

## Determinants of profitability: evidence from construction companies listed on Vietnam Securities Market

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### ABSTRACT

The profitability of businesses is influenced by many different factors such as financial structure, financial leverage, size and age of enterprises, business characteristics, etc. Therefore, the determination of the factors influencing on the trend of the profitability of enterprises is an essential and important basis for managers to provide useful solutions to improve performance measurement. This study was conducted based on data collected from 73 listed construction companies in Vietnam for the period 2008-2015 with 584 observations and using quantitative methods in combination with the FEM regression model through Hausman test with the help of Stata software 14.0. The research results show that: (1) The age of the company (AGE) and debt ratio (TD) negatively affect the profitability (2) Growth rate (GROW) and asset utilization performance (TURN) have positive impacts on profitability (3) Company size (SIZE) has a positive impact on profitability, and (4) The proportion of fixed assets in total assets (TANG) maintains an opposite effect on profitability although the effect is not clear. Based on the research results, the authors have provided a number of specific recommendations and solutions to improve the profitability of the construction companies listed on the Vietnam Stock Exchange.

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## 1. Introduction

The construction sector plays a significant role for the development of the country in any country. During the years of construction and development, Vietnam Construction industry always maintained and affirmed its position and role as one of the key economic sectors and made important contributions to the achievements of economic development. By the end of 2017, the total production value of the construction industry (calculated at constant prices in 2010) was about VND 952.3 trillion (up 8.9 times compared with 2007). Despite many difficulties, construction enterprises are always proactive in overcoming difficulties, gradually stabilizing and developing business, creating jobs and income for employees. The average annual growth rate is about 8.4%, contributing significantly to the overall growth of the country (Phong, 2018). However, since 2008, due to the impact of the global financial crisis and monetary policy in Vietnam, lending interest rates of more than 20% per year have led to many difficulties for the manufacturing industries including the construction industry. Moreover, in this period, Vietnam's real estate market was frozen reducing business efficiency, significantly. According to the authors' calculations, the return on assets (ROA) in the period of 2012-2015 was between 1% and 3%. In fact, the profitability of the construction industry was much lower than in other sectors and lower than bank deposit rates, which made it difficult for the construction industry to expand production and attract investment. A specific characteristic of the construction industry is the need of large capitals to execute the work, and payment time is affected by many factors such as sources of funds of investors, payment profiles, the progress of projects, disasters, weather, etc. Compared with other industries in the manufacturing sector, the debt to equity ratio of construction companies is usually the highest, which is 0.7 times higher than that of other manufacturing companies.

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With the official data source collected at the State Securities Commission of Vietnam and at the stock exchanges of HOSE and HNX, by quantitative research method, we conducted a review and analysis of the effects of different factors such as company age, debt ratio, growth rate, number of asset revolutions, company size, the proportion of fixed assets to profitability (through ROA criteria, ROE) on 73 listed construction companies in Vietnam. We fully believe in the representativeness, completeness, and comprehensiveness of the research sample as well as the reliability of the research results for the following reasons:

- *In the field of research:* We chose the construction industry as a business since it plays an important role in the socio-economic development of the country and this is a sector that contributes significantly for the development of the national economy. The construction industry is also the largest industry in the country, providing the majority of investment goods and the Government is the customer of the most of the industry's works. Moreover, in Vietnam, spending on annual capital construction investment is approximately 25% of gross domestic product (GDP) (Ministry of Finance, 2019).

- *Regarding the sample selection:* We chose construction companies listed on Vietnam's official stock exchange (HOSE, HNX). These contain large-scale companies and play a decisive role on the construction market in Vietnam. On HOSE, we selected 12 out of 13 listed construction companies listed on HNX and selected 61 companies out of 72 listed companies. Sample rate was accounted for 85.9%.

- *About research data:* Research data was collected from secondary sources published by Vietnam Securities Commission (State Securities Commission of Vietnam, 2018), Ho Chi Minh City Stock Exchange (HoChiMinh Stock Exchange, 2018), and Hanoi Stock Exchange (Hanoi Stock Exchange, 2018). These data met transparency, publicity, and auditing.

- *About the study time:* The study period was chosen from 2008 to 2015. This period was affected by the global economic crisis, due to the pressure on the monetary management policy of Vietnam and the impact of the frozen real estate market, the challenges that many construction enterprises faced and by considering the sluggish business trend (in the period of 2008-2013) until there were signs of recovery (2013-2015) and the growing session (from the end of 2015).

The main objective of this study was to identify the main characteristics of the construction industry that have significant impacts on profitability and to investigate the impact of factors on the profitability of the construction companies listed on the stock exchange of Vietnam. Although many theoretical and empirical studies have been conducted in the world and in Vietnam, the results are inconsistent. Therefore, we conducted data analysis and evaluation to answer the questions: (1) Is there any relationship between the factors of profitability of listed construction companies? and (2) what is the trend of impact of factors on the profitability of companies?

From the research results, we have proposed a number of recommendations and solutions to improve profitability, contributing to improving the performance of listed companies on the stock exchange in Vietnam.

## 2. Literature review

Profitability has always been a matter of considerable interest not only from administrators but also from researchers around the world. In particular, the factors that influence and trend to influence of the factors on profitability are always important for investigation. There have been many theoretical and empirical studies on the impact of factors on the profitability of companies such as return on assets, return on equity, and return on revenue. However, depending on the specific characteristics of each country and each industry, each stage of specific economic development, the research results were different. There have been many empirical studies on the impact of factors on return on assets (ROA) and return on equities (ROE), but the direction of the relationship is not consistent among studies. For example, the debt to equity ratio has a negative impact on ROA in studies of Ebaid (2009); Khan (2012); Zeitun and Tian (2007); Sheikh and Wang (2013); or the study on construction, consumption, real estate sector of Salim and Yadaw (2012); Bērzkalne (2014), but in the study of Javed et al. (2014), there is no association between debt to ratio and ROA. Regarding ROE, debt to equity ratio positively affects ROE in a number of studies, such as Abor (2005); Gill et al. (2011) and Salim and Yadaw (2012). On the contrary, in other studies such as Shubita and Alsawalhah (2012); or the study on real estate of Salim and Yadaw (2012); Muritala (2012); the study on listed companies of Bērzkalne (2014), the debt to equity ratio negatively affects ROE. Some studies found no relationship between debt to equity ratio and ROE such as studies of Ebaid (2009); Khan (2012); the study on the remaining sectors of Salim and Yadaw (2012) and Javed et al. (2014). Apart from investigating the impact of debt to equity ratio on profitability, the authors explored other elements of the firms such as Asset Turnover Ratio (TURN) (Muritala, 2012; Onaolapo & Kajola, 2010; Javed et al., 2014); Firm Size - SIZE (Ebaid, 2009; Sheikh & Wang, 2013; Zeitun & Tian, 2007; Abor, 2005; Khan, 2012; Onaolapo & Kajola, 2010; Dawar, 2014; Salim & Yadaw, 2012); Revenue Growth Rate - GROW (Gill et al., 2011; Abor, 2005; Sheikh & Wang, 2013; Zeitun & Tian, 2007; Dawar, 2014); Firm Age- AGE (Onaolapo & Kajola, 2010; Muritala, 2012; Dawar, 2014); Fixed Assets to Total Assets Ratio - TANG (Zeitun & Tian, 2007; Muritala, 2012; Sheikh & Wang, 2013; Onaolapo & Kajola, 2010). However, the extent of impact and direction of relationships of these factors on the profitability of studies were not consistent. These studies have a general limitation on the factors affecting profitability. On the other hand, most of these studies refer to enterprises in general, and are less likely to study enterprises in an specific industry, especially those with many specificities such as construction.

Based on the research review, in our paper, we plan to determine the impact as well as the trend of impact of many internal factors while affecting the profitability of construction business.

### 3. Research Methods

For the purpose of this study, data was collected from 584 financial statements of 73 construction companies listed on Vietnam's stock exchange during the period from 2008 to 2015, in which there were 61 companies listed on Hanoi Stock Exchange and the remaining 12 companies were listed on Ho Chi Minh City Stock Exchange. In this study, we applied research model previously used and tested by Onalapo and Kajola (2010):

$$Y_{i,t} = \beta_0 + \beta_1 TD_{i,t} + \beta_2 TURN_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE_{i,t} + \beta_5 TANG_{i,t} + \beta_6 GROW_{i,t} + e_{i,t}$$

**Table 1**

Description of variables in the model

Variables	Formula	Sources
Y	ROA Profit before taxes/Average total assets	Sheikh & Wang, 2013; Berzkalne, 2014; Zeitun & Tian, 2007; Onalapo & Kajola, 2010.
	ROE Profit before taxes/Average shareholder's equity	Shubita & Alsawalhah, 2012); Berzkalne, 2014; Dawar, 2014; Zeitun & Tian, 2007; Onalapo & Kajola, 2010.
TD	Total liabilities/Shareholder's equity	Gill et al., 2011; Abor, 2005; Sheikh & Wang, 2013; Ebaid, 2009; Berzkalne, 2014; Onalapo & Kajola, 2010.
SIZE	Ln(assets).	Ebaid, 2009; Sheikh & Wang, 2013; Zeitun & Tian, 2007; Abor, 2005; Khan, 2012; Onalapo & Kajola, 2010; Dawar, 2014; Salim & Yadaw, 2012.
GROW	(DTTi-DTT(i-1)) / DTT (i-1)	Gill et al., 2011; Abor, 2005; Sheikh & Wang, 2013; Onalapo & Kajola, 2010; Dawar, 2014; Zeitun & Titan, 2007.
TURN	Net sales/Average total assets	Javed et al., 2014; Onalapo & Kajola, 2010; Muritala, 2012.
AGE	The number of years since listing to time of the study.	Onalapo & Kajola, 2010; Muritala, 2012; Pouraghajan et al., 2012; Dawar, 2014.
TANG	Fixed assets/Total assets	Sheikh & Wang, 2013; Zeitun & Tian, 2007; Dawar, 2014; Onalapo & Kajola, 2010.

Source: Compilation of the authors

Research hypotheses include:

*H<sub>1</sub>: Debt to equity ratio (TD) has a negative impact on the profitability of construction companies listed on Vietnam's stock exchange.*

According to Pecking Order theory, enterprise executives always have better information about corporate value compared with outside investors, so they prefer to use internal sources of capital rather than loans. However, in difficult periods, the internal capital of enterprises may be limited which forces enterprises to borrow, leading to lower business efficiency. Thus, according to the Pecking Order theory, the higher the amount of loans, the lower the profitability of companies.

*H<sub>2</sub>: Fixed assets to total asset ratio (TANG) has a positive impact on profitability in construction companies listed on Vietnam's stock exchange.*

In construction companies, fixed assets mainly include office buildings, construction machinery and vehicles. These assets play a critical role on the process of creating products in construction companies. When enterprises invest in all kinds of machineries, they will be proactive in the process of construction, and able to complete the work in time or before the rate of progress. Moreover, fixed assets can become collateral assets when enterprises need to borrow money from banks due to a lack of capital. According to Akintoye (2008), if enterprises have a large number of fixed assets, they will get preferential interest rates when borrowing money from the banks, thereby increasing business efficiency.

*H<sub>3</sub>: Firm size (SIZE) has a positive impact on the profitability of construction companies listed on Vietnam's stock exchange.*

The size of an enterprise has a substantial impact on the market share and prestige of that enterprise, thus affecting its profitability (Shepherd, 1971). In addition, the larger the size of an enterprise, the greater the capacity of resources as well as the opportunities to cooperate with other firms and the easier the diversification of sectors (Frank & Goyal, 2003). According to the Trade-off theory, large enterprises are received more preferential treatments when borrowing money, besides, when borrowing large amounts of loans, they will be entitled to reduce corporate income tax as interest expenses are tax deductibles. In order for a construction enterprise to bid and win large projects, one of the most important criteria is that the size of the enterprise becomes sufficiently large which is reflected in the total assets.

*H<sub>4</sub>: Revenue growth rate (GROW) has a positive impact on the profitability of construction companies listed on Vietnam's stock exchange.*

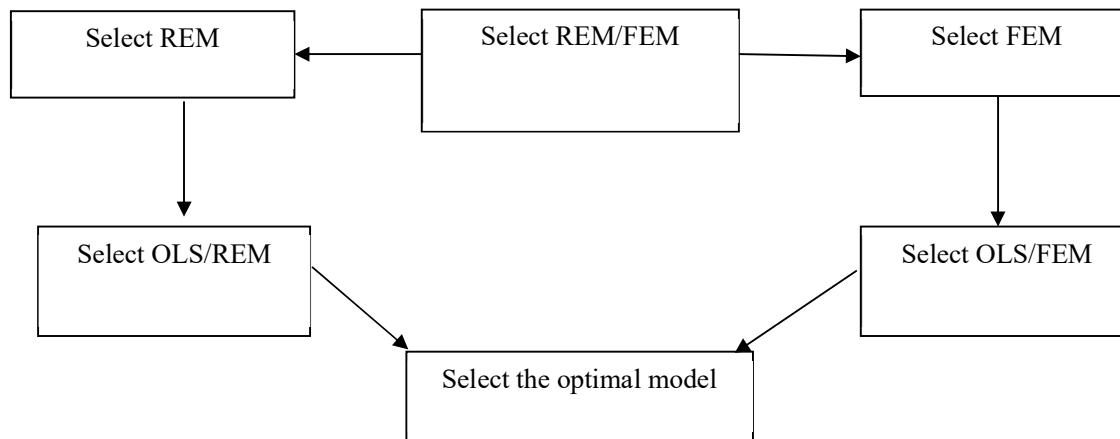
The revenue growth rate is measured by the continuous growth of net revenue. An increase in net revenue will result in increase in growth rate and profits of companies (Zeitun & Titan, 2007). Whereby, the revenue growth rate is a significant indicator reflecting the development of the businesses. With construction companies, one of the most important indicators when the bidding is the net revenue of recent years. If the growth rate of revenue decreases, it means that enterprises are facing difficulties, their business efficiency and their prestige will be adversely affected.

*H<sub>5</sub>: Asset turnover ratio (TURN) has a positive impact on the profitability of construction companies listed on Vietnam's stock exchange.*

Asset turnover ratio is an indicator of the efficiency where a company is deploying its assets to produce the revenue. The higher the value of asset turnover ratio, the more effective the use of assets, thus it will contribute to the improvement of business efficiency in an enterprise. Thus, enterprises can only achieve high business efficiency if they use resources including assets effectively.

*H<sub>6</sub>: Firm age (AGE) has a positive impact on the profitability of construction companies listed on Vietnam's stock exchange.*

Firm age is defined as the number of years of listing until the time of the study. Stinchcombe and March (1965) provided that companies with long operating histories are more experienced in business operations, thus they can avoid certain risks in the course of business operations, and get preferential treatments in the process of borrowing. Therefore, the firm age will positively influence business efficiency. Previous studies applied common regression models such as Ordinary Least Square (OLS), Fixed Effects Model (FEM), and Random Effects Model (REM). In this study the author will analyze and select the optimal model among three models through the following figure:



**Fig. 1.** The process of selecting the optimal regression model

Description of the figure:

Step 1: Select either fixed effect method (FEM) or random effect method (REM) based on Hausman test.

Step 2: Select between the better model in step 1 and OLS to find the optimal model.

According to Fig. 1, firstly, the better model was selected between two models FEM and REM by conducting the Hausman test. The test results are shown in Table 2.

**Table 2**

Results of Hausman test between two models REM and FEM

Dependent variable	Chi2(x) statistic	Pro>Chi2	Select model (FEM, REM)
ROA	36.15	0.0000	FEM
ROE	64.43	0.0000	FEM

*Source: Compilation of the authors from Stata 14*

The result of the Hausman test shows that for both equations with dependent variables ROA, ROE, the better model is FEM. After FEM is selected, the optimal model will be selected between OLS and FEM by conducting a test of FEM. Table 3 represents the selection of the optimal model.

**Table 3**  
The test result between OLS and FEM

Dependent variable	F (72, 505); F(72, 500)	Prob>F =0,0000	Model selection (OLS, FEM)	Note
ROA	4.02	0.0000	FEM	Test results of FEM
ROE	4.14	0.0000	FEM	

Source: Compilation of the authors from Stata14

Therefore, for all equations, FEM is the best regression model.

#### 4. Research results and discussion

Table 4 represents some basic statistics for the variables in the model.

**Table 4**  
Descriptive statistics of variables in the model

Variable	Obs	Mean	Std. Dev	Min	Max
ROA	584	0.04194	0.06025	-.277009	0.32200
ROE	584	0.11868	0.20963	-1.99319	0.61083
TD	584	0.65222	0.18778	0.04965	1.18881
TANG	584	0.13891	0.11532	0	0.83710
SIZE	584	12.4399	1.42823	7.16858	16.5277
GROW	584	0.20675	0.54087	-0.6026	7.31180
TURN	584	0.71409	0.40588	0.03572	2.91622
AGE	584	8.04794	3.17436	1	15

Source: Compilation of authors from Stata14

The table of descriptive statistics shows that the sample has 584 observations and characteristics of variables are explained as follows:

- Two variables reflecting profitability are ROA and ROE with large differences in values of mean, minimum and maximum. The minimum values of both ROA and ROE are negative while the maximum values are very high. This indicates that business efficiency of construction companies during the period from 2008 to 2015 vary considerably.
- The indicator of capital structure is TD with the minimum value of 0.0496, and maximum value of 1.188, which indicates that there exists at least one company with negative shareholder's equity due to relatively low business efficiency resulting in negative accumulated profits and the absolute value of accumulated profits is greater than the shareholder's equity.
- The indicator reflecting asset structure is TANG with mean of 0.11391 (times). Thus, the amount of fixed assets is not high compared with total assets.
- For the variable GROW, the values of mean, minimum, maximum are 0.20675; -0.6026; 7.31180, respectively which reflect a high growth rate of average revenues of companies (20%), however, revenue growth rates of these companies vary considerably.
- Variable TURN has a mean of 0.71409 indicating low business efficiency of construction companies. This can be explained by the fact that the average revenue of construction companies is low compared with the number of total assets.
- Firm age (AGE) has a mean of 8.04794 with a minimum value of 1 year and the maximum value of 15 years. Therefore, the company with the lowest age was listed in 2007 and the company with the highest age was listed in 2000, while most companies were listed in 2008 or 2009.

**Table 5**  
Result of FEM with dependent variable ROA

ROA	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
TD	-.1079949	.0217426	-4.97	0.000	-.1507119	-.0652779
TANG	-.0377588	.0234896	-1.61	0.109	-.0839082	.0083906
SIZE	.0153309	.0043139	3.55	0.000	.0068555	.0238063
GROW	.0217707	.0035967	6.05	0.000	.0147043	.0288371
TURN	.0457963	.0091796	4.99	0.000	.0277615	.0638312
AGE	-.0063523	.0009311	-6.82	0.000	-.0081817	-.00445229
cons	-.0549092	.048078	-1.14	0.256	-.1498182	.0399998

Adjusted R-Sq = 0.3381 F(6,505) = 42.99 Prob > F = 0.0000

It can be seen from the table that TD has a negative impact on ROA with a 1% level of significance. Therefore, for the listed construction companies, the higher the amount of debts, the lower the value of ROA. This finding is consistent

with the research hypothesis and result of many studies of Ebaid (2009); Khan (2012); Zeitun and Tian (2007); Sheikh and Wang (2013); Onaolapo (2010); Doan Ngoc Phuc (2014); the study of Salim and Yadaw (2012) on the consumer, real estate, and industrial sectors; Muritala (2012) and the study of Chiang et al. (2002) on construction and real estate industries in Hong Kong. The table also shows that TANG has a negative impact on ROA but it is not statistically significant. The reason is that in the construction industry, the amount of fixed assets is not large compared with other manufacturing industries, thereby, it has little impact on business efficiency. GROW has a positive impact on ROA at 1% level of significance. This result is consistent with the research hypothesis and the research results of Sheikh and Wang (2013), but contradicts to the results of Zeitun and Tian (2007), Onaolapo and Kajola (2010); Javed et al. (2014); Dawar (2014). This shows that in construction companies, growth of revenue means an increase in ROA.

TURN has a positive relationship with ROA at 1% level of significance. This finding is consistent with the research hypothesis and research result of Onaolapo and Kajola (2010). AGE is negatively associated with ROA and statistically significant at 1%. This contradicts to the research hypothesis and research results of Onaolapo and Kajola (2010). It can be explained by the fact that the period from 2008 to 2015 was a difficult period for the global economy in general and Vietnam in particular, so companies with long operating history often had a complicated organizational structure which led to large management costs. Since the growth rate of revenue is no greater than the growth rate of costs, the higher the firm age, the lower the value of ROA in difficult times.

**Table 6**

Result of FEM with dependent variable ROE

ROA	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
TD	-.2819796	.0801238	-3.52	0.000	-.4393965	-.1245626
TANG	-.0691295	.0865618	-0.80	0.425	-.2391952	.1009361
SIZE	.1171965	.0158972	7.37	0.000	.0859636	.1484293
GROW	.063147	.0132543	4.76	0.000	.0371065	.0891874
TURN	.0774959	.0338278	2.29	0.022	.0110354	.1439564
AGE	-.0330377	.0034313	-9.63	0.000	-.0397792	-.0262963
cons	-.9260406	.1780196	-5.20	0.000	-1.275791	-.5762904

Adjusted R-Sq = 0.3717 F(6,505) = 49.79 Prob > F = 0.0000

Result of regression analysis shows that TD has a negative impact on ROE at 1% level of significance. In other words, the higher the amount of debts of listed construction companies, the lower the value of ROE. This result is consistent with findings of Onaolapo and Kajola (2010); Shubita and Alsawalhah (2012); Doan Ngoc Phuc (2014); Berzkalne (2014) and Dawar (2014). However, it contradicts to research results of Abor (2005) and Gill et al. (2011). Research result on the impact of debt indicator to ROE contradicts to findings of Abor (2005); Gill et al. (2011) and Ebaid (2009). This can be explained by the fact that the mean values of ROE of these studies were relatively high (36.94%; 26% and 21.37% respectively). While the mean value of ROE in the study of Shubita and Alsawalhah (2012) was 8%, the mean value of ROE of listed construction companies in this study was 11.86%. Therefore, when the economy grows, the higher the value of ROE, the larger the number of debts and vice versa. This is consistent with the M&M theory. SIZE has a positive impact on ROE at 1% level of significance. This finding is consistent with the research hypothesis and research results of Abor (2005); Gill et al. (2011); Sheikh and Wang (2013); Muritala (2012). GROW has a positive impact on ROE at 1% level of significance. This finding is consistent with the research hypothesis and research results of Sheikh and Wang (2013), but it contradicts to findings of Zeitun and Tian (2007); Onaolapo and Kajola (2010); Javed et al. (2014); Dawar (2014). TURN has a positive impact on ROE at 1% level of significance in both equations. This confirms the research hypothesis and research results of Muritala (2012); Onaolapo and Kajola (2010). Firm age is negatively associated with ROE at 1% level of significance in both equations. As the discussion above, in the period of the financial crisis, the larger the organizational structure, the higher the non-manufacturing costs which can reduce ROE. Although firm age has a negative impact on ROE the extent is not considerable. For example, when firm age increases by 1 year, ROE decreases by 0.033 times when other factors held constant.

## 5. The conclusion and recommendations

The research result proved that the higher the debt to equity ratio, the lower the values of ROA and ROE. Therefore, enterprises should pay attention to the capital structure in order to reduce the debt to equity ratio. In order to do this, potential solutions are proposed as follows. Firstly, companies should regularly analyze liabilities to make a proper repayment plan. Secondly, enterprises should restrict the amount of loans of credit institutions in the period of economic crises. When business efficiency increases, the increase in debt financing is effective financial leverage to boost business efficiency. However, during difficult periods, a large amount of loans will negatively affect the business performance of enterprises. In addition to reducing debts, increasing shareholder's equity is the right policy of enterprises as the higher the amount of owner's equity, the greater the degree of independence, autonomy in the business.

TURN has a positive and significant impact on ROA and ROE, therefore enterprises need to improve the efficiency of asset utilization. As asset turnover ratio is calculated by dividing net sales by average total assets, in order to improve the efficiency

of asset utilization, enterprises must identify all measures to increase sales and invest in assets appropriately. Enterprises need to make sure the growth rate of revenue is greater than the growth rate of assets. Therefore, when a company intends to invest in certain assets, it should consider the expected revenue. It is critical not to invest in unnecessary equipment. The increase in revenue does not only affect the efficiency of asset utilization but also directly affects the profitability of assets and equity. As a result, enterprises should expand relationships, find more projects and establish prestige regarding quality and progress to strengthen the trust of investors, thereby gradually expanding the market, increasing revenue for the business. SIZE has a positive and significant impact on ROA and ROE. This shows that the larger the size of the company, the higher the ROE and ROA. According to the formula above, SIZE is calculated by  $\ln(\text{total assets})$ , while total assets are equal to total capital. Therefore, to increase the value of SIZE, enterprises need to enhance capital mobilization from both shareholders' equity and debts. However, as the above analysis, TD has a negative impact on ROA and ROE, so companies need to balance capital mobilized from debts and equity so that the size of enterprises increase while TD is controlled and is not increased.

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