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Article

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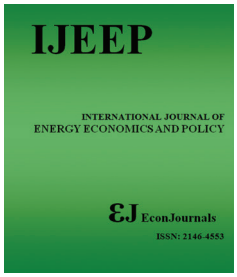
Provided in Cooperation with:
International Journal of Energy Economics and Policy (IJEEP)

Reference: Aizada, Zhakupova/Saule, Arystanbayeva et. al. (2023). Fueling financial sustainability in emerging markets : an investigation of ESG public policy and other determinants in the oil and gas industry through effective financial planning. In: International Journal of Energy Economics and Policy 13 (4), S. 365 - 374. https://www.econjournals.com/index.php/ijeep/article/download/14426/7405/33841. doi:10.32479/ijeep.14426.



International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2023, 13(4), 365-374.

Fueling Financial Sustainability in Emerging Markets: An Investigation of ESG Public Policy and Other Determinants in the Oil and Gas Industry through Effective Financial Planning

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Received: 25 March 2023 **Accepted:** 30 June 2023 **DOI:** https://doi.org/10.32479/ijeep.14426

ABSTRACT

This article's major goal is to pinpoint the variables that affect the capital structure and financial viability of the oil and gas sector in the regions that make up the Eurasian Economic Union. Data on oil and gas businesses in the Eurasian Union from 2012 to 2020 were gathered using the Orbis Database. All currently operating businesses with recent financial data were painstakingly obtained. 2.757 businesses with pertinent financial data in total were gathered. It includes a broad variety of oil and gas firms that have so far been the subject of inquiry. The results show that firm-specific factors are very important in determining the financial viability of oil and gas enterprises in the EUEA regions. For instance, both size and tax policy matter in driving the financial sustainability and leverage of companies. Furthermore, in contrast to CAPSTR, the oil price has had an enormous positive impact on the financial sustainability of oil and gas companies in EAEU regions. The results illustrate that ESG factors substantially affect financial sustainability in a negative way. The results show that oil and gas businesses use cutting-edge, environmentally friendly technologies in accordance with ESG Public Policy. Managers should continue to improve their strategies based on the growth of their businesses by utilizing new cutting-edge environmentally friendly technologies that will be suitable for stringent ESG Public Policy regulations. Overall results indicate that managers and practitioners should work on new strategies for expansion and penetration into the new markets in the EUEA regions.

Keywords: Financial Sustainability, EUEA, ESG Public Policy, Oil and Gas Industry, Energy Source
JEL Classifications: O2, P18, Q01, F3, B23

1. INTRODUCTION

An important part in our lives is played by oil and gas as energy sources. Without these kinds of energy sources, it is quite challenging to envisage life. Because fuels such as oil and gas are essential for heating, lighting, fertilizers, production, and transportation. Society's standard of living is influenced by and elevated by energy. Economic, political, and social aspects, as well as their ramifications, must all be taken into account when calculating the true cost of energy. This goes beyond simple financial considerations. For cooking and heating, 3 billion people still lack access to electricity and use unclean fuels like charcoal and animal dung in Emerging Markets, such as Kazakhstan, Russia, Belarus, Armenia, and Kyrgyz Republic. The use of energy boosts economic development and maintains welfare in nations. Another key thing to remember, energy is a crucial factor that significantly contributes to countries, where they achieve sustainable development in the long term. Likewise, there has been always an increasing demand for energy sources, and nowadays it continues to increase even more. Eren et al. (2019) stated that countries with high population growth, economic and financial development, enhanced lifestyle, production improvements, and economic competitiveness leads to high energy demand. As result, all the countries are struggling

to improve their economic and financial well-being, economic growth, and sustainable development by employing different strategies, where they try to provide energy sources to all in the country. However, without energy sources, it is not possible to develop the country economically and financially because all industries are dependent on energy. Therefore, as it has been stated in World-Bank statistics, the consumption of energy has tremendously increased by more than 40% since 1974 (World Bank, 2017a). In addition, statistics also show that the total consumption of energy resources is a fossil fuel. In the light of aforementioned, once businesses put aim to generate profit, that does not necessarily mean they should do everything to reach their objective by bringing damage to the environment and society. All business organizations, especially oil and gas companies, continuously receive pressure from different stakeholders to satisfy the expectations and needs of society in terms of being environmentally and socially friendly, while generating profit (De Villiers et al., 2014). Therefore, all oil and gas companies should make investment decisions that will definitely take into account the environmental, social, and governance factors (ESG) of a project. So the main aim of all business organizations should be keeping financial sustainability through ESG factors. Environmental, social, and governance (ESG) concerns have historically been prioritized at different points along the priority scale for the oil and gas sector. The majority of oil and gas operators, however, now place a high importance on ESG because of recent developments in environmentally friendly technology and the increased focus on ESG in public policy. This trend is likely to persist as the market grows and matures. Companies in the oil and gas sector who fail to consider ESG run the risk of losing customers and being sued.

The oil and gas business is at the center of all industries because it is so important to the global energy mix. According to data provided by UKOG (2022), fossil fuels have been regarded as the world's primary energy source since the 1950s and have evolved into the foundation of industry. Through fuel for global transportation of people and goods, heating, and electricity, petroleum products support the functioning of modern society (Gómez et al., 2020). As a result, it is a crucial sector in countries like Russia, Armenia, Belarus, Kazakhstan-Eurasian Economic Union Regions, which have an abundance of natural resources. Among organizations for regional integration, the Eurasian Economic Union (EAEU) is a relative newcomer. In 2011, it began operating as a customs union, and in 2015, an agreement to become an economic union was signed. In 2012, EAEU decides to establish Single Economic Space (SES) to allow the free movement of capital, goods, and services within the EAEU countries. However, the main objective of SES has not been limited to the aforementioned, and it also aimed to create one common market in the energy sector. The main objective of EAEU countries was to make the oil and gas industry independently accessible to all populations and businesses within these countries. In order, to increase the access of society to energy sources in the Eurasians Economic Union regions, the oil and gas industry should be financially stable and sustainable. This motivated us to go with the research on drivers of the capital structure and financial sustainability and of the energy sector in EAEU countries.

There are three ways that this empirical study adds to the body of literature. First of all, it is the first study to scientifically explore the factors that influence financial sustainability in the oil and gas sector. This empirical research studied the adjusted revenue over expenses and capital structure proxied as financial sustainability in the oil and gas industry of EAEU areas for the period of 2012-2020 years using a sample of 2757 companies, which is another differentiation from the existing literature on oil and gas corporations. Finally, research on the connection between ESG characteristics and financial sustainability was done for the 1st time in the oil and gas sector.

The conclusion, literature review, data and methodology, and empirical results sections make up the remaining portion of the article. The literature review covers the dependent and independent variables in great detail. The literature review section also looked at theoretical elements of capital structure and financial sustainability. Also, the Data and Methodology section included a detailed discussion of the methodology and variable types. Similar to how descriptive statistics, a correlation matrix, and regression analysis are provided by empirical results. Lastly, the Conclusion section wraps everything up and concludes with a useful policy conclusion.

2. LITERATURE REVIEW

In the energy sector, the relationship between financial sustainability and ESG aspects has not been studied. Numerous studies have been done on the factors that affect profitability, leverage, and capital structure in the oil and gas sector. To give an illustration of studies, there are some studies on financial sustainability determinants that will be reviewed other than oil and gas: Bisogno et al. (2017), Tehulu (2013), Rahman and Mazlan (2014), Henning and Jordaan (2016), Zhao et al. (2022), Ebenezer et al. (2020), Santis (2020), Orazalin et al. (2019), Navarro-Galera et al. (2021), Yitayaw, (2021), Chukwuebuka et al. (2021), and etc. Capital structure is a crucial study field of corporate finance that needs further empirical investigation, especially in the oil and gas sector. Furthermore, capital structure is directly associated with rational financing decision on certain projects that gives to the company the ability to flourish in a competitive environment, where shareholder value will be maximized (Foo et al., 2015). On the other hand, it will be very difficult for the companies to achieve financial sustainability if financing decisions are not coordinated rationally because it will potentially cause financial distress, and will lead to bankruptcy (Foo et al., 2015). With this in mind, it motivated us to empirically evaluate capital structure drivers alongside financial sustainability. No research has been done on the factors affecting energy sector's capital structure in EAEU regions. Additionally, it will close a vacuum in the body of knowledge about the regions of the Eurasian Economic Union. Another key thing to remember is that EAEU is a newcomer among regional integration organizations that have strong and significant energy source potentials. These regions are one of the most influential energy sectors in the world. Furthermore, there are some studies on capital structure reviewed: Foo et al. (2015), Ahmed (2021), Zaheer et al. (2021), Talberg et al. (2008), Ramli et al. (2019), and Saif-Alyousfi et al. (2020).

2.1. Dependent Variables

2.1.1. Financial sustainability (FSS)

Adjusted revenues over adjusted expenses (Yitayaw, 2021). FSS refers that whether the company generates sufficient funds from a certain business that will help to sustain productive processes for a long period of time. However, depending on the source of funding and the design of the objectives, the notion of financial sustainability varies between for-profit and nonprofit organizations (Bowman, 2009). According to Yitayaw (2021) and Ayayi and Sene (2010) financial sustainability refers to financial institutions that not only cover the cost of operations, and generate a sufficient level of profit to finance their sustainable growth. On the other hand, there are some studies that used profitability, operational self-sufficiency, financial self-sufficiency, leverage, and solvency indicators as a proxy for financial sustainability (Groves et al., 1981; Greenberg and Hiller, 1995; Ebenezer et al., 2020; Santis, 2020; Navarro-Galera et al., 2021; Zhang et al., 2023). Moreover, Zafra-Gómez et al. (2009a) combined the research works of Groves et al. (1981) Greenberg and Hiller (1995) to come up with better empirical results.

2.1.2. Leverage (CAPSTR)

It is another proxy for financial sustainability, and it is the ratio of total debt to total assets proxied as capital structure in certain studies. However, it will be used as a proxy for financial sustainability in this study (Zhao et al., 2022). The combination of debt and equity that a company uses to fund its overall operations and expansion is called the capital structure. As a result, their inability to rationally decide how to fund new endeavors and the growth of the businesses would put them in financial problems and possibly even cause bankruptcy (Foo et al., 2015).

2.2. Independent Firm-specific Variables

Lags of *FSS* and *CAPSTR* were used as independent variables to test the persistency in financial sustainability that is achieved through profitability and financial leverage of companies. *Management Efficiency (CI):* Operational cost over operational income is proxied for management efficiency. It is anticipated that profitability will increase as management effectiveness increases; in other words, cost to income has a negative impact on the ability of businesses to sustain their financial position (Kanapiyanova et al., 2022). Additionally, with effective management, costs will be decreased, increasing earnings, which will result in a stable financial situation. In contrast to financial sustainability, management effectiveness is anticipated to have a favorable impact on a firm's level of leverage (Eldomiaty and Azim, 2008). As debt levels rise, interest payments on debt will also rise, which will eventually result in a higher level of leverage for the company. Liquidity (LIQUID): The current ratio, which contrasts current assets to current liabilities, assesses liquidity. Liquidity is the capacity of the business to generate enough cash to meet short-term obligations (Faizulayev et al., 2018). It is anticipated to have a favorable effect on the financial viability of businesses and a detrimental effect on capital structure. For instance, if oil and gas companies have sufficient liquidity, their financial position will be strengthened and they will be better able to withstand any unanticipated shocks, which will help ensure their financial sustainability (Ismail et al., 2019). However, because the enterprises won't need to employ leverage to finance their initiatives, it is anticipated to have a negative influence on leverage (Akdal, 2011). *Profitability:* Return on equity (ROE), a metric for financial performance, measures profitability. ROE and CAPSTR are anticipated to have a favorable impact on financial sustainability since they will strengthen the firms' financial positions through high returns and prudent financing decisions, which will ultimately result in good financial sustainability. Additionally, ROE is anticipated to benefit CAPSTR (Ahmed, 2021). Size (LTA): The total asset logarithm was employed as a stand-in for size. According to the economies of scale paradigm, large companies will profit from growing their business by lowering their manufacturing costs (Stigler, 1958; Driffield et al., 2005; Parmankulova et al., 2022). LTA is therefore anticipated to have a favorable effect on the financial viability of businesses. LTA and CAPSTR do, however, have a predicted inverse connection that is consistent with the pecking order idea (Myers and Majluf, 1984). Greater asset tangibility will lessen the knowledge asymmetry that makes debt financing more expensive than equity financing. Tax (LTAX): A measure of fiscal policy that approximates the logarithm of tax payments in the oil and gas sector. Taxes are anticipated to have a detrimental effect on long-term financial viability. A lax fiscal approach should be used by government authorities to increase financial sustainability (Yespergenova et al., 2023). However, the theoretical research reveals that there is uncertainty regarding the relationship between tax and capital structure (Givoly et al., 1992).

2.3. Independent Macroeconomic Variables

In this empirical analysis, macroeconomic variables such as GDP growth, time dummies, oil prices, and ESG considerations are used. GDP expansion (GDPG): Gross Domestic Product growth is used as a proxy for national economic growth. Economic growth stimulates and intensifies the competitive environment in all industries in the designated regions, so that firm entry barriers to the markets are decreasing, which gradually reduces the market share in the energy sector. As a result, it is anticipated to have a negative impact on financial sustainability and capital structure (Ghani et al., 2023). *Time Dummies (IYears_2014 and _IYears_2015):* These time dummies are used as a proxy for the national currency depreciation crisis during the 2014 and 2015 period in EUEA regions and codded as 1 for that period, otherwise 0 (Yespergenova et al., 2023). Crude Oil Price (OilPrice): the logarithm of oil price was taken and used to see the impact on FSS and CAPSTR. It is expected that oil price volatility will have positive impact on profitability of oil and gas companies (Darko and Kruger, 2017). Unlike FSS, it is expected that oil price will have negative impact on capital structure of the companies. For instance, as the oil price goes up that will create more opportunities for the oil and gas companies to generate more profits, eventually their equity will increase in relation do debt. It is a period of crisis and is supposed to have a negative impact on both FSS and CAPSTR. *Energy Intensity, Unemployment, and Government Effectiveness (Unempl, GE, ENERINTENS):* They are used as a proxy for Environmental, Social, and Governance factors that are incorporated into business operations (Kanapiyanova et al., 2022).

For example, ENERINTENS is proxied as the environmental criterion, which is considered by the energy sector to show how they care about the environment by including the corporate policy that links to climate change. In addition, Unempl is used as a proxy for social criteria, where the firms show how they contribute to the social part of the country by employing more different skilled workers, and how they efficiently manage the relationship with stakeholders. GE is a crucial part of ESG factors, where it shows how effectively public and civil services are provided to the population in terms of quality.

2.4. Theoretical Review of Financial Sustainability and Capital Structure Determinants

First, Tehulu (2013) undertook an empirical research of the factors affecting the financial sustainability of East African microfinance firms. He claimed that maintaining the MFIs' financial viability is the key to reducing poverty in the East African region. For the years 2004 through 2009, a sample of 23 MFIs was used. To examine the factors influencing the financial viability of MFIs, ordered probit regression analysis was used. In this study, the financial sustainability dependent variable was represented by the financial self-sufficiency (FSS) indicator. Operational income less operational expenses equals FSS. It was determined that various company-specific parameters, such as firm size, cost effectiveness, credit risk factors, and gross loan portfolio, had a substantial impact on the financial sustainability of MFIs. Additionally, Chukwuebuka et al. (2021) examined the Nigerian oil and gas industry's financial sustainability drivers. Eleven oil and gas companies were chosen as a sample for the years 2009 through 2020. They used net profit margin and return on assets as measures of financial sustainability. The results demonstrated that corporate social responsibility has a favorable, significant impact on the long-term financial viability of Nigeria's energy sector. In addition, Henning and Jordaan (2016) used the Delphi approach to empirically predict the farmers' ability to repay loans in South Africa. Nine credit analysts and managers made up the sample of panel data. The findings of this study demonstrate the importance of present and historical profitability, account status, collateral, and the farm's credit history in determining how well applications do financially. Similar to this, Ebenezer et al. (2020), using a sample of 56 non-profit organizations, assessed the financial sustainability factors of NGOs in Ghana. Through the use of questionnaires, the administration of the NGOs gathered the sample of the data. The results showed that NGOs lack financial sustainability, and that in order to do so, they must take measures to increase their sources of income. A further empirical study was carried out by Rahman and Mazlan (2014) to identify the financial self-sustainability indicators of microfinance institutions in Bangladesh. Five MFIs' financial accounts for the years 2005 to 2011 in Bangladesh were gathered from a well-known microfinance web database. Operational self-sufficiency (operating financial revenue over operating financial expenses), used as a proxy for financial sustainability, was used to choose MFIs based on a number of borrowers. The results showed that the majority of MFIs are financially viable, which is accomplished by growing in size and reducing operating expenses. Similar to this, Yitayaw (2021) conducted an empirical analysis of 43 SACCOs (saving and credit cooperatives) in Eastern Ethiopia over the years 2015-2019 to determine their financial viability and profitability. In light of this, multiple regression analyses using the Random Effect technique were performed on unbalanced panel data, with financial self-sufficiency (adjusted operating revenue above adjusted operating cost) serving as a stand-in for financial sustainability. It was found that, in contrast to other explanatory factors, SACCO profitability did not translate into financial sustainability in Eastern Ethiopia. The findings also demonstrate that while size and operational efficiency have a considerable detrimental effect on financial sustainability, leverage enhances it. Last but not least, Zhao et al. (2021) studied the factors that affected the capital structure (the ratio of total debt to total assets), which served as a proxy for the financial sustainability of Chinese businesses between 2010 and 2019. They used conditional quantile regression to objectively examine the factors that influence financial sustainability. The findings corroborate trade-off theory and pecking order theories, particularly the highly significant association between size and leverage, according to the data.

We have chosen to scientifically assess the financial sustainability determinants of energy industry through operational self-sufficiency and capital structure in light of the empirical research discussed above. The economies of scale paradigm and the pecking order hypothesis will also be put to the test in this investigation.

3. DATA AND METHODOLOGY

3.1. Data

The Orbis data source was employed to compile information on oil and gas companies operating in the Eurasian Union from 2012 to 2020. We diligently collected recent financial data from all actively running businesses. In total, more over 24 000 firm-year-based observations have been gathered. It consists of several different oil and gas firms that have up until now been the subject of investigations. The following firm-level factors have been gathered: Size, tax, capital structure, managerial efficiency, and profitability. All of these elements directly affect how the corporations organize their finances. The cost of oil, economic growth, and ESG factors are other macroeconomic determinants. The variables are described and explained in Table 1.

3.2. Methodology and Model

The goal of this article is to discover the factors that contribute to the oil and gas industry's financial sustainability. To do this, it is necessary to first determine whether the variables have stationary features. The unit root panel test is used to evaluate the unit root properties of a series. As a result, each variable in the models is stationary and has an integration of zero (I[0]). Additionally, to avoid issues with multicollinearity, correlation analysis and the variance factor, which is shown as Mean VIF in Table 2, are used to analyze multicollinearity issue between variables. OLS models with FE and RE effects are used to estimate the variables that affect financial sustainability. Due to issues with bias and consistency, these results were not included in this research (Baltagi, 2005). This study uses both static and dynamic models to assess financial sustainability aspects because dynamic models provide accurate

Table 1: Definitions, notations, and anticipated effects on bank earnings of the dependent variables from equation 2

Definitions, notations, and anticipated effects on bank earnings of the dependent variables from equation 2.			
Variable	**Measure**	**Notation**	**Impact**
Dependent variables=>			
Financial sustainability	Adjusted revenue over adjusted operational expenses	FSS	
Capital structure	Overall debt over to total assets	CAPSTR	
Independent variables=>			
Firm specific			
Lagged dependent variables	Lagged capital structure/financial sustainability ratios	L1.CAPSTR and L1. FSS	±
Liquidity	Current assets over current liabilities	liquidity	±
Capital structure	Overall debt over to total assets	CAPSTR	±
Management efficiency	Total cost over income	CI/ROE	±
Firm size	Log of assets	LTA	±
Tax	Log of taxes paid expenses	LTAX	±
Profitability	Return on equity	ROE	±
Macroeconomic variables			
GDP growth	Gross domestic product growth	GDPG	±
Oil price	Logarithm of oil price	OIL	±
Time dummy variable	Coded as 1, otherwise 0 that shows the impact of declining period of demand for energy sources.	2014 and 2015	±
Environmental social governance factors			
Energy intensity	Measure of energy inefficiency, units of energy per unit of GDP.	ENERINTENS	±
Government effectiveness	Please see the World Bank database for further information about the definition.	Government Effectiveness	±
Unemployment	Shows the percentage of overall number of unemployed over all labor force.	Unemployment	±

FSS: Financial sustainability, ROE: Return on equity, GDPG: Gross domestic product growth

Table 2: Factors affecting financial sustainability and capital structure in oil and gas companies from 2012 to 2020. Two-step GMM system

Variable names	With ESG			Without ESG				
	Financial sustainability (1)		Capital structure (2)	Financial Sustainability (3)			Capital Structure (4)	
	FSS (Coef.)	P-values	CAPSTR (Coef.)	P-values	FSS (Coef.)	P-values	CAPSTR (Coef.)	P-values
Past realization effect								
L.FSS	0.301***	0.000			0.283***	0.000		
L.CAPSTR			0.722***	0.000			0.744**	0.000
Firm specific variables								
CI	−0.597	0.563	−0.004	0.800	−1.395	0.312	0.001	0.683
Liquidity	0.049	0.828	0.005***	0.000	0.531**	0.008	−0.011	0.381
ROE	0.433	0.532	−0.031*	0.077	−4.818	0.380	0.014	0.270
CAPSTR	1.393	0.594			−5.172	0.275	−0.086	0.593
LTA	3.715*	0.088	−0.171***	0.002	−1.486	0.747	−0.061	0.487
LTAX	−5.380**	0.021	0.178***	0.001	0.314	0.945	0.072	0.409
Macroeconomic variables								
OilPrice	25.048**	0.023	−1.046*	0.095	5.755	0.178	0.245	0.234
GDPG	−1.238	0.103	0.041	0.181	−0.281	0.256	−0.012	0.258
_IYears_2014	0.971	0.780	0.291	0.113	−1.571	0.232	−0.103*	0.071
_IYears_2015	−1.087	0.921	0.204	0.105	−3.270**	0.043	−0.029	0.507
Environmental, social and governance factors								
Unempl	−1.761*	0.069	−0.145	0.542				
GE	−6.297**	0.033	−0.233	0.714				
ENERINTENS	−6.508**	0.015	0.111**	0.054				
_cons	−28.301*	0.057	2.037	0.238	4.971	0.559	−0.206	0.504
Mean VIF	4.900		4.100		2.410		2.230	
AR (1)	0.315		0.002		0.318		0.400	
AR (2)	0.809		0.232		0.404		0.103	
F Prob value	0.000		0.000		0.000		0.000	
Hansen test	0.168		0.212		0.313		0.290	

Variance inflation factor is known as VIF. *** Shows sig. levels at 1%, ** Shows sig. levels at 5%, * Shows sig. levels at 10%, Arellano-Bond test: AR. FSS: Financial sustainability, ROE: Return on equity, GDPG: Gross domestic product growth, Table 1 contains a list of the variables' definitions

and objective estimations. To solve the endogeneity issues and unobservable heterogeneity, we use a two-step system GMM approach (Arellano and Bover, 1995; Blundell and Bond, 1998). As it comes to the decision between dynamic models, i.e., GMM difference, one-step system GMM, and two-step system GMM, the two-step system GMM methodology gives better results over the aforementioned approaches (Arellano and Bover, 1995; Blundell and Bond, 1998). To identify endogenous variables in

the regression model, Durbin, Wu-Hausman, and Hansen "J" tests were employed.

$$\prod bct = \alpha + \delta \Pi_{bc,t-1} \sum_{j=1}^{j} \beta_j X_{bct}^{j} + \sum_{l=1}^{l} \beta_l Y_{bct}^{l} + \sum_{m=1}^{m} \beta_m Z_{bct}^{m} + \varepsilon_{bct} \quad (1)$$

$$\prod bct = \alpha + \delta \Pi_{bc,t-1} \sum_{j=1}^{j} \beta_j X_{bct}^{j} + \sum_{m=1}^{m} \beta_m Z_{bct}^{m} + \varepsilon_{bct} \quad (2)$$

Where X_bctj stands for firm-specific variables that are directly relevant to financial planning decisions, Y_bctl stands for ESG variables, and Z_bctm stands for macroeconomic variables, and where bct is a proxy for financial sustainability for both operational self-sufficiency and capital structure. Additionally, is a constant phrase. The phrase "_bct" denotes an error, where "v_t" stands for an undetected personal effect and "u_t" stands for a disturbance component. As a result, the one-way error term regression form contains the variables v_t and u_t, which are IIN (0, _v, _u). Additionally, quantifies the rate of adjustment towards equilibrium, and _(bc,t-1) represents the dependent variable lagged by one period. To perform regression research on the financial viability of the energy sector in EUEA regions, we have created two models. ESG elements, macroeconomic factors, and firm-specific variables are all included in the first model (Equation 1). Referring to equation 2, the second model does not account for the impact of ESG variables on financial sustainability. The model's specifications are represented visually in Chart 1. To achieve financial sustainability in the oil and gas industry, businesses should undertake solid financial planning that takes firm-specific, macroeconomic, and ESG factors into account. In other words, FSS refers to a company's capacity to create a sound financial strategy that will enable it to expand its operations, withstand any dangers posed by humans or natural disasters, and consistently win the trust and confidence of its investors. ESG public policy must be integrated into the operations of oil and gas corporations. Businesses can use ESG Public Policy to achieve financial sustainability with smart financial planning.

4. EMPIRICAL ANALYSIS

The factors employed in this empirical study are described statistically in Table 3. All independent variables have unique means and standard deviations, which is contrary to the requirement of normalcy.

Skewness and kurtosis results show and support the abnormal distribution among most of the variables. We used the Jarque-Bera test to determine whether our variables were normal, and it was found that they were not. The findings of the Jarque-Bera test are not given but can be obtained upon request. According to the results of the descriptive statistics, the mean of financial sustainability is 1.3, with a minimum value of −0.116 and a maximum value of 748.36, making it the variable with the highest average value out of all of them. The asymmetry values are shown to be regularly distributed by the capital structure indicator's skewness and kurtosis results, which show that its mean is 0.352 with a range of −1.00 to 1.00, so it shows normal univariate distribution (George and Mallery, 2010). More than 9000 observations have been made in total. Furthermore, to check the relationship and multi collinearity between the independent variables, the correlation matrix, and variance inflationary factor were employed, in Tables 2 and 4, respectively. To form a proper model for the regression analysis, the correlation between the independent variables should be <50%, and we can see that the results of our correlation matrix overall are <50%. In addition, the findings of VIF in Table 2 reveal that the model is properly formed, as the mean VIF is <5 (Montgomery and Voth, 1994). Table 4 also shows the correlation matrix results, which show that there is little general correlation between the independent variables, supporting the adequacy of the model.

It was advised to utilize the Durbin-Wu-Hausman test to examine the endogeneity of the variables (Damira et al., 2022). The results of this test show that independent variables are all endogenous, where P < 1% of level significance. In other words, endogeneity in the model refers to the high level of correlation between independent variables and error terms. To avoid the biasedness of the results and to capture endogeneity issues of the data dynamic two-step system GMM was used.

Table 2's results for models 1 and 2 show that lagged values of FSS and CAPSTR, with values of 0.301 and 0.722, respectively, have a substantial positive impact on dependent variables. Referring to models 3 and 4, where empirical analysis was conducted without ESG factors, we can see that the results of lagged values of dependent variables are more are less the same with models 1 and 2. The P-values of lagged dependent variables are 0283 and 0.744, for FSS and CAPSTR respectively. So it illustrates the speed of adjustments which are 69.9% (1-0.301), 27.8% (1-0.722), 71.7% (1-0.283), and 25.6% (1-0.744) respectively. These results show that the company's financial sustainability depends on previous

Chart 1: Achievement of financial sustainability through the ESG public policy

Sources: Modified from Hauptmann (2020)

Table 3: Descriptive statistics for EUEA regions

Variable names	Mean	Standard deviation	Kurtosis	Skewness	Range	Minimum	Maximum	Observations
FSS	1.320	19.891	941.316	29.043	748.483	−0.116	748.366	9243
FSS	1.320	19.891	941.316	29.043	748.483	−0.116	748.366	9243
CAPSTR	0.352	0.395	−0.130	−0.256	2.000	−1.000	1.000	9315
CI	0.093	3.240	4470.381	64.221	248.476	−0.025	248.451	9311
liquidity	8.035	21.074	5.428	0.067	199.370	−99.370	100.000	9315
ROE	0.260	0.780	45.105	0.105	19.451	−9.513	9.939	9315
LTA	3.523	1.585	0.436	−0.372	9.902	−1.863	8.039	9315
LTAX	1.887	1.592	−0.389	0.158	8.379	−1.863	6.516	5536
OilPrice	1.831	0.150	−1.445	0.171	0.411	1.625	2.036	9315
GDPG	1.059	2.188	−0.627	−0.449	8.951	−2.951	6.000	9315
Unempl	5.247	0.351	−0.377	−0.904	1.090	4.500	5.590	9315
ENERINTENS	7.902	0.422	14.657	−3.510	3.070	5.380	8.450	8280
GE	−0.129	0.176	−0.873	−0.233	0.689	−0.533	0.156	9315

FSS: Financial sustainability, ROE: Return on equity, GDPG: Gross domestic product growth, Table 1 contains a list of the variables' definitions

Table 4: Correlation matrix

Variable names	FSS	CI	Liquidity	ROE	CAPSTR	LTA	LTAX	OilPrice	GDPG	Unempl	GE	ENERIN~S
FSS	1											
CI	−0.0017	1										
liquidity	−0.0056	0.007	1									
ROE	−0.0169	−0.0147	−0.0645	1								
CAPSTR	−0.008	−0.0132	0.3345	−0.1327	1							
LTA	0.0222	−0.0023	−0.0088	−0.13	0.2416	1						
LTAX	0.012	−0.0057	0.0021	−0.0231	0.3625	0.8974	1					
OilPrice	0.0299	0.0039	0.0013	−0.0234	0.0636	0.115	0.1357	1				
GDPG	0.0053	0.0256	0.0283	−0.0376	0.0719	0.1584	0.1836	0.5271	1			
Unempl	0.005	−0.049	−0.0289	0.0372	−0.0001	−0.0432	−0.0193	−0.1225	−0.5022	1		
GE	−0.0144	0.0227	0.015	−0.0049	−0.056	−0.0737	−0.1072	−0.4097	−0.023	−0.7802	1	
ENERINTENS	0.0025	0.0133	−0.0062	0.043	0.002	−0.1435	−0.1586	0.0724	0.1318	−0.0054	−0.0836	1

FSS: Financial sustainability, ROE: Return on equity, GDPG: Gross domestic product growth, Table 1 contains a list of the variables' definitions

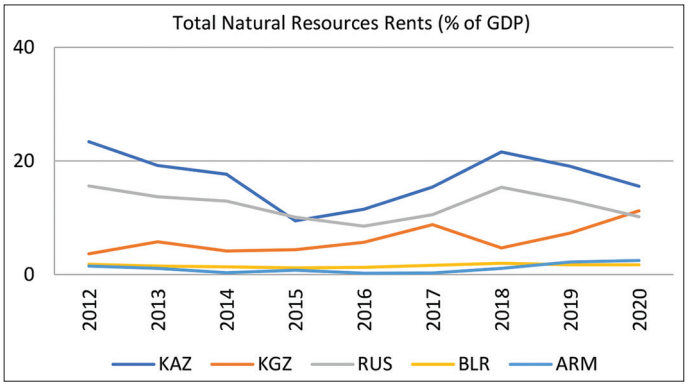
sustainability. Furthermore, although the impact is small (0.005%), liquidity has had a positive influence on companies' leverage. And it defies what we anticipate. Similar to this, the size, which has a value of 3.715, is important in establishing the financial viability of the oil and gas industry in the EAEU. In other words, as oil and gas companies decide to expand their operations, their profitability will continue to rise over time, and eventually, their ability to sustain their financial position will as well. It is in line with Tehulu (2013) and Driffield et al. and follows the economies of scale concept. (2005). According to the economies of scale paradigm, large companies will profit from growing their business by lowering their manufacturing costs (Stigler, 1958; Parmankulova et al., 2022). LTA is therefore anticipated to have a favorable effect on the financial viability of businesses. LTA, however, significantly negatively affects the financial structure of the companies. The findings support the pecking order idea (Myers and Majluf, 1984). Greater asset tangibility will lessen the knowledge asymmetry that makes debt financing more expensive than equity financing. As a result, asymmetric information has a severe impact on how oil and gas businesses organize their finances. Furthermore, LTAX exerts a negative significant impact on FSS at a 5% of significance level, and it is consistent with our expectations. It shows that financial sustainability declines as a result of government authorities applying strict fiscal policies to the oil and gas sector, which has a detrimental impact on the company's financial decisions. This result contradicts what Yespergenova et al. found. (2023). LTAX, on the other hand, significantly improves a capital structure. LTAX has a minimal effect on CAPSTR compared to FSS. When it comes to macroeconomic factors, only the price of oil has a substantial impact on the FSS and CAPSTR in all models. Unlike CAPSTR, the oil price has a hugely beneficial impact on the ability of oil and gas companies to remain financially stable in EAEU regions, which is statistically significant with a value of 25.048. It indicates that as the oil price goes up that stimulates oil and gas companies to generate more profit, eventually it leads to the financial stability of companies where it contributes to financial sustainability. The results concur with those of Darko and Kruger. (2017). In other words, while the volatility of the oil price has a statistically significant negative influence on the leverage of corporations, it does not have the same significant impact on financial sustainability. Our expectations are met, it indicates that as the oil price goes up that will create more opportunities for the oil and gas companies to generate more profits, and eventually their equity will increase in relation to debt. Time dummies have met our expectations, which indicates that during these periods the financial sustainability and leverage of companies reduced by 3.27% and 0.103%. During these periods, several things happened that affected the financial performance of the companies negatively. According to World bank statistics in Graph 1, between 2014 and 2015, the global economy faced one of the largest oil price plunges in modernized history, it was about a 70% decline. As we can see from Graphs 2 and 3, natural resource rents plunged during the

Graph 1: Largest decline in oil prices recorded in modern times

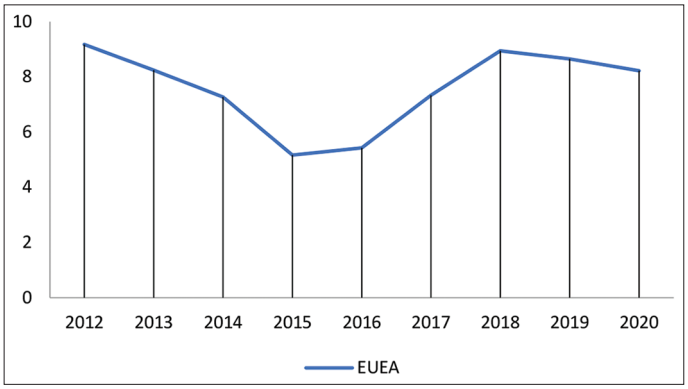
Source: World Bank

The nominal price of oil is deflated by the international manufacturers unit value index, where 100 equals 2010, to determine real oil prices. World Bank benchmark for crude oil. It was last observed in November 2017

Graph 2: For EUEA regions, the total natural resource rents are the sum of the natural gas and oil rents



Graph 3: Total natural resources rents are the average of sum of oil rents and natural gas rents for EUEA regions



aforementioned period in EUEA regions, especially the majority impact being on Russia and Kazakhstan. In addition to this, during that period depreciation of the Ruble and Tenge (national currencies of Russia and Kazakhstan) negatively contributed to the financial performance of the oil and gas industry as well. Finally, we can see that ESG factors negatively affect financial sustainability, and are all statistically significant with coefficient values of −1.761, −6.297, and −6.508. The findings indicate that new advances and environmentally friendly technologies are employed by oil and gas companies that go in line with ESG public policy. Acquiring those technologies and advances creates extra costs for the companies that eventually reduce their profitability, but in the long run, they will gain sustainability and the loyalty of the stakeholders. Despite this fact, if companies decided to ignore ESG public policy, they would end up with a competitive disadvantage and would be subject to regulatory fines.

5. CONCLUSION

The world's two main sources of fuel, oil and natural gas, play an important role in the energy sector and influence the global economy. Oil and gas production and delivery systems and processes are capital intensive and dependent on advanced technologies. The objective of this article is to pinpoint the elements that support the oil and gas industry's financial viability in EUEA regions. According to the definition of financial sustainability, a company must be able to create a financially sound organizational structure that will enable it to expand, withstand any risk-natural or artificial-and continue to win the trust and confidence of its stakeholders year after year. It increases the value of the company to its stakeholders, who look for financial stability when choosing investments. A strong financial sustainability approach aids the business in surviving in a competitive industry. When it comes to the oil and gas sector, businesses should adopt ESG public policies while attempting to earn decent returns.

Findings reveal that firm specific variables play a significant role in determining the financial sustainability of oil and gas companies in EUEA regions. For instance, both size and tax policy matter in driving the financial sustainability and leverage of companies. Economies of scale and pecking order theories are supported by findings in the oil and gas sector. Furthermore, in contrast to CAPSTR, the oil price has had an enormous positive impact on the financial sustainability of oil and gas companies in EAEU regions, which is statistically significant with a value of 25.048. It indicates that as the oil price goes up, that stimulates oil and gas companies to generate more profit, eventually leading to the financial stability of companies where it contributes to financial sustainability. The results illustrate that ESG factors substantially affect financial sustainability in a negative way, and they are statistically significant. The results show that oil and gas businesses use cutting-edge, environmentally friendly technologies in accordance with ESG Public Policy. Although acquiring those technologies and advancements incurs additional costs for the businesses, those costs ultimately lower their profitability. However, by adopting strict ESG Public regulations in businesses, it will take the companies a long time to acquire financial sustainability and the stakeholders' loyalty in the long run. Despite this, corporations would suffer a competitive disadvantage and face regulatory penalties if they chose to disregard ESG public policy.

This empirical study adds three new pieces to the existing body of literature. First of all, this is the first study to scientifically explore the factors that influence financial sustainability in the oil and gas sector. This empirical research studied the capital structure drivers in the oil and gas industry of EAEU areas for the period of 2012-2020 using a sample of 2.757 companies, which

is another differentiation from the existing literature on oil and gas corporations. Finally, research on the relationship between ESG characteristics and financial sustainability was done for the 1st time in the oil and gas sector.

The paper has significant practical policy implications for investors, managers, practitioners, legislators, policymakers, and regulators. Managers should continue to improve their strategies based on the growth of their businesses by utilizing new cutting-edge environmentally friendly technologies that will be suitable for stringent ESG Public Policy regulations, as the findings show that the size of the companies has a positive impact on their financial sustainability. The results also showed that regulators' strict fiscal policies had a negative influence on the oil and gas sector's capacity to sustain its financial health. Tax rules for the oil and gas sector should be softened by regulators and government officials; otherwise, the sector's financial sustainability would continue to decline. The oil and gas business needs to be financially sustainable, otherwise, society as a whole would suffer. Throughout our lives, oil and gas play a major role as energy sources. It is really challenging to envision a world without these kinds of energy sources. Because oil and gas are needed for heating, lighting, fertilizers, production processes, and transportation services. Energy enhances and raises society's standard of living. The true cost of energy is not merely measured in dollars and cents; it is also vitally important to take economic, political, and social variables into account along with their ramifications. Energy sources help countries' economies expand and maintain their well-being. Because the oil and gas business is already subject to stricter controls owing to ESG Public Policy requirements, which result in increased costs for oil and gas corporations, regulators in EUEA should relax tax policies. Finally, the findings demonstrated that the volatility of oil prices is the key factor affecting the oil and gas industry's financial viability. In other words, the oil price has a favorable effect on the companies' capacity to sustain their financial viability. Additionally, by emphasizing the crucial components of financial sustainability, the findings provide policymakers and regulators with some recommendations for enhancing and altering rules in the oil and gas industry of emerging markets, such as EUEA countries. Overall results indicate that managers and practitioners should work on new strategies for expansion and penetration into the new markets in the EUEA regions. Also, it is suggested to managers and practitioners to follow the ESG Public Policy requirement, even if doing so would cost the companies more money. ESG Public Policy laws will eventually give businesses a competitive edge and enable them to win investors' and customers' loyalty, as result market share of the companies will grow. Hence, those companies that go strictly in accordance with ESG Public Policy standards that will support both a healthy environment and social progress of EUEA regions.

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