DIGITALES ARCHIV

ZBW – Leibniz-Informationszentrum Wirtschaft
ZBW – Leibniz Information Centre for Economics

Nguyen Dinh Hoan

Article

Nexus among green energy investment, world oil price, monetary policy and business performance: evidence from energy companies on the Vietnamese stock exchange

International Journal of Energy Economics and Policy

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

This Version is available at:
http://hdl.handle.net/11159/593871

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Mitglied der
Leibniz-Gemeinschaft

Nexus among Green Energy Investment, World Oil Price, Monetary Policy and Business Performance: Evidence from Energy Companies on the Vietnamese Stock Exchange

Nguyen Dinh Hoan*

Department of Economics, Academy of Finance, Hanoi, Vietnam. *Email: hoannd@hvtc.edu.vn

ABSTRACT

The abhorent effect of GHG emissions effects pushes nations to consider effective policies and take initiatives accordingly inorder to maintain the surface temperature at steep level. Practitioners, Policymakers and other regulators in this regard are urging firms to behave in environmental friendly way through the increased usage of energy effeciency such as increasing renewable energy consumption and minimizing carbon emissions. By doing so, firms are now taking great interest in green business practices such as green energy investment so that they may contribute in improving energy effeciency and carbon performance. Hence, the present article intends to evalaute the effectiveness of green energy investment, world oil price and monetary policy on business performance. The sample chosen for the study is Vietnamese energy enterprises which are listed in stock exchange. The data was gathered from 45 firms covering the period of 2010-2021. The study used two methods; CUP-FM and CUP-BC to examine the association. Obtained results reveal that the chosen constrcuts share positive relation with business performance. At the end of the paper, suggestions are also given in the light of results which are useful for future researchers.

Keywords: Green Energy Investment, World Oil Price, Monetary Policy, Firm Performance
JEL Classifications: E22, E59, E60

1. INTRODUCTION

The increased global temperature due to its harsh impact on cliamte, has now become a worldwide concern. This is happening due to the excessive GHG emissions, especially carbon dioxide as their percentage is higher amongst all. As said already, these emissions are dangerous, hence, create environmental challenges which severly affect health, social welfare and economic activities (Tolliver et al., 2020). These abhorrent effects pushes nations to consider effective policies and take initiatives accordingly inorder to maintain the surface temperature at steep level. Practitioners, Policymakers and other regulators in this regard are urging firms to behave in environmental friendly way through the increased usage of energy effeciency such as increasing renewable energy consumption and minimizing carbon emissions. By doing so, firms

are now taking great interest in green business practices such as green energy investment so that they may contribute in improving energy effeciency and carbon performance (Journeault et al., 2016). Dutta et al. (2020) also argued that that a keen interest of firms towards green energy investment has been growing which signficantly impact their corporate performance.

It is obvious in this regard that energy idustry has greater signifcance in strategic manner as it enhances energy security and economic development goals. According to Salim and Yadav (2012), Eenergy is crucial as it is used as an input in several production activities such as machinery and equipment, transportation etc. Hence, it indicates that energy sector contribution a major share in the economic development. Fischer and Newell (2008) also argued that energy investment is a new wayto reduce pollution emissions

and enhance business performance. This form of investment is normally associated with environmental investment and has a potential to increase overall productivity and profitability of firm.

Further to discussion, in order to develop economy, there needs an increase in energy demand which leads to increase in demand for petroleum products. This shows that it is another important issue for countries as these products are affected by oil prices in the world market and oil demand, Hence, for countries oil prices are necessary to be considered and they are linked to the calculation of energy demand in particular country (Nguyen, 2015; Salim and Yadav, 2012).

As disucssed countries are needed to consider oil prices in order to calculate energy demand. Similarly, there will be injustice not to mention the role of energy enterprises in order to fullfill the mission of supplying energy to the country. Energy efficient businesses mean that industry players have a greater position in contributing to energy security in countries, especially developing countries like Vietnam. In particular, energy enterprises have large working capital, fixed asset investment costs, especially in the context that Vietnam has a small-scale economy, the ability of enterprises to mobilize capital (Zaman et al., 2014).

By looking in to past, a prominent changes can be seen in the conduct of monetary policy all over the globe. Many emerging economies including Vietnam, used multiple policy measures in order to achieve targeted objectives. In this regard, monetary policy holds significant place to achieve desired goals which traditionally includes several elements such as "promoting economic growth, achieving full employment level, reduction in the level of inflation, maintenance of healthy balance of payment, sustenance of growth in the economy, increase in industrialize and economic stability." Howoever, with the passage of time other elements have also been found as an supplementary objectives of monetary objectives such as "smoothing of the business cycle, preventing financial crisis and stabilizing long term interest rate and the real exchange." This is due to global financial crisis that happened to be the cause of major development in countries (Mishra and Pradhan, 2013). In most economies, monetary policy objectives revolves around "price stability, maintenance of balance of payments equilibrium, promotion of employment and output growth sustainable development." These objectives are crucial for economic growth in long-run. Moreover, due to the harmful effect of price volatility, the signifiance of price stability is emerged as without it, the objectives can be undermined.

As discussed, the prime purpose of monetary policy is connected with its measures which are applied during economic recession. Monetary policies regulate the supply of money because their grwoth rate affect inflation. With this notion, monetary policies are made to aggreagate the real sector's economy. Firm's role in this lieu is to conduct approperiate monetary policies that are interelated with economic objectives, hence helping country to achieve sustainable GDP inflation. This is to be done via direct or indirect approach of monetaroy policy in order to control monetary trends (Broz and Plouffe, 2010).

Recently, the impact of the COVID-19 pandemic has made the price of oil very low, even lower than the cost, causing the worldwide energy industry to fall into recession. Oil industry enterprises in Vietnam were also adversely affected such as profits plummeting, even falling into a state of loss, which affected businesses in the industry. Even at some times, Vietnam fell into a shortage of energy, especially gasoline, and at the same time, high oil prices increased costs for the economy. Thereby, in this situation it is imperative to evaluate the impact of oil price, green energy investment and monetary policy on the financial performance of energy enterprises, conducted in Vietnam.

This study thus is divided into 5 main parts. In addition to the introduction, the second part of the study discusses the theoretical framework and previous studies, and the third part is about data collection and research methods. In section 4, the study will discuss the research results and the last part is the general conclusion of the study.

2. LITERATURE REVIEW

The volatility of oil prices has an impact on business activities of enterprises in the energy industry. Indeed, the energy industry is primarily oil-related, where high oil prices mean higher costs for the economy, which means that oil businesses have a significant impact on the economy. certain, this has been discussed through the study of Song and Yang (2022).

An efficient economy is the result achieved in economic activity and the consumption of goods, as such, efficiency is synonymous with the indicator that reflects the results of business activities. The main goal of every company is to maximize business efficiency. Increasing business efficiency doesn't just mean reducing costs and increasing profits for the investors or owners of the company. According to Kasim et al. (2018), the underlying source of increased business efficiency is the overall increase in the operating business, including those factors that have no direct connection to the company's bottom line. Besides reducing costs and increasing profits, increasing business efficiency includes increasing use of company resources, improving working conditions and customer satisfaction, as well as reducing negative impacts on the company's business and the business environment.

Various researches have been conducted in the area of monetary policy and its relationship with firm's profitability. For example the study done by Imoisi et al. (2013) revealed the association of monetary policy with balance of payment in nigeria. The authors used OLS technique to find the association and the selected timeline was from 1980 to 2010. The findings revealed that monetary policies share positive association with balance of payment position of country. Similarly, Ajayi and Atanda (2012) studied the connection of monetary policy with bank performance. The sampled country was Nigeria and it was revealed that monetary policy instrument appears to be ineffective to stimulate credit in longer run. It is also revealed in the research that bank credits are positively related with inflation,exchange and bank rate. However in the case of liquidity ratio and cash reserves ratio, the relation seems negative.

Similarly, many of studies were conducted in the area of petroleum price fluctutations on oil and gas and their influence on coporate's performance. A recent research in this area identfied that when crude oil prices get increased, they share positive relationship with ROE, simultanously it impacts negatively in crisis period such as ASIAN crisis, US financial crisi, 911 etc (Dayanandan and Donker, 2011). Similarly another study done by Barber et al. (1999), revealed that oil price hike had an adverse impact on US and Japan auto sector.

Another study conduced by Dayanandan and Donker (2011) scrutnized the impact of petroleum price changes on the financial perforamcne of firm in the context of North America. The study was conducted in oil and gas corporations and covered the perid from 1990-2008. From obtained results, it was found that price of petroleum affected the chosen corporations in positive and significant manner. Moreover, the very same study also found that petroleum prices and financial performance of selected corporations was netgative due to financial crisis that occurred in 2007-2008 period. With the findings, the scholars made this conclusion that in resource-based sectors such as oil and gas companies, the prominent explonatory factors to measure firm performance are commodity prices. Similarly, the study conducted by Gupta (2016), scrutnized petroleum prices shocks and their association with country-level factors and oil and gas equity returns. The study chose 70 countries and used firm-level data. From obtained results, it was identified that firm-level returns are negatively associated with macroeconomic stress indicators, however, incase of pertroleum prices shocks, the relationship turns in to positive. It is also argued in the literature that oil and gas firms which are located in petroleum rich countries, their senstivity to market stress nad petroluem price shocks is comparatively higher to those firms which are located in opposite countries. Also, the corporations which do not face much competition appears to be les responsive towards petroleum price shocks.

Further to discussion, the series of literature indicates that oil price and its effect on macroeconmic activties has been discussed widely. These studies in the light of results claim that that oil price impact supply side and output cost in an adverse manner. (Hamilton et al., 2009). Similary, literature from past decade also revealed that oil price impacts economy in several ways such as increasing prodcution cost which affects supply side (Filis et al., 2011). These effects get more severe in those countries which import oil. According to Park and Ratti (2008), studies found that oil price effected real stock return in the context of Eurpeon markets. However Norway was not effected in their cases. The literature also documents that countries which export oil, are positively affected due to rise in oil price where as in case of oil importing countries, the relation is negative (Bjørnland, 2009). It indicates that increase in oil price increases the production and investment cost via firms performance (Bjørnland, 2009). According to Arfaoui (2010), Filis et al. (2011), oil price is more like a market risk factor, however, its coeffecient is negative. Elyasiani et al. (2011), arugued that oil price fluctuations are responsible for systematic assets risks at the industrial level. Similarly, the studies found a asymmetric effect. Even though with vast evidences, the researches seem to be scarce when we specifically talks about the relationship of oil price with firm performance.

As far as green energy investment is concerned, it is a key measure for organizations as it helps them in increasing their competitve advantage (Chen and Ma, 2021). Eyraud et al. (2013) definition of green investment states that "all kinds of capital expenditure related to environmental protection should be included in firm green investment, for example, financial investment in renewable technology, selected energy-saving technology and R&D in green technology." Although, there is a risk for firms when they make investment in environmental protection, Howoever, through proactive environmental management strategies, performance of firm can be improved especially when there is an involvment of process innovation and product differentiation (Oltra and Saint-Jean, 2009). According to He et al. (2019), emphasizing environmental pollution control and increasing expenditures on it along with the ajdustment of industrial strcuture appears to be a favourable condition as it promotes sustainable competitve advantage through ehich firms could minimize the adverse impact of those business activties which are harmful for environment. Two possible justifications can be focused here, first with environmental degradation, social welfare concept will be emerged and then firm are obliged to adopt the activities which increases environmental protection. This way, a new market competition restricts organizations in terms of product behavior which would eventually enhance environmental quality. Thus, finally making green investment unaovid part of firm investment. Secondly, organizations which highly emphasize on green investment, possess greater competitve edge over others. This way, they will become more effecienct in green related energy investment, hence, become a driving force of sustainable development. Thereby, we can conclude that green energy investment is related to firm performance positively.

Ulbert et al. (2022) commented that in the 20th century, the golden ratio was discovered by modern science, including economics, business, and finance. In the financial sector, this ratio is mainly applied to technical analysis, and little attention has been paid to its use in solving corporate financial problems, such as decisions about capital structure. capital structure. In the authors' study, data on 455 US and European manufacturing and service companies were studied for the period 2010–2019. The purpose of the investigation is to determine if there are any positive effects of capital structure based on the golden ratio on financial performance and market acceptance. The authors found a significant positive relationship between the deviations of capital structure based on the golden ratio and the deviations of the revenue, earnings, stock price, and market value data of the companies relative to that of the companies. their past maximums. Therefore, indicating a capital structure based on the golden ratio can be an effective tool for businesses to promote their activities and be accepted by the market. Based on this result, the authors assert that the relationship is more pronounced in the United States than in Europe, and stronger for service firms than for manufacturing firms.

Cuevas-Vargas et al. (2022) seeked empirical evidence on the impact of capital structure and innovation on firm performance

among Mexican small and medium-sized manufacturing enterprises (SMEs) and analyze indirect effect of capital structure to determine the mediating effect of innovation. A quantitative approach and cross-sectional design were applied through the Partial Least Squares Structural Equation Modeling (PLS-SEM). A simple random sampling technique and questionnaire were used to collect data from 220 managers or business owners in the state of Aguascalientes, Mexico. The results indicated that capital structure has a significant impact on innovation and only an indirect effect on firm performance. Since innovation has proven to be a significant full mediator in this relationship, if SMEs want better corporate performance, they must increase their level of innovation. Therefore, decision makers must pay special attention to reinvesting their profits to increase the level of innovation and operational efficiency of the business.

3. DATA AND METHODOLOGY

The purpose of the present study is to evaluate the impact of world oil price, monetary policy and green energy investment on business performance of 45 Vitenamese stock exchange listed energy companies. The study covered the period from 2010 to 2021. The monetary policy is taken as the capital mobilization interest rate, taken from the State Bank of Vietnam. Some other indicators are taken from the General Statistics Office of Vietnam. World oil prices are taken from Bloomberg, collected daily, and annual oil prices are averaged over the days of the year, which are representative of the OIL variable used in the research model.

Based on previous studies Salim and Yadav (2012), Abeywardhana (2017), Kasim et al. (2018), Margaritis and Psillakim (2010), Pratheepkanth (2011), this study assesses the impact of world oil price, green energy investment and monetary policy on the financial performance of enterprises through the proposed equation which is given below:

$$PROFIT = \beta_0 + \beta_1 OIL + \beta_2 POLICY + \beta_3 GEI$$
$$+ \beta_4 DEBT + \beta_5 SIZE + \beta_6 GROWTH + \beta_7 TANG$$
$$+ \beta_8 AGE + \beta_9 BOARD + \beta_{10} GENDER + \mu \qquad (1)$$

Besides that the study also used control variables in the study which details are mentioned in Table 1:

The study also employed descriptives in order to assess the properties of sampled data. Correlation matrix is also applied in order to find out the directional linkage among constructs. Moreover, CSD has been evaluated through the help of BP-LM test that is established by Breusch and Pagan following P-CD test which is established by Pesaran. Furthermore, the issue of CSD exists due to interdependencies among selected companies, Thereby, LM test which is established through Breusch & Pagan equation is written below:

$$LM_1 = \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} T_{ij} \hat{\rho}_{ij}^2 \to X^2 \frac{N(N-1)}{2} \qquad (2)$$

Table 1: Description of variables, expected signs

Variable	Abbre.	Expected sign	Previous studies
Dependent variable			
Profit	ROA/ROE		Salim and Yadav (2012)
Explanatory variable			
World oil price	OIL	+	Song and Yang (2022)
Monetary policy	POLICY	+	Margaritis and Psillaki (2010)
Green energy investment	GEI	+	Eyraud et al. (2013)
Control variable			
Capital structure	DEBT	-	Margaritis and Psillaki (2010), Jensen and Meckling (1976)
Firm size	SIZE	+	Norvaisiene (2012)
Firm growth	GROWTH	+	Norvaisiene (2012)
Tangible assets	TANG	+	Muhammad et al. (2014)
Firm age	AGE	+	Muhammad et al. (2014)
Board of directors	BOARD	+	Cuevas-Vargas et al. (2022)
Gender of the chairman	GENDER	+	Cuevas-Vargas et al. (2022)

Source: Authors' compilation

Further, LM test established via Pesaran equation is written below:

Moreover, the LM test projected by the Pesaran equation is mentioned below:

$$LM_2 = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \left(T_{ij} \hat{\rho}_{ij}^2 - 1 \right) \to N(0,1) \qquad (3)$$

Similarly, CSD test under Pesaran eq is written below:

In contrast, the CD test established by the Pesaran equation is mentioned below:

$$CD = \sqrt{\frac{2}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} T_{ij} \hat{\rho}_{ij}^2 \to N(0,1) \qquad (4)$$

The unit root has also been evaluated by scholars and the study used CADF test to check it. The equation for CADF is given below:

$$y_{it} = \alpha_i + b_i y_{it-1} + c_i \bar{y}_{it-1} + d_i \Delta \bar{y}_t + e_{it} \qquad (5)$$

Along with it, to check unit root CIPS has also been applied. The reason being that it regulates CSD issues, hence giving appropriate outcomes (Chang et al. 2017). The equation is constructed below:

$$\Delta W_{i,t} = \varnothing_i + \varnothing_i Z_{i,t-1} + \varnothing_i \bar{Z}_{t-1}$$
$$+ \sum_{l=0}^{p} \varnothing_{il} \Delta \bar{W}_{t-1} + \sum_{l=0}^{p} \varnothing_{il} \Delta W_{i,t-1} + \mu_{it} \qquad (6)$$

Moreover, in this paper co-integration was also examine via Westerlund and Edgerton (2008) approach. The equations for this purpose have been stated below:

$$LM_{\varphi}(i) = T\widehat{\varphi}_i(\widehat{r}_i / \widehat{\sigma}_i) \tag{7}$$

$$LM_{\tau}(i) = \widehat{\varphi}_i / SE(\widehat{\varphi}_i) \tag{8}$$

Where, $\widehat{\varphi}_i$ = estimation against $\widehat{\sigma}i$ standard error.
$\widehat{r}^2_i$ = assessed variance of $_{it}$ in the long run.
$\varphi_i(L) = 1 - \sum \varphi_{ij}L_j$ = scalar polynomial with L lag length.
ρ_i =factor loading parameters vector.

Lastly, CUP-FM and CUP-BC proposed by Bai et al. (2009) have been used in order to check the relationship. The equations under the said methods are given below:

$$\beta_{cup} = \left[\sum_{i=1}^{N} \left(\begin{array}{c} \sum_{t=1}^{T} \widehat{y}_{it} + \widehat{\beta}_{cup})(x_{it} - \overline{X}_i)' \\ -T\left(\lambda'_i\left(\widehat{\beta}_{CUP}\right)\widehat{\Delta}_{F\varepsilon i}\left(\widehat{\beta}_{CUP}\right) + \widehat{\Delta}_{u\varepsilon i}\left(\widehat{\beta}_{CUP}\right)\right) \end{array} \right) \right]$$
$$\left[\sum_{i=1}^{N}\sum_{t=1}^{T}(x_{it} - \overline{X}_i)(x_{it} - \overline{X}_i)' \right] \tag{11}$$

4. RESULTS

4.1. Descriptive Statistics
Oil prices have fluctuated greatly in recent times, ranging from an average value of 19.33 USD/barrel to the highest average value of 127.98 USD/barrel, thereby showing that oil is still an important product. in the economy and has a great impact on businesses in the energy industry in particular and the economy of most countries in general.

Table 2 presents the results of descriptive statistics of the variables used in the model. For the financial performance variable, ROA has a mean of 6.5%, a minimum of −22.2% and a maximum of 41.2% and a standard deviation of 8.2%. ROE has mean 12.4%, minimum value −31.2% and maximum 54.3% and standard deviation of 14.3%. Thereby reflected in the group of enterprises collected in this study, there are enterprises with good operating ability but also enterprises with poor financial performance.

Table 2: Descriptive statistics

Variable	Mean	Stb. Dev	Min	Max
ROA	0.065	0.082	−0.222	0.412
ROE	0.124	0.143	−0.312	0.543
OIL	77.66	21.33	19.33	127.98
POLICY	0.098	0.046	0.045	0.112
GEI	0.076	0.056	0.063	0.231
DEBT	0.564	0.214	0	1
SIZE	9.442	2.321	8.332	10.221
GROWTH	0.213	0.112	0.111	0.321
TANG	0.243	0.113	0.211	0.454
AGE	15.332	2.123	3.442	34.321
BOARD	5.221	1.303	3	9
GENDER	0.764	0.233	0	1

Source: Stata 15

For the monetary policy variable POLICY, it shows that the lowest interest rate is 4.5% and the highest is 11.2%, the average interest rate is 9.8%, thereby showing that monetary policy is managed through flexible deposit interest rates. active. Interest rates fluctuate depending on the actual situation in the financial market.

4.2. Correlation Matrix
Table 3 presents the results of the correlation matrix of the variables used in the regression model, the correlation coefficients are all <0.8, so there is no possibility of multicollinearity occurring in the regression model. In addition, studies evaluating through VIF analysis like Table 4, all show that the component VIF indexes are <10, and the mean VIF is also <10, so it is unlikely that multicollinearity will occur. As follows:

As discussed in methodology part, CSD has been used through BP-LM and P-CD test. Results revealed that t-values are greater than 1.96, hence CSD issue does not exist here. The values are explained in below Table.

The study also applied CADF and CIPS test to check unit root. Findings show that ROE, ROA, oil, policy, board, tang have not root at level, whereas variables such as GEI, debt, size, growth, age and gender have no root at first difference.

Co-integration has also been examined in the study and findings in Table 7 show that P-values are <5% and t-value are also fulfilling the criteria. Hence, it indicates that co-integration exists.

The results of CUP-FM and CUP-BC indicated that the REO and REC, eco-innovation, R&D expenditures, and technology exports are associated with CO2 emissions negatively. The findings also revealed that industrialization positively and significantly affects CO_2 emissions. These associations are mentioned in Table 9.

Research results Tables 5 and 6 show that oil price has a positive and statistically significant impact on corporate financial performance. That is, an increase in oil prices makes energy enterprises in Vietnam more profitable, and conversely, when oil prices fall, the profits of energy enterprises decrease. This result can explain that Vietnam is a country that is not yet self-sufficient in energy security, so its oil source depends on imports in the world market. Enterprises in the industry often import a large amount of oil to reserve in case of low prices, and when oil prices are high, businesses prioritize selling this oil and that brings more efficiency (Nguyen, 2015).

Research results Tables 5 and 6 show that green energy investment has a positive and statistically significant impact on corporate financial performance. That is, an increase in green investment makes energy enterprises in Vietnam more profitable, and conversely, when they neglect "pay to green" notion, the performance might be affected. This result can explain that Vietnam is a country that is not yet self-sufficient in energy security, so organizations highly emphasize on green investment, they would achieve greater competitve edge over others. This way, they will become more effecienct in green related energy investment, hence, become a driving force of sustainable development (Chen and Ma, 2021).

Table 3: Correlation matrix

	ROA	Oil	Debt	GEI	Policy	Size	Growth	TANG	Age	Board	Gender
ROA	1.000										
Oil	0.128	1.000									
Debt	0.821	0.543	1.000								
GEI	0.621	0.234	0.432	1.000							
Policy	−0.112	0.456	−0.233	0.342	1.000						
Size	0.312	0.127	0.323	0.546	0.431	1.000					
Growth	0.521	0.314	0.546	0.765	0.222	0.332	1.000				
TANG	0.323	0.136	0.325	0.231	0.146	0.347	0.652	1.000			
Age	0.125	0.314	0.544	0.123	0.118	0.326	0.334	0.143	1.000		
Board	0.326	−0.424	0.113	0.215	0.325	0.434	0.447	0.211	0.215	1.000	
Gender	0.124	−0.135	0.322	0.213	0.123	0.232	0.218	0.223	0.281	0.543	1.000

Source: Stata 15

Table 4: VIF analysis

Variable	VIF	1/VIF	VIF	1/VIF
	ROA		ROE	
Debt	3.12	0.3205	3.22	0.3105
GEI	3.21	0.311	2.98	0.3355
Policy	3.11	0.3215	2.43	0.4115
Size	2.42	0.4132	2.41	0.4149
Growth	2.54	0.3937	2.54	0.3937
Oil	2.01	0.4761	2.13	0.4694
TANG	1.21	0.8264	1.33	0.7518
Age	1.32	0.7575	1.54	0.6493
Board	1.11	0.9009	2.12	0.4716
Gender	1.10	0.9091	1.08	0.9259
Mean VIF	2.115		2.178	

Source: Stata 15

Table 5: CSD

Variables	Breusch-Pagan LM	Pesaran scaled LM	Pesaran CD
ROA	463.765***	31.548***	21.244***
ROE	200.858***	11.844***	20.832***
Oil	221.950***	21.038***	5.923***
Policy	108.540***	20.876***	2.212***
GEI	104.240***	20.876***	2.212***
Debt	201.848***	22.655***	3.055***
Size	191.828***	19.958***	22.850***
Growth	223.950***	21.038***	5.923***
TANG	108.940***	20.876***	2.212***
Age	109.720***	20.836***	3.212***
Board	464.865***	31.545***	25.244***
Gender	211.022***	20.429***	11.234***

Table 6: CADF and CIPS unit root tests result

Variables	CIPS		CADF	
	Level	1st difference	Level	1st difference
GEI	----	−4.342***	----	−5.333***
REO	−5.532***	----	−4.902***	----
REA	−4.092***	----	−4.111***	----
Oil	−2.291***	----	−3.463***	----
policy	−4.032***	----	−4.231***	----
board	−2.121***	----	−3.263***	----
Debt	----	−4.002***	----	−5.382***
Age	----	−5.322***	----	−4.454***
Size	----	−3.022***	----	−3.091***
Gender	----	−3.344***	----	−2.456***
Growth	----	−4.337***	----	−3.372***

Table 7: Co-integration test results

Model	No shift		Mean shift		Regime shift	
	Test stat	P-value	Test stat	P-value	Test stat	P-value
LM_τ	−2.490	0.00	−4.803	0.00	−5.002	0.00
LM_φ	−4.039	0.00	−3.102	0.00	−3.982	0.00

Table 8: CUP-BC and CUP-FM test results

Variables	CUP-FM		CUP-BC	
	Coeff	t-stat	Coeff	t-stat
OIL	0.526***	3.291	0.534***	3.102
POLICY	0.289***	2.164	0.627***	4.093
GEI	1.039***	0.299	0.720***	5.902
DEBT	−1.982***	−3.102	−1.382***	−2.181
SIZE	0.583**	2.416	2.222***	3.872
GROWTH	0.328***	4.182	0.654***	4.327
TANG	1.822***	2.102	1.2092***	2.281
AGE	0.673**	2.716	2.122***	2.072
BOARD	0.328***	5.182	0.654***	4.227

Dependent Variable: ROA

Table 9: CUP-BC and CUP-FM test results

Variables	CUP-FM		CUP-BC	
	Coeff	t-stat	Coeff	t-stat
OIL	0.426***	4.291	0.634***	3.102
POLICY	0.389***	1.264	0.517***	4.093
GEI	1.029***	2.319	0.620***	5.822
DEBT	−1.872***	−4.212	−1.282***	−2.181
SIZE	0.493**	3.436	2.222***	2.822
GROWTH	0.326***	4.282	0.654***	5.327
TANG	1.821***	3.201	1.292***	2.181
AGE	0.623**	3.214	2.122***	3.172
BOARD	0.338***	4.122	0.654***	5.227

Dependent Variable: ROE

Research results in Table 8 as well as Table 9 suggested that monetary policy has a positive effect on financial performance, that is, a suitable monetary policy causes the deposit rate to decrease, which will make financial performance worse. of the business is improved. Indeed, loan interest rates have an effect on business operations, if enterprises borrow capital with high interest rates, it means that enterprises have to only have a high cost of capital and therefore it is difficult for enterprises to ensure profits. Usually, countries with good monetary policy are often associated with

stable macroeconomics, maintaining low interest rates and thus helping businesses to maintain appropriate borrowing rates.

The research results also show that the board of directors has a positive impact on the financial performance of the business. That is, the larger the board size, the more efficient the business becomes. This may explain that, when the firm has a higher board size, it means that the business is operated by more supervision and therefore governance decisions are often more appropriate. This result is similar to the study by Abdul Gafoor et al. (2018) finding that the number of board meetings and the number of board members are very important for business performance in the enterprise.

5. CONCLUSION

The energy industry always has an important position to ensure the demand for energy use in production and consumption in each country. The energy industry often requires large capital investments to invest in fixed assets, distribution networks and businesses. The monetary policies of the country are often administered to help businesses access capital at an appropriate cost of capital, especially low interest rates that can support businesses in doing business. Research and evaluate the impact of capital structure and monetary policy on financial performance at 45 typical energy enterprises listed on the Vietnam Stock Exchange, time to collect data. In the period from 2010 to 2021, the research results confirm that: choosing a capital structure in favor of equity has the ability to improve the financial performance of enterprises. The expansionary monetary policy has the ability to promote production and business in enterprises, making them more efficient. In addition, firms with large board sizes are often more efficient. Further, increasing the world oil price also enhances the firm performance in the case of Vietnam.

REFERENCES

Abdul Gafoor, C.P., Mariappan, V., Thyagarajan, S. (2018), Board characteristics and bank performance in India. IIMB Management Review, 30(2), 160-167.

Abeywardhana, D.K.Y. (2017), Capital structure theory: An overview. Accounting and Finance Research, 6(1), 133-138.

Ajayi, F.O., Atanda, A.A. (2012), Monetary policy and bank performance in Nigeria: A two-step cointegration approach. African Journal of Scientific Research, 9(1), 463-476.

Bai, J., Kao, C., Ng, S. (2009), Panel cointegration with global stochastic trends. Journal of Econometrics, 149(1), 82-99.

Bjørnland, H.C. (2009), Oil price shocks and stock market booms in an oil exporting country. Scottish Journal of Political Economy, 56(2), 232-254.

Broz, J.L., Plouffe, M. (2010), The effectiveness of monetary policy anchors: Firm-level evidence. International Organization, 64(4), 695-717.

Chang, Y., Sickles, R.C., Song, W. (2017), Bootstrapping unit root tests with covariates. Econometric Reviews, 36(1-3), 136-155.

Chen, Y., Ma, Y. (2021), Does green investment improve energy firm performance? Energy Policy, 153, 112252.

Cuevas-Vargas, H., Cortés-Palacios, H.A., Lozano-García, J.J. (2022), Impact of capital structure and innovation on firm performance. Direct and indirect effects of capital structure. Procedia Computer Science, 199(2), 1082-1089.

Dayanandan, A., Donker, H. (2011), Oil prices and accounting profits of oil and gas companies. International Review of Financial Analysis, 20(5), 252-257.

Dutta, A., Jana, R.K., Das, D. (2020), Do green investments react to oil price shocks? Implications for sustainable development. Journal of Cleaner Production, 266, 121956.

Elyasiani, E., Mansur, I., Odusami, B. (2011), Oil price shocks and industry stock returns. Energy Economics, 33(5), 966-974.

Eyraud, L., Clements, B., Wane, A. (2013), Green investment: Trends and determinants. Energy Policy, 60, 852-865.

Filis, G., Degiannakis, S., Floros, C. (2011), Dynamic correlation between stock market and oil prices: The case of oil-importing and oil-exporting countries. International Review of Financial Analysis, 20(3), 152-164.

Fischer, C., Newell, R.G. (2008), Environmental and technology policies for climate mitigation. Journal of Environmental Economics and Management, 55(2), 142-162.

Gupta, K. (2016), Oil price shocks, competition, and oil and gas stock returns-Global evidence. Energy Economics, 57, 140-153.

Hammoudeh, S.M., Yuan, Y., McAleer, M. (2009), Shock and volatility spillovers among equity sectors of the Gulf Arab stock markets. The Quarterly Review of Economics and Finance, 49(3), 829-842.

He, L., Zhang, L., Zhong, Z., Wang, D., Wang, F. (2019), Green credit, renewable energy investment and green economy development: Empirical analysis based on 150 listed companies of China. Journal of Cleaner Production, 208, 363-372.

Imoisi, A.I., Olatunji, L.M., Ekpenyong, B.I. (2013), Monetary policy and its implications for balance of payments stability in Nigeria: 1980-2010. International Journal of Economics and Finance, 5(3), 196-204.

Jensen, M.C., Meckling, W.H. (1976), Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3, 305-360.

Journeault, M., Perron, A., Vallières, L. (2021), The collaborative roles of stakeholders in supporting the adoption of sustainability in SMEs. Journal of Environmental Management, 287, 112349.

Kasim, T., Haracic, M., Haracic, M. (2018), The improvement of business efficiency through business process management. Economic Review Journal of Economics and Business, 16(1), 31-43.

Margaritis, D., Psillakim, M. (2010), Capital structure, equity ownership and firm performance. Journal of Banking and Finance, 34(3), 621-632.

Mishra, P.K., Pradhan, B.B. (2013), Financial innovation and effectiveness of monetary policy. Available from: https://www.ssrn.com/abstract=1262657

Arfaoui, M., Abaoub, E. (2010), On the determinants of international financial integration in the global business area. Journal of Applied Economic Sciences, 5(3), 153-172.

Muhammad, H., Shah, B., Ul Islam, Z. (2014), The impact of capital structure on firm performance: Evidence from Pakistan. Journal of Industrial Distribution and Business, 5(2), 13-20.

Nguyen, T.D. (2015), Oil and Gas Industry report. Available from: https://www.psi.vn/Reports/2654/bao-cao-nganh-dau-khi.aspx

Norvaisiene, R. (2012), The impact of capital structure on the performance efficiency of Baltic listed companies. Economics of Engineering Decisions, 23(5), 505-516.

Oltra, V., Jean, M.S. (2009), Sectoral systems of environmental innovation: An application to the French automotive industry. Technological Forecasting and Social Change, 76(4), 567-583.

Park, J., Ratti, R.A. (2008), Oil price shocks and stock markets in the U.S. and 13 European countries. Energy Economics, 30(5), 2587-2608.

Pratheepkanth, P. (2011), Capital structure and financial performance:

Evidence from selected business companies in Colombo stock exchange Sri lanka. Journal of Arts, Science and Commerce, 2(2), 171-183.

Salim, M., Yadav, R. (2012), Capital structure and firm performance: Evidence from Malaysian listed companies. Procedia Social and Behavioral Sciences, 65, 156-166.

Song, X., Yang, B. (2022), Oil price uncertainty, corporate governance and firm performance. International Review of Economics and Finance, 80, 469-487.

Tolliver, C., Keeley, A.R., Managi, S. (2020), Policy targets behind green bonds for renewable energy: Do climate commitments matter? Technological Forecasting and Social Change, 157, 120051.

Ulbert, J., Takács, A., Csapi, V. (2022), Golden ratio-based capital structure as a tool for boosting firm's financial performance and market acceptance. Heliyon, 8(6), e09671.

Westerlund, J., Edgerton, D.L. (2008), A simple test for cointegration in dependent panels with structural breaks. Oxford Bulletin of Economics and Statistics, 70(5), 665-704.

Zaman, R., Arslan, M., Sohail, M., Malik, R.K. (2014), The impact of Monetary policy on financial performance: Evidence from banking sector of Pakistan. SSRN Electronic Journal, 4(8), 119-124.