase in leverage also provides a tax shelter when the optimum level of leverage is used. The results confirm that along with the PCM competition indicator, the Boone Indicator and the firm's income total income ratio are also efficient competition indicators.

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