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An Investigation on Impact Factors that Affect the Business Efficiency of Oil and Gas Enterprises in Vietnam

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Abstract

Oil and gas's businesses have important role in economy. Improving performance of oil and gas's businesses were management target of those businesses and also the requirements of state management. This paper examines the factors that affect to oil and gas's businesses, analyze trends impact of these factors on the efficiency. On that basis, the paper give policy implications for state management and corporate governance.

Keywords: Business efficiency; Influencing factors; Models; Research variables

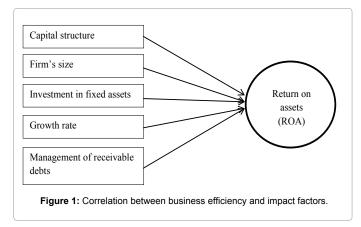
Rationale of the Research Model

This research was conducted in the recession of the stock market in Vietnam, when the stock prices do not reflect the real market value of equity that companies have on the stock trading floor. Therefore, the indicators used in our model to measure the efficiency of petrol business are the financial efficiency indicators which are the return on asset (ROA) and return on equity (ROE).

ROE indicator can be easily used to compare between different companies in one section on different scales, between companies in different sectors, or between different investment activities. However, the biggest advantage of ROE is that it can be distorted easily by the financial strategies of the business administrators. For example, if the administrators predict the profit of the company is likely to decrease for some reasons, in order to improve its ROE the administrators would adjust the capital structure by increasing investment in debt or buying stock from cash. ROE is sensitive to the financial leverage, thus a high ROE might not indicate high efficiency.

Different from ROE, ROA indicator measures the profitability of a company on its total assets. The company's total assets include all kinds of assets, not only the net assets. However, ROA indicator should be applied in the case of comparing between different companies of one sector. For that reason, ROA indicator is used to assess how a company uses their total capital in its production despite that it is either loan or ownership capital.

Based on the previous models in the literature, our research model is represented in Figure 1.



Hypothesis of the Correlation between Business Efficiency and Impact Factors

The capital structure

According to the literature of capital structure, companies prefer capital from loans to benefit from the tax shield. When the low-cost debt and tax shield, companies will gain when increasing the debt. However, once debt/equity ratio increases, the impact of debt rate will force the increase of the required return rate of the owners, which means the cost of equity will increase. At a high level of debt/equity ratio, as well as high level of cost of debt, if companies utilize their loans ineffectively, the increased debt ratios will have negative impact that reduces the firms' performance. In the worst case it can lead to firms' bankruptcy if companies lose their ability to pay interests at debt maturity.

According to Zeitun and Tian, debt/equity ratio is one of the indicators that reflect capital structure. They showed that this ratio has a significant and negative impact on the firms' efficiency. Most of studies by Onaolapo và Kajola [1], Abbasali and Esfandiar [2], Maja Pervan and Josipa Višić [3] found that the debt ratio has negative effect on business performance at different levels.

Hypothesis 1: Capital structure has negative impacts to business efficiency.

Zeitun, Tian and Schiantarelli and Sembenelli mentioned about the impact of termed debt structure on business profit. The studies showed the positive correlation between the short-termed debt and business efficiency. Therefore, within the capital structure, the authors proposed the hypothesis that investigates the impact of termed debt structure to the business efficiency as following:

Hypothesis 2: Debt structure has positive impact to business efficiency.

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Firm's size

Theories and most of studies by Zeitun and Tian, Onaolapo and Kajola, Abbasali and Esfandiar, Maja Pervan and Josipa Visic proved the significant and positive impacts of firm's size to the business efficiency. However, other studies by Durand and Coederoy [4], Tzelepis and Skuras found no significant impacts between corporates' size and efficiency.

On the other hand, one of the most characteristic of oil and gas industry is the need of large amount of investments. Therefore, firms with large scale will have more advantages in generating profit to increase their efficiency.

Hypothesis 3: Business scale has positive impact to the business efficiency.

Fixed asset investment

Only Abbasali and Esfandiar showed that the increase of the fixed asset proportion has positive impact to the business efficiency, while other studies of Zeitun and Tian, Onaolapo and Kajola indicated the negative correlation between fixed asset proportion and business efficiency.

Oil and gas enterprises typically have a large proportion of fixed assets. Investment in these fixed assets alongside with modern technology will help firms to decrease their cost, as well as to save time and thus increase their profitability.

Hypothesis 4: Fixed investment has positive impact to the business efficiency.

Growth rate

In order to compete in the market, enterprises need to develop their business activities. Growth is one of the basic conditions for enterprise to achieve their targets. It helps enterprises to accumulate capital to invest in expanding their business activities, as well as secure a good image to customers, investors and suppliers. However, the growth in assets needs to take into consideration other factors such as: what are the objectives of growth, which assets to increase investment, which are the sponsor sources? If the companies use the undistributed profit to re-invest, the growth in assets will be the chance contributing to increase firms' revenue and profit, ROA will also increase. Vice versa, if they use mainly loans, they need to be more precautious and reconsider thoroughly between revenue and cost as well as the risks in case they do not operate effectively.

In most of studies by Zeitun and Tian, Onaolapo and Kajola, Abbasali and Esfandiar, growth rate is demonstrated to have positive influence to business efficiency.

Hypothesis 5: Growth rate has positive impact to business efficiency.

Administration capacity of receivable debts

Oil and gas enterprises have high amount of receivables, most of which are short-termed receivables. However, if they are not well-administrated, the corporates' performance will be affected. The administration of receivables relate to the exchange between risks and profitability as well as the business plans in the future. A tightened debt strategy could eliminate the chances to get high values contracts which bring about high revenues. However, if companies apply easy payment conditions, have loose management of liabilities retrieving, and do not remind customers on debts; they face more risks of not

being able to retrieve debts, and are more likely to run out of capital for their business.

The ability to manage receivable debts is assessed based on receivable debt cycle indicator and the average collection period. The average collection period is the average numbers of days it takes for a firm to convert a receivables into cash. A decrease of average collection period demonstrates good management of receivable debts. On the contrary, an increasing average collection period will diminish the capital needed for the business activities. Accordingly, firms have to out-source their capital by borrowing from banks or issuing shares. Both of these solutions generate cost of capital use and risks for enterprises.

Studies of Marian, Daniel, Dalia [5] illustrate that average collection period has negative impacts on business efficiency.

Hypothesis 6: Receivable management has negative impacts on business efficiency.

Measuring and Coding the Variables

Dependent variables

Based on literature and previous studies, the authors choose the return on assets indicator to measure the efficiency of oil and gas enterprises, and code the indicator as ROA.

Independent variables

The factors and their related variables are mentioned in section. The authors conduct measurement and coding and transfer all indicators and variables into the research model in Table 1.

Research Methods

Research sample

The research collects data from the financial reports of oil and gas enterprises that have been listed on the stock trading floors in Hanoi and Ho Chi Minh City from 2010 to 2014. The sample size is 30 enterprises that have completed financial reports in the period 2010- 2014. The research uses tables, and combines data accordingly in the chains of time and space. Two measure models have thus been combined in this research which are: Fixed effect model (FEM) and Random effect model (REM).

We analyze the correlation coefficient between independent variables to test the multi-collinearity.

From Table 2, we can see the correlation coefficients between the independent variables are relatively small, while the correlation coefficient between SIZE1 and SIZE2 is quite big (0.866). In order to avoid multi-colinearity, we eliminated SIZE2 out of the research model (as SIZE2 has bigger correlation coefficient with other independent variables than SIZE1).

We analysed the correlation coefficient between the independent and dependent variables to evaluate the impact of the independent variables on dependents ones. For each factor, we only select a representative variable that has the closest connection with the dependent variables (business efficiency). Accordingly, 5 independent variables participating into the concession model include TDTA, SIZE1, TANGB, GROWTH1, and RETURN.

Research model

The research model to be estimated as follow:

No.	Factors	Variables	Codes	Measurements	Hypothesis	
1	Capital structure	Total debt to total equity	TDTE	Debt	-	
				Total equity		
		Total debt to total assets	TDTA	Debt	-	
				Total assets		
		Short-termed debt to assets	STDTA	Short-term debts	+	
				Total assets		
2	2 Firm size Size of revenue SIZE 1 Total revenue Size of assets SIZE 2 Total assets		Total revenue	+		
			Total assets	+		
3 Investment of fixed assets		vestment of fixed Fixed assets to total assets	TANGB	Fixed assets	+	
		ratio		Total assets		
4 Growth rate		Growth rate Growth rate of revenue		Revenue this year – Revenue of previous year	+	
				Revenue of previous year		
		Growth rate of assets	GROWTH 2	Total assets this year – Total assets of	+	
				previous year		
				Total assets previous year		
5	Administration of receivable debts	3		Average receivable at the beginning and ending period x 365	-	
				Net revenue		

Table 1: Measuring and coding the independent variables.

	ROA	TDTE	TDTA	STDTA	SIZE1	SIZE2	TANGB	GROWTH1	GROWTH2	RETURN
ROA	1	-0.208	-0.351	0.063	0.187	0.108	0.044	0.14	0.271	165
TDTE	-0.208	1	0.484	0.094	-0.065	-0.02	-0.1	-0.041	-0.009	-0.052
TDTA	-0.351	0.484	1	0.031	-0.009	-0.04	-0.089	-0.011	0.038	-0.082
STDTA	0.063	0.094	0.031	1	-0.118	217	-0.520	0.069	-0.008	0.029
SIZE 1	0.187	-0.065	-0.009	-0.118	1	.866	0.224	-0.063	-0.023	-0.131
SIZE 2	0.108	-0.02	-0.04	-0.217	0.866	1	0.346	-0.073	0	-0.097
TANGB	0.044	-0.1	-0.089	-0.520	0.224	0.346	1	-0.09	0.035	0.038
GROWTH 1	0.14	-0.041	-0.011	0.069	-0.063	-0.073	-0.09	1	0.145	-0.051
GROWTH 2	0.0271	-0.009	0.038	-0.008	-0.023	0	0.035	0.145	1	-0.034
RETURN	-0.165	-0.052	-0.082	0.029	-0.131	-0.097	0.038	-0.051	-0.034	1

Table 2: Correlation Matrix amongst variables.

Independent variables	Coefficients	Prob.	
С	6.19364	0	
TDTA	-7.310342	0	
SIZE1	1.56E-13	0.0263	
TANGB	-0.217985	0.9147	
GROWTH1	0.091006	0.0687	
RETURN	-0.000341	0.0313	
R ²	0.205341		

Table 3: Result of OLS model.

 $ROA_{it} = C_i + \beta_1 TDTA_{it} + \beta_2 SIZE1_{it} + \beta_3 TANGB_{it} + \beta_4 RETURN_{it} + u_{it}$

With: i, $t \in N$

TDTA, SIZE1, TANGB, GROWTH1, RETURN are independent variables that represent financial factors of the enterprises in year t.

u_{it} is the remaining; C_i is the intercept of each enterprise,

The regression model of squared estimation:

Five observations out of 30 were stacked; there are 150 observations for each variable in the model.

The result of OLS estimation is reflected in Table 3.

The variables: TANGB, GROWTH1 do not have influence on ROA (with Prob> 5%)

The variables: TDTA, SIZE1, RETURN have impacts on ROA under the following model:

ROA	FEM			
Independent variables	Coefficient	Prob		
С	7.416225	0.001		
TDTA	-6.515525	0.0217		
SIZE1	-3.94E-13	0.1157		
TANGB	-0.077967	0.982		
GROWTH1	0.148066	0.0036		
RETURN	-0.000362	0.0375		
R ²	0.487421			

Table 4: Results of FEM.

ROA=6.193640 - 7.310342TDTA+0.00000000000156SIZE1 - 0.000341RETURN

This model can explain 20, 53% the fluctuation of ROA.

Fixed Effects Model (FEM)

Table 4 showed that variables SIZE1 and TANGB do not have impacts on the return on assets (ROA) (with the significant prob>5%).

The variables TDTA, GROWTH1 and RETURN have impacts on ROA under the following model:

ROA=7.416225 - 6.515525TDTA+0.148066GROWTH1 - 0.000362RETURN

This model can explain 48, 74% the fluctuation of ROA.

The random effects model (REM)

According to Table 5, variables SIZE1 and TANGB do not have impacts on the return in assets (ROA) (with the significant prob >5%).

Variables TDTA, GROWTH1, and RETURN have impacts on ROA under the following model:

ROA=5.994388 - 6.991100TDTA+0.117478GROWTH1 0.000352RETURN

This model can explain 16.95% the fluctuation of ROA.

However, the question is that which model is more suitable: FEM or REM. The Hausman test will be used to choose between these two models.

Hausman test

The Hausman test is used under the following hypothesis:

 H_0 : Cove $(\epsilon_i X_{it}) \neq 0$ (there is no correlation between the variables and the random effects, then choose REM)

 H_1 : Cove $(\epsilon_i X_{it})$ =0 (there is correlation between the variables and the random effects, then choose FEM)

The Hausman test was run on Eviews. The results showed that p_value=0.0907 > 5%, so that we could not reject $H_{0,i}$ in this case REM is more suitable. Therefore, REM is the relevant model to investigate the effects of impact factors on return on asset (ROA).

Adapting REM to be the research model, we omit all the variables that have Prob >5%. After filtering out the insignificant variables to ROA, we have the results in Table 6.

The REM model can explain 15.67% the fluctuation of ROA as following:

ROA	REM			
Independent variables	Coefficients	Prob		
С	5.994388	0		
TDTA	-6.9911	0.0001		
SIZE1	1.2E-13	0.1614		
TANGB	0.302519	0.8945		
GROWTH1	0.117478	0.0133		
RETURN	-0.000352	0.0242		
R ²	0.169466			

Table 5: Results of REM.

ROA	REM			
Independent variables	Coefficient	Prob		
С	6.495164	0		
TDTA	-7.046919	0.0001		
GROWTH1	0.114935	0.0152		
RETURN	-0.000374	0.0167		
R ²	0.156716			

Table 6: Results of REM after eliminating the insignificant variables.

ROA=6.495164 - 7.046919TDTA+0.114935GROWTH1 - 0.000374 RETURN.

The model includes the variables: debts to assets, growth rate of revenue, average collection period. It can explain 15.67% the fluctuation of ROA. When the debts to assets increase by 1%, the business efficiency will decrease by 7%. When the growth rate of assets increases by 1%, the business efficiency will increase by 0.115%. The average collection period has minor negative impact on business efficiency with a small coefficient [6-8]. However, as the average collection period generate negative influences, it is necessary for enterprises to manage their receivable debts/liabilities carefully, while still ensure the flexibility in order to eliminate negative impacts to the revenues.

Research Results

Based on the results that are mentioned earlier, the research model is built as follow:

ROA=6.495164 - 7.046919TDTA+0.114935GROWTH1 - 0.000374 RETURN,

Of which: (+) positive, (-) negative, (K) no impact.

The research results demonstrate that: total debts to assets have a significant negative impact on business efficiency. Firm's size and proportion of fixed assets do not influence the business efficiency. Growth rate of revenue generates positive impacts, but average of collection period affects negatively to business efficiency (Table 7).

- Total debts to total assets: has negative impact on business efficiency. This result is in line with the previous studies. Enterprises that have high debts to total assets will be less effective and vice versa. This can be explained: Using debts is two-faceted. On one hand, it helps to increase the firms' revenue by benefiting from tax sheltering. However, on the other hand, it can lead to negative impacts if the firms could not use the loans effectively. If the amount of revenue before tax and interests gained from loans are smaller than their interest payable, the rate of return will decrease. It worsens the failing situation of the enterprise and makes them more into debts [9,10]. The benefits generates from using debts could not compensate for its costs.

When enterprises use debts/liabilities, these financial risks might occur: the firms use loans ineffectively; or the economic situation is not favorable for the firms, thus, debts will have a negative impact on business efficiency. Enterprises that lose their solvency of interests and due loans can face the risk of bankruptcy.

We conclude that the negative correlation between debts to total assets and the business efficiency reveals the inefficiency in using loans of oil and gas enterprises. Business efficiency is decreasing while the debt ratio tends to increase, so that the benefits gained from debts could not compensate its generated costs, which results in the decrease of business efficiency.

- The firm's size (the size of revenues): does not affect the business efficiency. This result is different from previous studies as well as the

No.	Factors	Variables	Hypothesis	Results
1	Capital structure	Total debts to total assets	-	-
2	Firm's size	Size of revenue	+	К
3	Investment of fixed assets	Proportion of fixed assets	+	К
4	Growth rate	Growth rate of revenue	+	+
5	Administration of variable debts	Average collection period	-	-

Table 7: Overview of research results.

original hypothesis. It can be explained as follow: large firm's size helps increase business profit by exploiting the economies of scale. However, not every enterprise with large size has high performance in business. The matter is that whether enterprises are able to utilize their economies of scale [11]. The revenue is increase due to increasing the sale prices or sale volume? If the revenue increases due to sale volume, the corporate should thrive to reduce the costs of a product unit. Although revenue contributes to the increase of profit, high profit also depends on the costs of firms which have to be minimized. This demonstrates that the business efficiency is the result between the inputs and outputs of a corporate.

-The proportion of fixed assets: does not affect the business efficiency. This result is different from the current theories and previous studies; however, it matches with a study by Vo Thi Tuyet Hang. The reasons could be that the enterprises did invest in fixed assets ineffectively, and could not maximize the use of the invested assets. Moreover, the proportion of investment in fixed assets of oil and gas enterprises tends to decrease in the period of 2010-2014, investment in fixed assets did not generate high efficiency for the enterprises at the moment. It is resulted from the difficulties of the current unstable economic situation in which enterprises need to be extremely precautious in investing for scaling up. Besides, it depends on the administration abilities of the enterprises, the efficiency generated from assets, the business costs, and the capacities of labors...

- Growth rate of revenue: high growth rate of revenue leads to high business efficiency of enterprises. This result fits with the theories and original hypothesis. The increase of revenue enables enterprises to compensate cots, re-invest for scaling up their production, enlarge their consumption market, and attract more consumers, thus, improve their business efficiency.
- Average collection period: has negative impact on business efficiency. Although revenues might increase, the inabilities to collect receivable debts will create difficulties for enterprises to have the capital for business and investment activities. Enterprises may loosen their debt policies in order to increase their revenue. Nevertheless, receivables from customers are not well managed which reduce the business efficiency of oil and gas enterprises.

Policy Implications

Building suitable capital structure

The insufficiencies in capital structure are one of the reasons that lead to the low business efficiency of oil and gas enterprises regardless their strengths and potentials.

In the capital structure, low proportion of long-term loans and high proportion of short-term loans have limited the enterprises' abilities to invest for long term. At the same time, if enterprises cannot manage well loans, they will easily face the risks of losing their liquidity. Therefore, identifying the business activities - that have insufficient equity capital or that use loans- will generate higher profits for making decision. Moreover, enterprises should consider the proportions between short and long term loans to ensure the high efficiency of investment as well as the abilities to solve due liabilities.

Besides, reputations and capacities are the critical images of enterprises to mobilize capitals from all channels. In order to catch attentions of investors on stock market, financial reports of enterprises have to include business plans and strategies which are clear, accurate, efficient in a long run, and able to demonstrate the management and operation capacities of the enterprises. This reinforces the images of enterprises, creates trusts for investors, thus, and facilitates the capital mobilizations.

Developing strategies to invest and broaden to increase revenues

In order to increase revenue, oil and gas enterprises need to diversify their consumption markets. Besides, oil extraction activities need to focus on finding solutions to increase the oil recovery factor, maintain the optimal volume of oil extraction, ensure the safety, limit the risk of flooding in mining sites, and actively invest in oil extraction activities abroad. At the same time, oil and gas enterprises need to control carefully all oil projects ranging from searching, developing mining sites to extracting so that they can increase their oil reserves and extractions as suggested plans.

In parallel with broaden consumption market, enterprises need to increase the quality of their products, minimize the costs, decrease prices, and increase their competition abilities so that they can achieve higher revenues and profit.

Increasing the efficiency of using fixed assets

Fixed assets play a major role in oil and gas industry. However, it is not the value of fixed assets but the methods of mobilizing and managing them that determine enterprises' efficiency.

To increase the efficiency of using fixed assets depends on several factors. The instability of the current economic situation with numerous difficulties and variations can hinder enterprises from achieve high efficiency when they invest in fixed assets. In oil and gas industry, investments in fixed assets require long period. The oil searching and extracting activities require large amount of capital with the latest and most modern technology; while the risks are extremely high. Therefore, it is crucial for oil and gas enterprises to carefully balance their costs and benefits in oil projects not only in a short but also in a long run.

In extracting mining sites, enterprises need to calculate between cots and profit of each mining site before conducting the extractions. Mining sites that have high cost at the period of low market price should not be exploited.

Moreover, in order to ensure good operation of assets, enterprises should pay attention in maintenance and repairing services accordingly to plans to limit large malfunctions and damages that affect greatly the business activities. Good maintenance services also help enterprises to prolong assets longevity and usage that enhance asset productivity.

Developing concrete strategies to manage liabilities of customers while ensuring the flexibility

It is necessary to create flexible and favorable conditions in providing the best products and services for customers if they are regular and loyal customers with good reputations in returning debts. It helps to keep customers and increase the images of the enterprises.

In cases of new costumers or customers with bad profile of returning debts, enterprises should strictly manage and regularly remind them. Old debts should be paid before generating new ones.

Enterprises should build up debt controlling system professionally. Customers should be categorized and credit should be ranked based on level of risks that are identified by solvency indicators such as: current payment ability, quick payment ability, debt coefficient. In order to rank credits, the credit marks of customers can be calculated by several

important financial indicators such as: current payment ability, quick payment ability, debt ratio... Each indicator has different coefficient to calculate the mark for each customer.

Based on the credit ranking, enterprises can establish policies of credit sales, credit limit, and payment conditions accordingly. In negotiation and contract signing processes, enterprises should agree with customers on dividing the payment periods. For example, customers deposit 30% or 50% when signing in the contracts, and pay the rest within 30 days since the acceptance or transferring of products.

It is recommended that firms should pay attention to maintain a record of customers' liability in order to monitor and manage payment ability of their customers. Liability of each customer should be summarized and assessed monthly and quarterly so that firms could remind and then collect receivables from the customers. The monitoring in customers' liability helps firms in controlling customer receivable tightly, thus firms could proactively suggest appropriate policies and solutions just in time.

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