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RESEARCH ON FACTORS AFFECTING PROFITABILITY OF PETROLEUM ENTERPRISES LISTED ON VIETNAM STOCK MARKET

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This research was conducted to identify factors affecting firms' profitability with empirical evidence in Vietnam. The authors selected a sample of 20 petroleum enterprises listed on Vietnam stock market from 2014 to 2018. By using the regression models OLS, FEM, REM, the authors found the following factors as net profit, total asset turnover, firm size, debt ratio, and cost ratio affecting the profitability of petroleum enterprises in Vietnam.

Keywords: *profitability, ROA, ROE, petroleum enterprises, regression models.*

1. Introduction

Profitability is a concept that reflects the relationship between profitability and enterprise size. Profitability shows us the performance of the business in a certain period of time (Nguyen Van Ngoc, "Dictionary of Economics", National Economics University).

In recent years, there have been many domestic and foreign studies on factors affecting the profit rate of enterprises, but the number of intensive research works in Vietnam, especially in the group of natural resources such as oil and gas is still limited.

Oil and gas is considered a strategic resource of countries, an indispensable energy source in the 21st century including Vietnam. Vietnam Oil and Gas industry has made a great contribution to the socio-economic development of the country, effectively

performing its role as an economic leader, as a tool of macroeconomic regulations of the Government.

Oil and gas is considered a super-profitable industry, but also risky. Today, the petroleum industry in Vietnam is struggling from pressure from China in the context of the South China Sea sovereignty dispute between Vietnam and China. For joint stock companies, especially those in the oil and gas industry group, analyzing the factors affecting the profit rate will help businesses better understand the strengths as well as the existence in the business to make timely decisions to help increase the value of assets of the business, help investors make the right investment decisions.

On this basis, the authors conducted a study on the factors affecting the profitability of petroleum enterprises listed on VietNam stock market to bring meaning both theoretically and practically. We

mainly clarify two issues in this paper: (1) What factors affect the profitability of petroleum enterprises in Vietnam?; (2) What is the theoretical explanation of micro factors for the change in the profitability of Vietnam's petroleum enterprises?

2. Literature review

For researches on the influence of factors on rate of return, the method of correlation and analysis of recess were used quite commonly. For example, Mohammed Ziaur Rehman et al., (2014) studied the topic "Choosing financial ratios is the deciding factor in the profitability of evidence from the oil industry in Saudi Arabia", they also used recessed analysis techniques to examine the relationship and effects of variables independent of dependent variables. E.C., Mary et al., (2013) also used the Pearson correlation model and elastic analysis to clarify the relationship between financial ratios and profit ratios in the Nigerian pharmaceutical industry.

Lena A. Sessian et al., (2018) studied structural and market-related factors, looking at their impact on the profitability of listed companies by using a multiples-recessive analysis model to measure the impact of variables on profitability.

Along with that, Kaukab Abid Azhar, Nawaz Ahmed (2019) studied the relationship between the scale and profit share of textile companies listed in Pakistan. With research data from 10 textile companies listed on the Pakistan Stock Exchange from 2012 to 2016, the authors used correlation analysis models and linear regression model for experimental analysis.

Researchers from all over the world have developed various research models to analyse and clarify the factors that influence firm's profitability in different industry groups. Studies have also identified macro- and micro-factors that have a direct or indirect impact on the firm's profitability over each specific period.

Mohammed Ziaur Rehman et al., (2014) studied the topic "Selection of financial ratios is the deciding factor in profits - evidence from the oil industry in Saudi Arabia". With the secondary data taken

from the financial documents of 10 petroleum companies listed on the Saudi stock exchange from 2008 to 2012. The results of the study showed that the inventory turnaround, the ratio of long-term debt to equity had a significant impact on the profitability of the petroleum company in Saudi Arabia. But, the study accepted the assumption that the profitability ratio of creditors did not have a significant relationship with the firm's profitability.

E.C., Mary et al., (2013) clarified the relationship between financial ratios and profitability in the Nigerian pharmaceutical industry. The survey sample included pharmaceutical enterprises in Nigeria between 2001 and 2011. The authors said that pharmaceutical companies did not neither use their assets effectively nor take advantage of any discounts related to timely payments, and those led to increase sales costs, and reduce profitability.

Kulkanya Napompech (2012) studied the impact of working capital on the profitability of listed companies in Thailand. 2007 to 2009. The result of the study show the inversely proportional relationship between gross profit and inventory conversion time and accounts receivable, which is similar to those found in previous studies by Shin and Soenen (1998), and Delagger (2003). The author found that two actions that could increase the rate of profit are reducing inventory conversion times by producing and selling goods faster, and reducing recess in stages.

In a research paper in 2018, Lena A. Sessian et al., studied the impact of structural and market-related factors on the profit share of companies listed on the stock exchange. The result indicated that the preceding variables explained 26.4% and 31.4% with ROA and ROE, respectively at a meaningful 5%. Many researchers have debated this result, however, the uniqueness of this study is that the assessment of credit ratings was considered a factor explaining the rate of return of listed companies.

In a paper studying the impacts of financial leverage, growth and firm size on the profitability of Jordan-listed industry companies (Nawaf Ahmad

Salem AlGhusin, 2015), the author collected data of 25 listed industry companies in Jordan over a 10-year period (1995-2005), through studying and analyzing, the result showed that there was a significant impact of financial leverage and growth on the profitability of companies in the industry. By using a linear recess analysis model, the author said that the firm size of the business had a positive relationship to the profitability, but it was insignificant. This finding is similar to the research result of Nguyen and Neelakantan (2006), and Biger et al. (2008). The growth potential of industrial companies in Jordan also had a positive relationship to profitability, the findings contrast with those of Biger et al. (2006).

In 2019, Kaukab Abid Azhar and Nawaz Ahmed studied the relationship between the scale and the profitability of listed textile companies in Pakistan. With research data from 10 textile companies listed on the Pakistan Stock Exchange from 2012 to 2016, the authors found that there was no specified relationship between the size of the business and the profitability in the case of Pakistani textile companies. The results showed that there was an inverse correlation between total assets and the company's profit ratio. This result contradicts many previous studies conducted in other fields.

Earlier, in 2011, Camelia Burja conducted a research measuring the profitability according to ROA ratio. The author considered fixed assets, debt ratio, financial leverage, revenue for current assets, revenue-to-equity, investor's gross profit ratio and cost ratio as factors that affected the profitability. By testing four models, the author showed overall results on the existence and strong impact of inventory, debt ratio, financial leverage, and capital efficiency.

In addition to foreign studies, there are a number of researches on factors affecting the profitability that have been conducted in Vietnam, however, there are only a few researches in the petroleum industry. Most researches focus on analyzing the impact of working capital on profitability, not fully

exploiting the relationship between financial ratios and profitability of enterprises.

Bui Ngoc Toan (2016) studied the topic "Impact of working capital policy on profitability-to-total assets of Vietnam's real estate enterprises". By using panel data of 35 real estate enterprises listed on Vietnam's stock exchange from 2010 to 2014, the author used the Multi linear regression model to measure the impact of independent variables on dependent variables included in the model. The results of the study showed that profitability-to-total assets was impacted in the opposite direction by the average collection period, inventory transfer cycle, cash conversion cycle. The author also found the same impact of the size of the business, the leverage ratio, the rate of economic growth on profitability-to-total assets.

In 2018, Dr. Duong Thi Hong Van and Tran Phuong Nga studied the topic "The impacts of working capital management on the profitability of enterprises: Evidence from building materials enterprises in Vietnam". The authors put out many research hypotheses and used OLS, REM, FEM models in the research paper. The results clarified the following issues: (1) inventory transfer cycle, average collection period, firm size had the positive relationship with the profitability-to-total assets; (2) the average collection period, cash conversion cycle, debt ratio, current payment rate, fixed asset ratio were in contrast to the profitability-to-total asset.

Previously, in 2016, Nguyen Tuyet Khanh carried out the research: "Using the Dupont model to analyze the financial performance of the petroleum enterprises listed on the stock exchange". By using the Dupont financial model, the author analyzed ROA and ROE. The Dupont model divides ROA into two parts: return on sales (ROS) and total asset turnover (TAT); ROE is divided into 3 parts: ROS, TAT and financial leverage. Research has shown that financial analysts can find specific causes that affect the volatility of ROA and ROE targets based on the Dupont model. Specifically, for the petroleum enterprises, the reason for ROA and ROE fluctuating

tuations in 2014 was the increase of production costs. ROA and ROE volatility in 2015 was due to a decrease in total assets, in addition, revenue and profitability both declined significantly. These caused the profit-to-revenue ratio to decrease, while poor asset performance was the main reason for these decreases.

Based on the results of the above researches, the authors set out some hypotheses for the paper as follows:

Hypothesis 1: The average collection period (ACP) shows the average number of days for businesses to recover money from customers. Therefore, the smaller the average collection period is, the better it is for businesses to collect debts, and it also demonstrates the effectiveness of commercial credit policy. This issue has been mentioned in previous studies, namely: research by Sharma & Kumar (2011) and research by Duong Thi Hong Van (2018) has shown that the average collection period has a favorable impact on profitability. Meanwhile, studies by Mumtaz et al (2011), research by Afeef (2011), Gul's 2013 study and a study in the Vietnamese market by Tu Thi Kim Thoa and Nguyen Thi Uyen Uyen (2004) resulted in the average collection period having the opposite impact on profitability.

H1: The average collection period (ACP) has a negative impact on profitability.

Hypothesis 2: Shortening the inventory transfer cycle will accelerate the business process, increase revenue, and reduce the costs associated with holding inventory, thereby increasing the profitability of the business. Experimental evidence shows that inventory transfer cycle has the opposite effect on profitability, as the researches of Mumtaz et al (2011), Afeef (2011), Gul (2013), Tu Thi Kim Thoa and Nguyen Thi Uyen Uyen (2004).

H2: Inventory transfer cycle (ITR) has negative a impact on the profitability.

Hypothesis 3: AP is the cost-to-revenue ratio. Minimizing the cost to pay is what every business wants. Thus, the smaller the cost is, the smaller the cost/revenue ratio is.

H3: AP has a positive impact on the profitability.

Hypothesis 4: Total Asset Turnover (TAT) is the Net Revenue-to-Total Net Assets ratio. This factor is used to assess the effectiveness of total assets in business. It shows how much co-assets are originally collected. The higher this ratio is, the more efficient the business will be, which also means an increased profitability on total assets. Therefore, the total asset turnover ratio has a favorable impact on the rate of return. This impact was mentioned in Nguyen Tuyet Khanh's research in 2016.

H4: Total Asset Turnover (TAT) has a positive impact on the profitability.

Hypothesis 5: In fact, there have been many conflicting research results on the impact of firm size on the profitability. Research by Sharma & Kumar (2011) indicates that the size of the business has the opposite effect on the profitability. Meanwhile, the researches of Mumtaz et al (2011) and Gul's research (2013) show that the firm size has the positive impact on the profitability. Large-scale businesses will have the power to negotiate with suppliers to enjoy many preferential policies such as high discounts, longer payment periods, which have an advantage over small-scale companies in leveraging resources to maximize profits.

H5: Firm Size (SIZE) has a positive impact on the profitability.

Hypothesis 6: The debt ratio or financial leverage (LEV) is the ratio of total debt to total assets expressing the level of debt of the enterprise. Businesses with higher debt ratios are more dependent on increased financial cost loans that in terms of business in efficiency will pressure the profits, thereby reducing profits so businesses need to choose an optimal debt ratio is essential. Thus, the debt ratio has the opposite effect on the profitability. This hypothesis is similar to the study of Song Thi Ha Thanh (2017).

H6: LEV has a negative impact on the profitability.

Hypothesis 7: Duong Thi Hong Van (2018) concluded in her research that the fixed asset ratio

(FATA) has a possitive impact on the profitability of the business.

Fixed assets are long-term assets. Large fixed assets also affirm the advantages of the business and the opportunity to grow larger than smaller companies.

H7: FATA has a possitive impact on the profitability.

Hypothesis 8: Besides the above factors, inflation is also a factor which must be taken into account for its impact on the profitability. There have been many experimental researches existing a opposite relationship between the return on share investment and inflation (Bodie, 1976; Fama, 1981; Adams and CTG., 2004). In 1981, Fama explained that the negative correlation between inflation and the share yield was due to the existence of two parallel relationships, inflation with economic activities and economic activities with the profit margin of shares. In particular, the profit margin of shares had the same direction with economic activity, and eco-

nomie activity was in contrast to inflation. As a result, the return on shares was in the opposite direction to inflation. However, this is an inflation research with a return on shares, so, "Does inflation have the same or opposite impact on the profitability of Vietnam's petroleum enterprises?". In response to that issue, the authors included inflation in the model and conducted analysis.

H8: The impact of inflation (LP) on profitability is possitive/negative.

3. Research Methodology and Data

3.1. Research Methodology

The authors used factor models and variations of factor models such as FE models (Fixed Effect) and RE (Random Effect).

Variables included in the model include:

Dependent variable is ROA used to measure profitability on total assets.

Independent variables are the following variables: *ACP, ITR, AP, TAT, SIZE, LEV, FATA, LP.*

Table 1: Describe variables and expected impact marks in the model

No.	Symbol	Variable	Formulas	Expected mark
Independent variables				
1	ROA	Return on Asset	Return/Total Assets	
Dependent variables				
1	ACP	Average collection period	(Average receivables/Sales)*365	(-)
2	ITR	Inventory turnover ratio	COGS/Average Inventory	(-)
3	AP	Cost-to-revenue ratio	Cost/Revenue	(+)
4	TAT	Total Asset Turnover	Revenue/Total Assets	(+)
5	SIZE	Firm size	Logarit(Total Assets)	(+)
6	LEV	Financial leverage	Total Debt/Total Assets	(-)
7	FATA	Fixed asset ratio	Fixed Asset/Total Assets	(+)
8	LP	Infaltion	Data of WorldBank	(-)/(+)

Source: Collected by authors

The authors performed multiple regression model on the panel data to investigate the extent and relationship direction of variables after controlling the company's characteristics in the industry. The author used OLS, FE, and RE, which are common techniques for estimating panel data. Specifically, the authors use the following linear model:

$$ROA = \beta_0 + \beta_1 ACP_{it} + \beta_2 ITR_{it} + \beta_3 AP_{it} + \beta_4 TAT_{it} + \beta_5 SIZE_{it} + \beta_6 LEV_{it} + \beta_7 FATA_{it} + \beta_8 LP_{it} + u_t$$

3.2. Data

The authors used annual secondary data sheets of 20 companies in the Vietnam petroleum industry listed from 2014 to 2018.

Data was set up as panel data to use the advantages of estimating with observed numbers or in-rises, thereby improving the efficiency of estimating tools. In addition, panel data analysis

can control non-observed time hemanship as factors that show differences between companies. Finally, tool variables are easily available with panel data to correct endogenous problems in the research model, (Arellano & Bond 1991).

3.3. Analysis method

The authors used the multiple regression model to maximize the impact of independent variables on dependent variables. First, the authors examined the multi-collinearity phenomenon between independent variables in the model through Variance magnification factor (VIF), if VIF is greater than or equal to 10, multi-collinearity is evaluated as severe (Gujarati, 2003). After testing the multicollinearity, the authors conducted a regression analysis. The author used regres-

sion, OLS, FE and RE and used the Hausman test to find a suitable model with the research data. When the FE/RE was found, the Wooldridge test and LM test would be performed to examine the model's defects. In the case of defects, the authors proceed to modify the model to make it more effective.

4. Results and Discussions

4.1. Descriptive statistics

Table 2: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	100	4.61	5.789044	-12	27
ACP	100	66.99	167.7138	1	1387
ITR	100	2594.94	6797.567	9	63078
AP	100	23.7801	52.67711	1.69463	473.8631
TAT	100	119.66	84.15489	1	366
SIZE	100	6.003659	1.026536	4.137924	7.909325
LEV	100	192.32	1.026536	7	1726
FATA	100	22.47087	20.46615	1.11103	78.89133
LP	100	3.16	1.248191	0.9	4.7

Source: Collected by authors from Vietstock data

Table 2 presents a summary of statistic description. It shows that the mean value of ROA for total sample is 4.61. These indicators show that listed companies do operate really efficiently during the study period.

4.2. Correlation analysis

Table 3 presents correlation coefficients among independent variables: ACP has the strongest correlation with AP (0.1985) and weakest correlation with FATA (0.0156); ITR correlated most strongly with FATA (0.2042) and weakest correlated with SIZE (0.0025); AP correlated strongest with FATA (0.0210) and weakest correlated with LP (0.0108). However, the correlation coefficient only evaluates two-way relations among independent variables but cannot evaluate the one-way effects of these vari-

Table 3: Correlation coefficients

	AR	ITR	AP	TATR	LP	FATA	SIZE	LEV
ACP	1							
ITR	-0.0766	1						
AP	0.1985	-0.0903	1					
TAT	-0.2419	0.1935	-0.2284	1				
LP	0.0978	0.0243	0.0108	0.0277	1			
FATA	0.0156	0.2042	0.0210	-0.0784	-0.0164	1		
SIZE	-0.0052	0.0025	-0.1195	0.3306	-0.0004	0.4954	1	
LEV	-0.1253	-0.1371	-0.0915	-0.1365	0.0272	-0.3057	-0.2853	1

Source: Collected by authors from Vietstock data on the dependent variable. Therefore, the author continues to perform regression analysis.

4.3. Results of hypothesis testing

The authors tested the phenomenon of multicollinearity by VIF, and results <10 (Table 4), so the model variables do not have multiple collinearity.

Check regression model to select RE and OLS with results obtained OLS regression is not suitable for the model (Table 5). Next, the authors used the Hausman test to choose between the fixed effects FE regression model and the random effects RE regression model (Table 6). The RE test is considered to be more optimal than the FE model. Then, the authors use the xtserial command to check that there is no string correlation in the model. Breusch and Pagan Lagrangian test shows that the model has the phenomenon of variance (Table 7).

Table 5: Test of REM and OLS regression models

Model	Chi2	Pro>Chi2	RE/OLS
ROA	33.66	0.0000	RE

Source: Stata data analysis

After applying Fixed effects model (FE) and Random effects model (RE), the authors calibrated it with GLS model to correct the phenomenon of

Table 4: Multicollinearity testing

Variable	VIF	1/VIF
FATA	2.44	0.409346
SIZE	1.91	0.523412
TAT	1.67	0.599164
LEV	1.32	0.755992
AP	1.23	0.814936
ACP	1.21	0.827248
ITR	1.20	0.831913
LP	1.02	0.976506
Mean VIF	1.56	

Source: Stata data analysis

Table 6: Hausman test

Model	Chi2	Prob >Chi2	FE/RE
ROA	8.87	0.3535	RE

Source: Stata data analysis

variance to ensure that the estimates are obtained firmly and efficiently. (Table 8)

After adjusting by GLS model to correct the phenomenon of variance, the authors have the follow-

Table 7: Wald test (Breusch and Pagan Lagrangian test)

Model	Chi2	Prob >Chi2	FE/RE
ROA	33.66	0.0000	There is a phenomenon of variable

Source: Stata data analysis

Table 8: Data Estimation Results with REM model

ROA	FE	RE	RE adjusting
ACP	0.00471	0.00233	-0.000414
ITR	0.0000491	-0.00000338	-0.0000254
AP	-0.0306***	-0.0295***	-0.00542
TAT	0.0375***	0.0221***	0.0137***
LP	0.155	0.186	0.0891
FATA	-0.0127	-0.00364	-0.00236
SIZE	1.476	0.959	0.667*
LEV	-0.00705	-0.00238	-0.00123*

Note: ***, **, * level of statistical significance is equal to 1%, 5% and 10%, respectively

ing results: R2 equal to 0.562 proves the interpretability of the model is quite good, with the Prob index of 0.000 allowing to reject the assumption that all coefficients of the estimation are simultaneously zero, so the regression model is considered to be fit.

AP is inversely related to ROA. This result shows that the increase in the firm's cost coefficient is the main factor causing the ROA to change, namely, the decrease in ROA. Good management of operating costs of enterprises helps businesses save costs and arrange business models effectively, increasing the profitability rate of businesses.

Through the analysis of the regression model, the authors also find a positive effect of TAT with ROA, the significance level of 1%, which means that the more efficient the enterprise uses assets, the higher the rate of return on assets production higher and vice versa.

Besides, the authors also find a positive relationship between SIZE and ROA. The size of the firm is also one of the determinants of profitability, it has a positive effect on the profitability rate of firms in the petroleum industry; the larger the enterprise is, the higher the profitability is.

LEV has a negative impact on the profitability of the firm, which can be explained as follows: in an enterprise, if the goods are not sold, the opportunity to sell will be lost, thus losing some profit; If the goods are sold too much, it will increase expenses for receivables, risk of bad debts arising, risks of not being able to recover

debts also increase. Lowering the standard of selling subject to an increase in average collection period can lead to an increase in revenue and profit, but a sale will lead to an increase in receivables and associated costs. This result is also consistent with the theory and previous studies that a tight credit policy will increase the profitability of a firm as long as it does not cause a loss of revenue.

5. Conclusions

The authors examined the factors affecting the profitability of 20 enterprises in the petroleum industry listed on the Vietnamese stock market in the period 2014-2018. The authors applied regression methods on panel data, the research results show that ROA is negatively affected by cost coefficient (AP), financial leverage (LEV); Total asset turnover (TAT) and firm size (SIZE) are factors that have a positive impact on the profitability ROA.

The research results have important implications for policy makers in finding solutions to develop enterprises in the petroleum industry in particular and businesses in general in Vietnam. Specifically, it is necessary to improve the management of operating costs in enterprises in the petroleum industry, expenses account for a very large proportion, reducing the profit earned by the business. The costs for production of enterprises always have certain fluctuations in each period, so managers need to analyze and determine a reasonable cost structure as well as optimal funding for business in each of those periods.

In addition, managers must control the use of assets in the business, avoid using them wastefully or for wrong purposes. Research results also show that businesses need to pay more attention in investing in fixed assets for production and business. At the same time, research also observes that an increase in debt ratio can reduce a company's performance because of high interest rates, exhausted cash flows, or ineffective debt monitoring leading to negative effects on profitability. Therefore, businesses need to consider when deciding to issue debts or access bank loans to invest in developing production facilities.

The results of this research are empirical evidence of the petroleum industry in Vietnam, so it brings practical value to businesses in this industry. However, the authors still has many limitations as observed samples; the scope of the research...; some indicators reflecting other profitability of the business (such as ROE, ROS, ROI) have not been considered...

Although the authors have used several regression models (OLS, RE, FE) to control normality problems such as heterogeneity, unobserved effects, and potential endogenous problems, the authors are not sure that all econometric problems are completely under

control, especially endogenous problems. This is also the research direction for the next paper. ♦

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Summary

Bài báo này được thực hiện nhằm nghiên cứu các nhân tố ảnh hưởng đến tỷ suất sinh lợi của doanh nghiệp với bằng chứng thực nghiệm tại Việt Nam. Nhóm nghiên cứu đã chọn mẫu gồm 20 doanh nghiệp ngành dầu khí được niêm yết trên thị trường chứng khoán Việt Nam với 100 quan sát từ năm 2014 đến 2018. Bằng phương pháp sử dụng mô hình hồi quy OLS, FEM, REM, nhóm nghiên cứu đã chỉ ra các yếu tố: Lãi ròng, Hệ số vòng quay tổng tài sản, Quy mô doanh nghiệp, Hệ số nợ, Hệ số chi phí có ảnh hưởng tới tỷ suất sinh lợi của các doanh nghiệp ngành dầu khí Việt Nam.

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