DETERMINANTS INFLUENCING FINANCIAL PERFORMANCE OF LISTED FIRMS: QUANTILE REGRESSION APPROACH

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ABSTRACT

This research is conducted to assess the factors influencing financial performance of listed firms on Vietnam Stock Exchange. The factors include capital structure, firm size, short-term liquidity, fixed asset investment, growth rate and receivable management. Data were collected from audited financial statements of 269 large listed firms for the period from 2010 to 2016. Quantile regression and Ordinary Least Square regression (OLS) have been used for processing the multi-year dataset. The results show that firm size has a positive relationship with financial performance. In contrast, capital structure, short-term liquidity and fixed asset investment have negative relationship with financial performance. Meanwhile growth rate and receivable management has no impact on financial performance at the low level but different effects at different quantiles. In case of measuring ROS, ROA and ROE as proxies of financial performance, the results are heterogeneous.

Contribution/ Originality: The contribution of this research is that it has examined the impact of determinants on financial performance. Quantile regression and OLS are employed. We found that firm size has a positive association, but capital structure, short-term liquidity and fixed asset investment have a negative relationship. Other factors have no impact on financial performance.

1. INTRODUCTION

Profit and its maximization are important objective of any business entity. In case of having profit, stakeholders and society as well receive benefits. Thus, improving financial performance is much interested on the sides of stockholders and the State as well. It is also vital for any entity to run business in a stable and sustainable development.

For measuring of financial performance, many criteria are used such as by accounting value, market value or social performance and others. Commonly, profitability indicator has been employed as a proxy of financial performance. If the profit ratio of an entity is getting higher and higher, it means the entity has a good financial performance and vice versa.

There are many indicators measuring the efficiency of a business, but the most commonly used indicators in the literature can be divided into two main categories of ratios of accounting values and ratios of market values. According to Murphy *et al.* (1996) financial performance should be measured basing on both accounting and market value. Basically, return on sales (ROA), return on assets (ROS), return on equity (ROE), price to book ration (P/B), Tobin Q are proxies of financial performance of an entity.

Identifying and evaluating the impact of factors on financial performance of an entity is such an important topic which has drawn the attention of business executives as well as researchers in the world and Vietnam as well. There are more and more studies on this topic such as studies of Margaritis and Psillaki (2010); Wei *et al.* (2005); Zeitun and Tian (2007); Onaolapo and Kajola (2010); Pouraghajan and Malekian (2012); Siminica *et al.* (2012); Nguyen (2013); Vo (2015); Chu *et al.* (2015); Phan (2016); Ahmed *et al.* (2018) and Omodero and Ogbonnaya (2018).

Based on the results of previous studies, we see the gap in previous literature such as (i) only focus on a few influencing factors, lack of consideration of various factors in financial perspective, (ii) the results of factors influencing financial performance are not consistent, sometimes even contradictory; (iii) no research employs quantile regression model to examine the effect of factors on the financial performance and most of the previous studies used OLS. However, applying the model of quantile regression requires that the dependent variable is normal distribution and homogeneous standard deviation. If the assumptions are not satisfied, then the regression results by the OLS approach are no longer reliable. Therefore, through this research, factors are identified in an adequate manner and results are more reliable by using the quantile regression model. The some recommendations are given for improving financial performance of listed firms in the context of Vietnam.

2. LITERATURE REVIEW

Margaritis and Psillaki (2010) investigated the relationship between capital structure, ownership and business performance of the firm with research data of French firms in traditional industrial sectors such as textiles, pharmaceutical and industrial development sectors such as computers, research and development. The variables included in the model are similar to those of Wei *et al.* (2005) but additional variables of the proportion of fixed assets, the proportion of the current assets. While Wei *et al.* (2005) studied only the one-way impact between debt ratio and some factors influencing financial performance, Margaritis and Psillaki (2010) conducted a two-way study with two regression models being constructed. Results showed that the cause-and-effect relationship between debt ratio and financial performance and vice versa.

Zeitun and Tian (2007) has looked into factors affecting financial performance on aspects of finance (financial indicators based on books, financial statements of firms) and market. Data were collected from 167 listed non-financial firms on the Amman-Jordan Stock market in 16 different business sectors form the period from 1989 to 2003. Under the financial perspective, a variable of financial is surrogated by return on assets (ROA). Under the market perspective, financial performance is surrogated by Tobin's Q. The variables of influencing factors are similar to that of previous studies and inclusive of some variables in the model such as the deviation of the cash flow, the corporate income tax, the proportion of fixed assets, the political crisis and business sectors. The results showed that (i) factors influencing financial performance include debt ratio, growth rate of total assets, firm size, business sectors, proportion of fixed assets among, in which the debt ratio has the strongest impact, which is consistent with the results of previous studies; (ii) the factors that have a positive effect on financial performance include total assets growth, firm size and taxes; (iii) the proportion of fixed assets has a negative impact on business results. Firms with a high proportion of fixed assets have low financial performance as firms have invested too much in fixed assets without business results improvement; (iv) factors of business sectors have a strong impact on financial performance in some areas of real estate, educational services, petroleum and tobacco.

Onaolapo and Kajola (2010) examined factors affecting financial performance which is represented by ROA, ROE. Independent variables are debt ratio, firm size by asset, fixed assets ratio, growth rate, asset turnover, years

of operation and business sectors. The research data included 30 non-financial firms listed on the Nigerian Stock Exchange from 2001 to 2007. The random impact model was appropriated by the Hausman test with a significance level of over 5%. However, the results of this model are not significantly different from the OLS estimation model. The results showed that the debt ratio and the proportion of fixed assets are negatively correlated with financial performance while positive asset turnover. The business sector in which the beverage, food, chemistry, printing and publishing industries, the tobacco industry, the computer and office equipment sectors have strong impacts on financial performance.

Pouraghajan and Malekian (2012) explored the impact of capital structure on financial peformance with the sample of 400 listed firms in twelve sectors on the Tehran Stock Exchange for the period from 2006 to 2010. Independent variables include debt ratio, asset turnover, firm size by assets, the proportion of tangible assets, age of the firm and growth rate. ROA and ROE are proxies of financial performance. The results indicated the negative relationship and strong impact between debt ratio and financial performance. Asset turnover, firm size, tangible asset structure and growth rate were statistically and positively correlated with ROA and ROE. Siminica *et al.* (2012) investigated the relationship between asset return ratios and financial indicators of 40 firms listed on the Bucharest Stock Exchange in Romania for four years from 2007 to 2010. The research included two years of economic growth in 2007 and 2008, and two years of recession in 2009 and 2010. Dependent variables include the proportion of fixed assets, financial stability rate, debt ratio, financial leverage, employment rate, current ratio, quick ratio, self-finance ratio for fixed assets, investment capital, demand for working capital, the number of working capital turnover days, the average collection period, the efficiency of the use of assets, the number of days a property rotation. The results illustrated that the decrease in Romanian firms' financial performance is a result of the economic crisis. Prior to the crisis in 2007, financial performance was significantly affected by financial structure. After the crisis, the importance of business governance indicators (profit ratios and turnover ratios) was emphasized, in addition to the impact of uncontrollable and random external factors via management. Unlike previous studies, Siminica *et al.* (2012) developed step when focusing on factors demonstrating financial management capacity, especially working capital management influencing financial performance of the entity.

In Vietnam, Nguyen (2013) conducted the research on the factors affecting financial performance of food manufacturing and processing firms listed on the Vietnam Stock Exchange. The variables include capital structure, size (turnover), revenue growth rate, fixed asset investment, management of receivables, business risk, years of operations. Data were collected from audited financial statements of 45 food manufacturing and processing firms listed for a period from 2010 to 2012. The approach used to estimate the parameters of the model is the Ordinary least squares (OLS). The results revealed that receivables management, fixed asset investment, capital structure, business risk have an adverse effect on financial performance whereas growth rate has a positive influence. Vo (2015) investigated the financial factors affecting the financial performance of listed construction firms on Vietnam Stock Exchange for the period from 2010 to 2013. The results revealed that financial performance of construction firms are influenced by capital structure, firm size, growth rate and management of receivables. Chu *et al.* (2015) examined the factors influencing financial performance of the listed firms and provided some suggestions for managers for improvement of their financial performance accordingly. Results denoted that ROA is significantly affected by the ratio of state capital, financial leverage, management capacity, firm size, quick ratios and the business cycle of the firm.

3. HYPOTHESES

Based on literature review above, some hypotheses are designed as below:

Capital Structure

One of the main factors affecting financial performance is capital structure. Corporate capital structure is the combination of liabilities (short-term and long-term liabilities) and equity in the total resources that the business can mobilize to finance its operations. Zeitun and Tian (2007) found that the capital structure had an effect on the financial performance of an enterprise when measured with accounting index and market index. Margaritis and Psillaki (2010) investigated the cause-and-effect relationship between capital structure and financial performance and found that financial performance affects the capital structure and vice versa. Besides, studies of Onaolapo and Kajola (2010); Margaritis and Psillaki (2010); Pouraghajan and Malekian (2012); Pervan and Višić (2012); Gleason *et al.* (2000); Ku and Yen (2016) mostly noted that the debt ratio has the negative effect on financial performance at different impacts. Therefore, we give a hypothesis as:

H₁: There is a negative and statistically significant relationship between capital structure and financial performance

Firm Size

The impact of firm size on financial performance is of great importance in business studies. Firm size plays an important role in financial performance as it represents resources of the business. Large firms with well-organized resources and high-quality machines enables targets to be easily achieved. The studies of Penrose (1959); Zeitun and Tian (2007); Margaritis and Psillaki (2010); Pouraghajan and Malekian (2012); Pervan and Višić (2012); Gleason *et al.* (2000); Kang and Liu (2014); Wu and Chua (2009) affirmed that firm size is positively correlated with financial performance, and that larger firms are more likely to compete better because of the advantage of accessing resources. However, Westphal (1998) found that firm size appears not to be related to corporate profits. Other researchers such as Durand and Coeurderoy (2001); Tzelepis and Skuras (2004) found the firm size has insignificant influence to the financial performance. We give a hypothesis as:

H2: There is a positive and statistically significant relationship between firm size and financial performance

Current Ratio

With a view to measure liquidity ratio, current ratio and liquid ratio are commonly used by researchers. These ratios have effect on financial performance. According to Almajali *et al.* (2012); Omondi and Muturi (2013) there is a positive relationship between liquidity ratio and financial performance. In contrast, Khalifa and Zurina (2013) pointed out that liquidity ratio has a negative relationship with financial performance. Thus, we have a hypothesis as:

H3: There is a positive and statistically significant relationship between current ratio and financial performance

Fixed Asset Investment

While the study results by Pouraghajan and Malekian (2012) showed that an increase in fixed asset investment had a positive effect on financial performance, Zeitun and Tian (2007) and Onaolapo and Kajola (2010) found that the high proportion of fixed assets reduced the financial performance. An enity equipped with modern facilities can limit labor cost, enabling to shorten the production time. Investment in fixed assets will cut down on the labor cost, reduce the cost of products and services. As a result, the cost is decreased and profits are increased. Therefore, we have a hypothesis as:

H₄: There is a positive and statistically significant relationship between fixed assets investment and financial performance

Growth Rate

Growth rate is measured through indicators of assets growth or sales growth. Firms with high growth rate have good financial performance because they can make a profit from their investments. Researches of Khatab *et al.*

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(2011); Pouraghajan and Malekian (2012) revealed that the growth rate by sales had a positive effect on ROA but negative influence on ROE while studies conducted by Wei *et al.* (2005); Onaolapo and Kajola (2010) showed that the growth rate did not have any impact on financial performance. Therefore we have a hypothesis as:

H₅: There is a positive and statistically significant relationship between business growth and financial performance.

Receivables Management

Receivables from customers is the amount of money owed by the customer due to selling products for clients on credit. Only when customers make payment, cash flow of an entity increases. The amount of trade receivables arising depends on factors such as the economy, price and characteristics of the product, especially the policy of selling on credit (trade credit policy) of an enterprise. It can be said that almost all businesses incur receivables but vary from insignificant levels to uncontrollable ones, leading to the situation of insufficient capital to carry on their investment in business activities, which shall reduce their competitiveness. Studies by Siminica *et al.* (2012) and Nguyen (2013) revealed that the higher amount trade receivables are, the more adverse impact it imposed on financial performance of the entity. Thus, we give a hypothesis as:

H₆: There is a negative and statistically significant correlation between receivable management and financial performance

4. RESEARCH METHODOLOGY

4.1. Quantile Regression

Koenker and Bassett (1982) were the pioneering authors to conduct the quantile regression instead of estimation of parameters of average regression function via OLS approach. They proposed the estimation of the regression parameter on each quantile of the dependent variable so that the total absolute difference of the regression function at the quantile τ of the dependent variable is the smallest. In other words, instead of determining the effect of the independent variable on the average value of the dependent variable, quantile regression helps to determine the effect of the independent variable on the dependent one over each quantile of that variable dependent.

Regression using the OLS method only obtains a single regression line that represents the conditional average value of the dependent variable Y by the values of the independent variable X. In the mean time, quantile regression shows multiple regression functions corresponding to each quantile of dependent variable.
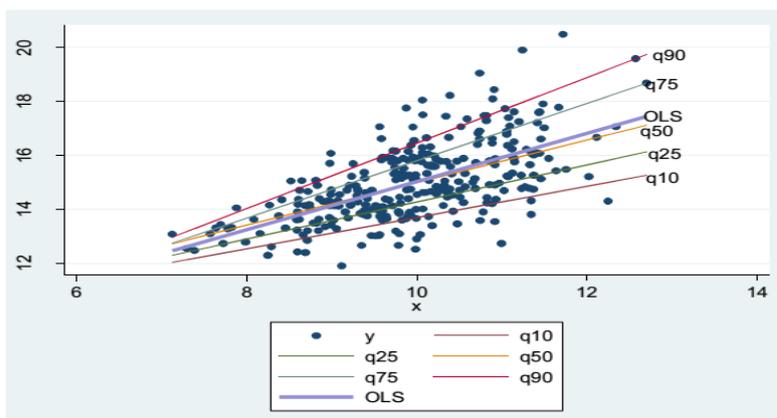
Graph-1. Results of Quantile Regression of Y by X

Considering parameter {y,x, i 1,2,...,n i i} = with the general linear regression model

$$Y_i = \mathrm{xi}'\beta \; + u_i \qquad (1)$$

In which: $(x_i')_{Kx1}$ is the independent variable matrix. β is unknown parameter and needs to be estimated. According to OLS approach, β is estimated on condition of:

$$min \sum_i 1xu_1^2 = \sum_i 1x(u_i - xi'\beta)^2 \quad (2)$$

Equation (2) represents the weight of the average deviation component, the $xi'\beta$ component represents the corresponding mean condition and median condition of OLS. The drawback of OLS is that only central trend of the variable distribution yt (dependent variable) is measured, while other locations, such as the two tails of the distribution, are not mentioned. On the other hand, the estimation parameter in the model (1) is fixed in the study period, which is a huge limitation because it is not practical as economic variables tend to fluctuate. To overcome these limitations, this study has used the QR - Quantile Regression proposed by Koenker and Bassett (1982). Consider the following model:

$$Y_i = xi'\beta_\theta + u_{\theta i} \quad (3)$$

$$\text{Quantile}_\theta(y_i | x_i) \equiv \inf\{y:F_i(y|x)\ \theta\} = xi'\beta_\theta \quad (4)$$

Hypothesis: $\text{Quantile}_\theta(u_{\theta i} | x_i) = 0$

In which, Quantileθ(yi|xi) is the quantile regression θ (0;1) $\square$ of the dependent variable yi, αθ,βθ the estimator parameter vector, is the deviation component. Fi (y|x) is the probability distribution function of y in terms of x and fuθ (y | x) as the probability density function. The change in quantile $\theta\in(0;1)$ will reflect the total distribution of the variable yi. Therefore, quantile regression has superior advantages over OLS regression. Quantile regression (QR) allows the researcher to look at the whole variation of yi based on the change in quantile $\theta\square$ (0;1). On the other hand, according to Hao and Naiman (2007) assumptions in QR are not as stringent as that in OLS, for example, standard distribution conditions and homogeneous variances are not required. According to Koenker (2005) and Hao and Naiman (2007) the quantile regression has some advantages such as it allows for a detailed representation of the relationship between the dependent variable and the independent ones on each quantile of dependent variable, not just considering the relationship over the average value like OLS regression. In OLS regression, outliers were often excluded for estimating OLS without deviation. In the mean time, quantile regression is robustness, without being affected by the presence of such outliers; The test of the parameters of quantile regression is not based on the standard of deviation. In addition, these tests are not based on any assumptions about the distribution pattern of the regression deviation; Quantile regression is particularly appropriate when analyzing regression models with the presence of variance or in data samples where the distribution function of dependent variables is asymmetric around the mean value. Then, the regression function on the different quantiles will have a distinct difference, indicating varied effects of independent variables on the dependent ones at the different quantiles.

4.2. Model and Data Analysis

Based on relevant studies on influencing financial performance, this research measures the impact of the six factors on financial performance. Based on the hypotheses given, the general regression model has been designed for testing hypotheses above:

Model 1: $ROS_{it} = \beta_0 + \beta_1 lv_{it} + \beta_2 size_{it} + \beta_3 cr_{it} + \beta_4 tat_{it} + \beta_5 growth_{it} + \beta_6 return_{it} + \varepsilon_{it}$

Model 2: $ROA_{it} = \beta_0 + \beta_1 lv_{it} + \beta_2 size_{it} + \beta_3 cr_{it} + \beta_4 tat_{it} + \beta_5 growth_{it} + \beta_6 return_{it} + \varepsilon_{it}$

Model 3: $ROE_{it} = \beta_0 + \beta_1 lv_{it} + \beta_2 size_{it} + \beta_3 cr_{it} + \beta_4 tat_{it} + \beta_5 growth_{it} + \beta_6 return_{it} + \varepsilon_{it}$

Research data: The research data is secondary ones which were collected from audited financial statements of large listed firms on Vietnam Stock Exchange for the period from 2010 to 2016. In the total of 308 non-financial

firms, 269 non-financial listed firms on Ho Chi Minh Stock Exchange with sufficient information for the period of seven years, with a total of 1,883 observation samples (269 firms x 7 years) are collected. Variables in the research model and its measurement are shown in Table 1.

Data analysis: Using regression method on panel data for econometric models to determine the influencing factors, degrees and impacts of factors on financial performance of listed firms on Vietnam Stock Exchange. Quantile regression (QR) and ordinary least squares (OLS) have been employed in this research.

Table-1. Variables and Its Measurement in the Model

Variables	Type	Code	Measurement	Effect
Financial performance	Dependent	ROS, ROA, ROE	Profit after tax/Total net revenue; Profit after tax /Total asset Profit after tax /Total owners equity	
Capital structure	Independent	lv	Liabilities/ Total asset	-
Firm size	Independent	size	Firm size by revenue Ln (net revenue)	+
Current ratio	Independent	cr	Current assets/Current liabilities	+
Fixed asset investment	Independent	tat	Balanced value of fixed asset /Total asset	+
Growth rate	Independent	growth	(Revenue term$_t$ - Revenue term$_{t-1}$)/ Revenue term$_t$	+
Receivables management	Independent	return	Net revenue/Receivables	-

Source: Compilation by the authors

5. RESULTS AND DISCUSSION

As shown in Graph 2, in the period from 2010 to 2016, financial performance of firms had a tendency of decrease by the time. ROS in 2010 was 18.4%, in 2016 was only 5.48%. ROA also tends to decrease, i.e 8.87% in 2010 and only 2.29% by 2016, while ROE tends to decrease in the period of 2010-2015, especially negative 9.48% in 2015, in 2016 was improved, reaching 11.83%.
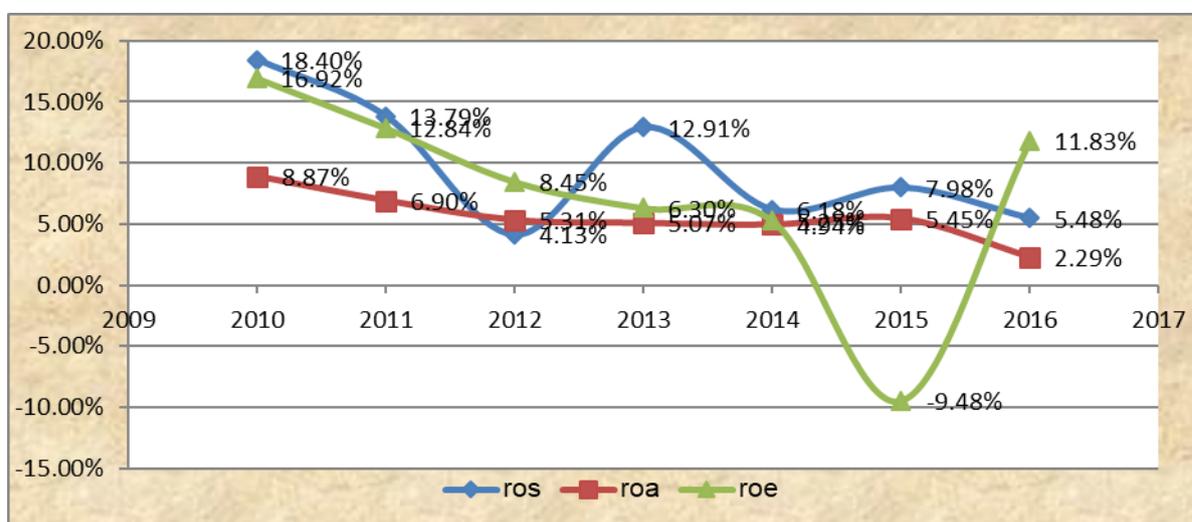
Graph-2. Financial Performance of Listed Firms in the period 2010-2016

In Table 2, the number of firms in real estate and construction is the largest among nine business sectors, accounting for 32.71%, followed by firms in the industrial sector (13.75%), agriculture (12.27%). There is also difference in financial performance of firms by industry when measured by ROS, ROA and ROE. When ROS is applied, the best performance is in the energy sector with 53.5%. If using ROA, the highest performance is in medical sectors of 8.7%, and consumption goods at the highest level of 16.6% given ROE target.

Table 3 indicates autocorrelation among variables. The purpose of examining the strong correlation between independent variables and dependent variables is to eliminate factors that may lead to multi-collinearity before running regression model. The correlation coefficient among the independent variables in the model has shown that no pair is greater than 0.8, therefore it is unlikely that multi-collinearity shall occur among independent variables. When using the regression model, VIF is also conducted for testing multi – collinearity. The results show that VIF of variables are less than two, thus multi – collinearity does not happen.

Table-2. Financial Performance by Sectors

Sector	Observation	Ratio (%)	ros	roa	roe
Real estate and construction	616	32.71	6.0%	4.1%	5.8%
Technology	49	2.6	-0.6%	6.5%	15.3%
Industry	259	13.75	11.7%	6.6%	12.9%
Service	175	9.29	7.6%	7.0%	12.0%
Consumption goods	161	8.55	8.1%	8.4%	16.6%
Energy	154	8.18	53.5%	8.6%	14.0%
Agriculture	231	12.27	0.5%	1.9%	-14.2%
Material	175	9.29	1.9%	5.5%	10.4%
Medical	63	3.35	8.0%	8.7%	14.2%
Total/Average	**1,883**	**100**	**9.8%**	**5.5%**	**7.4%**

Source: Compilation by the authors

Table-3. Results of Autocorrelation Matrix

	ros	roa	roe	lv	size	cr	tat	growth	return
ros	1								
roa	0.2791*	1							
roe	0.0275	0.0919*	1						
lv	-0.2453*	-0.8580*	-0.0341	1					
size	-0.0785*	0.1043*	0.0592*	0.1360*	1				
cr	0.0523*	0.0348	0.0086	-0.1462*	-0.1764*	1			
tat	-0.0415	-0.0586*	-0.0285	0.038	0.0231	-0.0590*	1		
growth	0.3771*	0.0527*	0.0458*	-0.005	0.2091*	-0.025	0.0597*	1	
return	-0.0144	0.0570*	0.027	-0.01	0.2124*	-0.0078	0.0650*	0.0327	1

Source: Compilation by the authors

Based on graphs of distributions of dependent variables (ROA, ROE and ROS) are not normal distribution. At the same time, the result of Shapiro-Wilk test, Shapiro-Francia test of all three models showed that ROS, ROA, and ROE variables did not follow normal distribution. Therefore, considering the factors affecting the ordinary least squares regression model (OLS) shall not be adequate and the results will not be reliable. Thus, application of Quantile regress (QRs) are needed to meet the test requirements.

Table 4 shows the coefficients of quantile regression model and the OLS regression model. According to OLS, the coefficient of capital structure (lv) is negative and statistically significant at 1%. It means that capital structure (lv) increases (or decreases) by 1%, the ROS on average decreases (or increases) by 0.422% (assuming other factors remain constant). For firm size (size), there is a negative relationship with ROS when applying OLS regression, with statistical significance at 1% in the quantiles of 10, 25, 75, 90 but of no statistical significance at median level. Firm size is negatively related to ROS and statistically significant 1% at the average level and quantile 75 and 90 but positively and statistically significant at the quantile 10 and 25. Current ratio (cr) was not statistically significant under the OLS model, but were statistically significant 1%, 5% at quantile 10, 50, 75, 90. The results have indicated that current ratios are positively correlated with ROS at quantiles, except at quantile 10 being inversely related. Fixed asset investment (tat), which was inversely related to ROS, is significant at 1% under the OLS model, but was not statistically significant at all the quantiles. Growth rate factor is positively correlated with OLS and is statistically significant under OLS regression at most quantiles, except for quantile 90. Receivables management (return) is not statistically significant under the OLS regression model and at all studied quantiles.

Based on the OLS regression results, quantile regressions (QRs) in Tables 4, 5 and 6 examine the influence of factors affecting financial performance on all three ROS, ROA, and ROE. Based on the R2 coefficient, when measuring financial performance by ROA, the highest coefficient of determination is 78.95% according to OLS model, and at quantiles with the higher Pseudo R2 than models when measuring financial performance under ROS, ROA. Also, the result of Shapiro-Wilk test, Shapiro-Francia test of all three models have shown that dependent variables of ROS, ROA, and ROE did not follow the normal distribution. Thus, Table 5 is formed for discussing the factors that affect the financial performance under OLS and Quantile regression (QR).

Table-4. Regression Model Results of Dependent Variable of ROS

	OLS	Quantile regressions				
		QR10	QR25	QR50	QR75	QR90
lv	–0.422***	–0.385***	–0.195***	–0.224***	–0.307***	–0.404***
	[0.039]	[0.023]	[0.008]	[0.005]	[0.011]	[0.024]
size	–0.071***	0.036***	0.010***	0.001	–0.010***	–0.033***
	[0.012]	[0.007]	[0.002]	[0.002]	[0.003]	[0.007]
cr	0	–0.008***	0	0.001**	0.008***	0.013***
	[0.002]	[0.001]	[0.000]	[0.000]	[0.001]	[0.001]
tat	–0.212***	0.043	–0.004	–0.013	0.009	–0.004
	[0.080]	[0.047]	[0.016]	[0.011]	[0.023]	[0.050]
growth	0.180***	0.251***	0.079***	0.025***	0.006**	0.005
	[0.009]	[0.005]	[0.002]	[0.001]	[0.003]	[0.006]
return	0	0	–0.000**	–0.000***	–0.001*	–0.001*
	[0.001]	[0.001]	[0.000]	[0.000]	[0.000]	[0.001]
_cons	1.328***	–0.363***	–0.015	0.171***	0.416***	0.876***
	[0.159]	[0.092]	[0.031]	[0.022]	[0.046]	[0.099]
N	1883	1883	1883	1883	1883	1883
R²/Pseudo R²	0.2183	0.188	0.0721	0.0823	0.1095	0.1102

Shapiro–Wilk test: statistic = 0.20608***
Shapiro–Francia test: statistic =0.2022***
* p<0.1, ** p<0.05, *** p<0.01

First, the corporate capital structure (lv) has a negative relationship with the ROA at a 1% significance level under the OLS model and at all quantiles. The result of this is consistent with hypothesis H1, and is also consistent with the results of the studies of Zeitun and Tian (2007); Onaolapo and Kajola (2010); Margaritis and Psillaki (2010); Pouraghajan and Malekian (2012); Pervan and Višić (2012); Gleason *et al.* (2000).

Second, firm size (size) was positively related to financial performance when measured in ROA and statistically significant at 1%, 5% in OLS, QR models. This means the larger the firm size is, the higher level the financial performance obtains, as the larger the firm is, the more competitive it is, then the better the operational results are. These results are consistent with the hypothesis H2 and is also consistent with the results of the studies of Penrose (1959); Zeitun and Tian (2007); Margaritis and Psillaki (2010); Pouraghajan and Malekian (2012); Pervan and Višić (2012); Gleason *et al.* (2000) and Kang and Liu (2014). However, they are contradictory with those of the publication of Wu and Chua (2009) and inconsistent with those of the studies by Durand and Coeurderoy (2001) and Tzelepis and Skuras (2004) which found that firm size had insignificant effect on financial performance of an enterprise.

Third, the current ratios (cr) have a negative relationship with ROA at a significant 1% under the OLS model and at most quantiles, except quantile 10 and 25. This result is in line with the study of Khalifa and Zurina (2013). However, this result is contrary to the original hypothesis H3, but is consistent with the results of the studies by Almajali *et al.* (2012); Omondi and Muturi (2013).

Fourth, under the OLS model, fixed asset investment (tat) has a negative relationship with ROA at significant level of 1%, which is contrary to hypothesis H4, but in terms of each quantile of ROA, the fixed asset investment factor is only significant at some quantiles of 10, 25 and 90. This result is consistent with that of the studies of

Zeitun and Tian (2007) and Onaolapo and Kajola (2010) in which the high proportion of fixed assets reduces financial performance of a firm. The result, however, is not consistent with that of a research of Pouraghajan and Malekian (2012) showing that enhancement of fixed asset investment has positive effect on financial performance.

Fifth, growth rate was not statistically significant under the OLS model, but was statistically significant at quantile of 10, 25 and 50. The result of this research proves to be inconsistent with that of studies of Khatab *et al.* (2011); Pouraghajan and Malekian (2012) but consistent with that of researches of Wei *et al.* (2005); Onaolapo and Kajola (2010) affirming that growth rate does not have impacts on financial performance.

Sixth, the receivables management (return) factor was not statistically significant under the OLS model, but was statistically significant at quantiles of 25, 50, 75 and 90. The results of this study is consistent to that of a study conducted by Siminica *et al.* (2012); Nguyen (2013).

Table-5. Regression Model Results of Dependent Variable of ROA

	OLS	Quantile regressions (QR)				
		QR10	QR25	QR50	QR75	QR90
lv	–0.438***	–0.205***	–0.153***	–0.186***	–0.240***	–0.314***
	[0.005]	[0.008]	[0.004]	[0.003]	[0.005]	[0.006]
size	0.030***	0.022***	0.015***	0.014***	0.015***	0.013***
	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]	[0.002]
cr	–0.002***	–0.003***	0	0	–0.001*	–0.001**
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
tat	–0.034***	–0.040**	–0.020**	–0.001	–0.011	–0.022*
	[0.011]	[0.016]	[0.008]	[0.007]	[0.010]	[0.013]
growth	0	0.012***	0.005***	0.004***	0.002	0.002
	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]
return	0	0	0.000**	0.000***	0.000***	0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
_cons	–0.118***	–0.183***	–0.091***	–0.039***	0.007	0.118***
	[0.021]	[0.032]	[0.016]	[0.013]	[0.019]	[0.025]
N	1883	1883	1883	1883	1883	1883
R²/Pseudo R²	0.7895	0.1727	0.1444	0.2104	0.2635	0.3069

Shapiro–Wilk test: statistic = 0.2179***
Shapiro–Francia test: statistic =0.21355***
* p<0.1, ** p<0.05, *** p<0.01

After running regression of dependent variable of ROE, the results are below:

Table-6. Regression Model Results of Dependent Variable of ROE

	OLS	Quantile regressions				
		QR10	QR25	QR50	QR75	QR90
lv	–0.112	–0.195***	–0.096***	–0.100***	–0.073***	0.017
	[0.068]	[0.017]	[0.006]	[0.006]	[0.008]	[0.014]
size	0.047**	0.030***	0.023***	0.030***	0.028***	0.021***
	[0.020]	[0.005]	[0.002]	[0.002]	[0.002]	[0.004]
cr	0.002	0	0	0	0	0.002**
	[0.004]	[0.001]	[0.000]	[0.000]	[0.000]	[0.001]
tat	–0.185	–0.123***	–0.026**	0.019	0.001	–0.015
	[0.139]	[0.035]	[0.013]	[0.013]	[0.016]	[0.029]
growth	0.024	0.017***	0.015***	0.003**	0.003*	0.003
	[0.016]	[0.004]	[0.001]	[0.002]	[0.002]	[0.003]
return	0.001	0	0.000***	0.001***	0.001***	0.003***
	[0.002]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
_cons	–0.472*	–0.288***	–0.211***	–0.250***	–0.174***	–0.053
	[0.276]	[0.070]	[0.026]	[0.026]	[0.033]	[0.058]
N	1883	1883	1883	1883	1883	1883
R²/Pseudo R²	0.0045	0.0355	0.0461	0.059	0.0558	0.0432

Shapiro–Wilk test: statistic = 0.06099***
Shapiro–Francia test: statistic =0.05836***
* p<0.1, ** p<0.05, *** p<0.01

6. CONCLUSION

This research found that firm size is positively related to financial performance; and on the contrary, capital structure, current ratios, fixed asset investment have negative relationship with business performance. Meanwhile, growth rate and receivables management do not affect financial performance, but do have impact on the different quantiles. At the same time, factors influencing financial performance when measuring by ROS, ROA and ROE are not identical. It is essential that businesses establish an appropriate capital structure, broaden the scales, invest effectively in fixed assets and properly manage receivables. Therefore, some suggestions are given for improving business operations efficiency of firms.

First, Firms Need to Establish an Appropriate Capital Structure in Some Aspects of

(i) *Effective usage of capital*: Firms are required to properly solve problems such as debt recovery from other units, release unintended inventories, etc. Boosting the speed of working capital circulation will help to reduce the need for capital, thus businesses are not forced to borrow money to invest in their operations as well as to pay liabilities such as supplier debt.

(ii) *Identification of funding sources*: Identify which business activities the enterprise's equity is not sufficient to meet or using the loan funds will bring in higher profits to make reasonable decisions. In addition, businesses should reduce short-term loans and use long-term loans.

(iii) *Utilization of capital mobilization channels*: Firms should focus on capital mobilization channels from issuing shares to existing shareholders, employees in firms and strategic partners or public issuing on the stock market.

Second, More Investment and Expansion of Firm Size

Firms should avoid multi-branch spreading and ineffective investment. The investment portfolio of the business must be narrowed and focus only on potential projects and of guaranteed investment capital. Each enterprise needs to restructure its production, timely grasp and study the market, to maintain and improve the quality of products and services to meet the increasing needs of customers. In order to improve competitiveness, market share should be expanded. Businesses can select potential segments based on market trends or technical strengths.

Third, Enhance the Efficiency of Machinery Usage and Management

Properly perform marketing, introduce the business capacity of firms, gradually occupy the market for contracts of great value, ensure sufficient time of machinery operation, balance tasks, rationalize the production plan for each department and each device, avoid overloading or underloading for machines, ensure machinery and equipment are used. The mobility always reaches the highest, complete the maintenance and preventive repair as planned to minimize major breakdowns during usage. Proper maintenance, repair and usage of machinery and equipment should be guaranteed to reduce the intangible depreciation. That means firms have effectively utilized the capital of the enterprise. Proper maintenance and repair shall prolong the life of machine, reduce the breakdown time because of repairs, increase the operating capacity of machinery and equipment to ensure they are operating at full capacity.

Fourth, Management of Receivables

Develop a professional liabilities control system, apply debt analysis and control techniques. Customer classification and credit ranking techniques should be applied, whereby each customer will be ranked according to the level of risk based on criteria such as current ratio, quick ratio, debit rate. In business operations, firms also need to pay attention to monitoring, urging for debt recovery and assessing the payment status of customers. Businesses should establish credit departments by using employees from business units, financial accounting, engineering and

administration departments. One of the measures to reduce bad receivables is to have customers of high credibility. Customers with a high level of trust are people and organizations that create efficiency. They always maintain healthy financial operations as well as pay attention and ensure timely repayment of debt under the signed contract. This helps bring in customers' long- term attachment to the business.

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