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Factors affecting the forecasted profitability of construction enterprises listed on the Vietnamese stock market

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Abstract: The study was conducted to analyze the factors affecting the forecasted profitability of construction enterprises listed on the Vietnamese stock market in the upcoming year. Using E-view software for quantitative analysis, a panel data regression model was developed. The White, Hausman, and Wald tests were employed to select the appropriate model based on tests of the pooled ordinary least squares model (POLS), finite element model (FEM), and random effects model (REM). The study established a regression model to determine the relationship of internal factors influencing the future profitability of 126 listed construction enterprises. The results indicated that the asset growth rate was positively correlated with profitability in the following year, whereas three factors—profitability in the previous year, company size in the previous year, and dividends paid in the previous year—were negatively correlated with future profitability. Additionally, the study found that the capital structure, net working capital, and revenue structure of listed construction enterprises in Vietnam from 2019 to 2024 did not significantly affect forecasted profitability. Based on these findings, several recommendations are proposed to assist business managers in predicting future profitability more accurately.

Keywords: *Construction industry, Corporate governance, Listed companies, Profitability forecasting.*

1. Introduction

Business efficiency plays a huge and significant role, thus most countries in the world encourage and create a favorable environment for businesses to improve business efficiency, thereby improving the efficiency of the entire economy. In recent years, although the Vietnamese economy has had many positive changes, business operations are still facing many difficulties. The impact of economic crisis and recession is still considered as a threat to the possibility of business bankruptcy. Construction companies are of no exception and are facing the challenges that they lack competitiveness, and are faced with limited financial resources, inefficient sales and business operations. In the period of 2019-2024, construction enterprises experienced low growth rates and small profits. Therefore, forecasting profitability is extremely necessary for businesses in general and construction businesses in particular. Forecasting profitability will enable businesses to recognize key issues affecting profitability in the planning year, thereby having appropriate solutions to improve business efficiency.

The profitability of enterprises can be reflected through many indicators, such as Tobin's Q, price-to-earnings ratio (P/E) and market value of enterprises [1-3] or profit ratios such as return on assets (ROA), return on equity (ROE) [4-6]. Although there have been many studies on forecasting the profitability of enterprises in the world, the results of these studies have not really been consistent with the current situation of construction enterprises in Vietnam in recent years. Therefore, the author wrote this article with the aim of analyzing and finding out the factors affecting the profitability forecast and

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evaluating the impact of those factors on listed construction enterprises in recent years. Based on the research results, construction enterprise managers can have specific measures to influence each factor to gradually improve the business efficiency of the enterprise.

2. Literature Review

There have been studies in the world on factors affecting future profitability, which are meaningful in forecasting the profitability of enterprises in a number of industries in many different countries up to now. Based on the given theoretical basis and through practical testing, studies have shown that future profitability can be influenced by a number of internal factors in the past of the enterprise including: profit, capital structure, enterprise size, growth rate, net working capital, dividend payment level.

It is possible to summarize the studies on factors affecting the forecast of profitability of scientists and based on these studies, the author puts forward the following research hypothesis:

2.1. Past Profits

The impact of past profits on the forecast of future profits has been studied by many empirical experts in economics and finance, typically [7-9]. These studies all found a trend of reversion to the average value of the rate of return with different characteristics and levels, depending on the research object and context. Specifically, Fama and French [8] studied the trend of reversion of ΔRNOA for enterprises listed on the US stock market during the period 1964-1995 and found that the trend of reversion was non-linear, and the degree of reversion was stronger when the profitability of the enterprise was below the industry average and when it was far from (higher or lower) the industry average. However, Allen * and Salim [7] conducted similar studies for UK listed companies from 1982 to 2000 and EU Confederation of Labor companies, respectively, and found that the reversal trend was not as clearly nonlinear as the study conducted by Fama and French [8]. Previously, Freeman, et al. [9] used the maximum likelihood estimation method to also find a reversal trend in ROE, and showed that the change in ROE was strongly correlated with the change in future profits. In general, the results of these studies confirmed the existence of the reversal nature of the average value of actual profitability, thereby affirming the impact of past profits on the forecast of future profits.

Thus, previous theoretical and empirical studies have firmly confirmed the significant role of past profits as one of the factors affecting the future profitability of enterprises, although the level and trend of impact may be more or less different (strong or weak, linear or nonlinear...) depending on the research context.

2.2. Capital Structure

In the study of Stierwald [10] capital structure as represented by the debt/total assets ratio was found to have a positive and statistically significant impact on 1-year ROA of listed firms on the Australian stock market during the period 1995-2005. Similarly, Dickinson and Sommers [11] also found empirical evidence of a positive impact of debt/equity ratio on 1-year return on net operating assets (RNOA) of listed firms in the US. The results of these studies provide empirical evidence for the benefits of financial leverage in improving the expected profitability of firms. However, Yoo and Kim [12] found a negative and statistically significant relationship between debt/total assets ratio and 1-year ROA of construction firms in Korea in the context of a long-term economic recession. This result demonstrates the potential risks and losses of using financial leverage in the context of the declining business situation due to the impact of the economic crisis. Comparing the results of the above studies, it can be seen that in fact, the impact of financial leverage on future profitability can be positive or negative depending on the operating context of the enterprise.

In the study of Evans, et al. [13] the impact of capital structure on expected profits is not clearly determined. The study uses two indicators: interest expense and change in long-term debt scale (both calculated on the average value of equity) to represent the capital structure factor. The research results are not really consistent because the interest expense in the period has a negative impact while the

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increase in long-term debt has a positive impact and is statistically significant on the return on equity (ROE) 1 year later, Espinosa [14] also did not find a statistically significant relationship between financial leverage (and profit in the following period, however in this study financial leverage only plays the role of a control variable in the regression model.

2.3. Business Size

The measurement of firm size varies across studies. Evans, et al. [13] measured firm size using the logarithm of total assets, and Stierwald [10] measured firm size using the number of employees, both of which found a positive and statistically significant effect of size on future returns on total assets. Czarnitzki and Kraft [15] and Yoo and Kim [12] found a negative and statistically significant effect of firm size on future returns – results that were interpreted based on the specific operating context of firms in their countries (Germany and Korea). Meanwhile, Espinosa [14] did not find a statistically significant relationship between firm size (proxied by the decile rank of the logarithm of total assets of firms) and future returns.

2.4. Asset growth

Richardson, et al. [16] and Dickinson and Sommers [11] found empirical evidence that the change in net operating assets during the period is negatively related to the next period's return on assets (ROA) of US listed firms in different periods. Abarbanell and Bushee [17] also found that the difference between the increase in long-term investment (measured by capital expenditure) of US listed firms compared to the industry average has a negative impact on dividends in the following year, thereby concluding that if a firm increases too much long-term investment, its profitability in the near future may decline. In particular, the negative impact of excessive long-term investment becomes more serious in the case of enterprises with large free cash flow and low leverage [18] because these enterprises have surplus funds and few fixed payment obligations, so they can invest more widely. However, some other studies have found a positive relationship between investment and future profitability. In Asia, Yoo and Kim [12] found that the growth of total assets during the period (measured by the difference between the logarithm of total assets at the end of the period and the logarithm of total assets at the beginning of the period) has a positive and statistically significant impact on the next year ROA of enterprises listed on the Korean stock exchange. Previously, Jiang, et al. [19] also found a positive relationship between the profitability of listed companies on the Taiwan Stock Exchange in each year during 1992-2002 and long-term investments (measured by capital expenditure) in the previous 5 years.

2.5. Dividends

Empirical studies on the role of dividends in profit forecasting show very different results. Zhou [20] concluded that firms that pay high dividends tend to have strong earnings growth in the future. Evans, et al. [13] used two variables to represent dividend policy, namely the size of cash dividends and a dummy variable representing whether the firm paid dividends in the period, and both of these variables were shown to have a positive and statistically significant impact on ROE in the next one year in practice.

Unlike the previous studies, Freeman, et al. [9]; DeAngelo, et al. [21]; Benartzi, et al. [22] and Grullon, et al. [23] did not find empirical evidence for a positive relationship between the change in dividends in the current period and future earnings. Grullon, et al. [23] argue that the positive relationship between current dividends and future profitability found by Nissim and Ziv [24] is not convincing because that study imposed a linear reversion of annual returns, whereas in reality it should be nonlinear, leading to an incorrect regression model format. Thus, although dividends are one of the factors affecting future profitability with the most solid theoretical foundation, their role in predicting profits in practice is complex, can vary depending on the context, and has not been consistently determined among empirical studies. In addition, researchers seem to be uninterested in the short-term impact of this factor.

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In summary, it can be seen that there have been many studies in the world on the impact of internal factors on the forecasting of business profits in diverse contexts, applying different approaches and research methods.

However, the level of interest of researchers in each of the above factors is not the same. While factors including long-term investment, dividends, profit structure and past profits are quite popularly studied, the factors of business size, revenue structure and capital structure have not received adequate attention. Up to now, there has not been a comprehensive study synthesizing all the above factors.

The results and interpretations of the studies also have certain differences, even contradictory when determining the impact direction of factors on future profitability, depending on the indicators used to represent the impact factors, measurement methods, research models and research context. Another limitation is that the above studies are mainly conducted in developed countries, there are still very few studies conducted and disseminated in developing countries and in Southeast Asia in general and Vietnam in particular.

In the context that Southeast Asian countries are increasingly contributing positively to the common prosperity of the region but also facing many internal challenges of developing economies as well as external pressure from global integration, causing the business situation and profitability to be strongly affected, often fluctuating over the years and the need to forecast profits becomes extremely urgent.

Therefore, by analyzing previous studies and studying some other internal factors, this study conducted by the author will provide a comprehensive perspective on forecasting profitability for businesses in general and construction enterprises in Vietnam.

3. Research Methodology

3.1. Research Data

The research sample includes data over a 5-year period of 126 construction companies listed on the Vietnamese stock market. The data sources are collected from information on stock exchanges, securities companies and data collected from FinnPro. The independent variables are taken from 2019 to 2023 to forecast the dependent variable from 2020 to 2024. The data used in the study is analyzed from financial statements and financial data of construction enterprises. The financial statements of these enterprises are established on the basis of compliance with the Vietnamese accounting standards system and have been audited.

3.2. Research Model

In this study, the author studies the following model.:

$$ROA_{it+1} = \beta_0 + \beta_X X_{it} + e_{it}$$

The independent variables are: profitability, debt ratio, business size, revenue growth, net working capital, stock dividends and revenue structure in year t (year t is studied from 2019 to 2023). For construction companies, the characteristic is that regular current assets account for a large proportion, so regular capital is an important factor in generating profits and minimizing risks. At the same time, the revenue components of these enterprises also fluctuate greatly among enterprises, thus in the research model, the group of authors will study and add the variables of net working capital and revenue structure to further examine the impact of these factors on the profitability of the enterprise.

The dependent variable is the profitability variable in year t+1 (measured by ROA).

The dependent variable and the independent variables are described in Table 1.

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Table 1.
Description of the variables in the model.

Variables	Symbol	Calculation method	Expected impact
Profitability in year t+1	ROAt+1	Net profit after tax in year t+1/ Average assets of company i in year t+1	
Profitability in year t	ROAt	Net profit after tax in year t+1/ Average assets of company i in year t	-
Capital structure in year t	DRt	Average dept in year t / Average assets of company i in year t	+
Firm size in year t	SIZt	Log(Average assets of company i in year t)	-
Growth rate in year t	GROt	(Average assets of company i in year t - Average assets of company i in year t-1)/ Average assets of company i in year t-1)	+
Net working capital in year t	NWCt	Average net working capital of company i in year t/ Average assets of company i in year t	+
Dividend in year t	DIVt	Dividend of company i in year t	-
Revenue structure in year t	RSt	$RSt = \sum_{j=1}^{3} z_j \times \ln \frac{1}{z_j}$ (z_j is the proportion of revenue from activity *j* in the total revenue of firm *i* in year *t*)	+

3.3. Data Analysis Method

To analyze the factors affecting future profits, the authors analyzed the correlation matrix and estimated the regression model. The study used panel data regression with three methods: Pooles Ordinary Least Squares (POLS), Random Effects Method (REM), Fixed Effects Method (FEM).

The article runs the model using E-view software, based on the results obtained when running the program, the equations of the factors affecting the future profits of the enterprise will be written. Then, the suitability of the model will be tested by testing for multicollinearity, heteroscedasticity, autocorrelation, and then through the adjusted coefficient of determination R^2 (Adjusted R-Square) to determine the explanatory ability of the model in practice.

4. Results and Discussion

4.1. Descriptive Statistics

The statistical results describing the variables are presented in Table 2. The data show that there are differences in the profitability of construction enterprises. Based on the data table collected by the authors, the profitability of construction enterprises is lowest mainly in 2021 and 2022 - this is the period when the Covid-19 epidemic broke out in Vietnam.

Table 2.
Descriptive statistics of variables of construction firms.

Variable	Obs.	Mean	Median	Maximum	Minimum	Std. Dev.
ROAt+1	630	0.0284	0.0165	0.3198	-0.6527	0.0726
ROAt	630	0.0347	0.0193	0.3198	-0.6527	0.0689
DRt	630	0.5303	0.5720	0.9938	0.0112	0.2351
SIZt	630	11.926	11.944	13.565	10.380	0.6762
GROt	630	0.2274	0.0269	8.224	-0.7078	3.288
NWCt	630	0.2108	0.1614	0.9028	-0.4121	0.2434
DIVt	630	1428.80	831	16993	171	2525.91
RSt	630	0.1361	0.0697	0.9896	0.0000	0.1712

4.2. Correlation Coefficient Matrix

Table 3 shows the correlation coefficient between the dependent variable and the independent variables and the independent variables with each other.

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Table 3.
The correlation coefficient matrix between the variables in the model.

	ROAt+1	ROAt	DRt	SIZt	GROt	NWCt	DIVt	RSt
ROAt+1	1							
ROAt	0.5541	1						
DRt	-0.2444	-0.3427	1					
SIZt	-0.0015	-0.0064	0.4006	1				
GROt	-0.0204	-0.0054	0.0519	0.1018	1			
NWCt	0.1651	0.2366	-0.6435	-0.4081	-0.0437	1		
DIVt	0.4810	0.7009	-0.1052	0.1652	0.1231	0.0887	1	
RSt	-0.0073	-0.0091	-0.0376	0.1033	0.1300	0.0840	0.0240	1

The correlation coefficient between the independent variables is not greater than 0.8, so there is no multicollinearity between the variables [25]. The above matrix shows that the variables ROA, NWC, DIV of the previous year are positively correlated to the ROA of the following year; the variables DR, SIZE, GRO, RS are negatively correlated to the ROA of the following year. The results of the correlation analysis between the independent variables in the model show that the possibility of multicollinearity between the independent variables in the model is not high.

4.3. Correlation Regression Analysis

The regression results with the dependent variable according to POLS, FEM and REM are as follows: phụ thuộc theo POLS, FEM và REM như sau:

Table 4.
Regression results.

Variable	VIF	The dependent variable ROAt+1		
		POLS	FEM	REM
Cons		0.0121	0.9585***	-0.0013
ROAt	2.7846	0.3911***	-0.1569**	0.3881***
DRt	2.3525	-0.0303**	0.0299	-0.0287**
SIZt	1.1218	0.0009	-0.0792***	0.0019
GROt	1.0393	0.0108	0.0811 ***	-0.0209
NWCt	1.6052	-0.0064*	0.0832**	0.0351**
DIVt	1.1561	0.0619***	-0.0533***	0.0597***
RSt	1.0336	-0.0357	-0.0531	-0.0012
N		630	630	630
R-Sq		0.4330	0.7461	0.5395
Significance		Prob (F-statistic) = 0.0000	Prob (F-statistic) = 0.0000	Prob (F-statistic) = 0.0000
White's Test		Prob = 0.0000		
Hausman's Test			Prob = 0.0000	
Wald's Test			Prob = 0.0000	

Note: **p<0.05 ***p<0.01.

Table 4 presents the models describing the regression results and the test results when choosing the appropriate model. The multicollinearity test results show that the VIF variance inflation factor is all <10, the model does not have multicollinearity.

The largest VIF index is 2.7846, indicating that the possibility of multicollinearity is negligible. The White test shows that the model has heterogeneity (p-value = 0.0000 <5%) so the POLS model is not suitable. The Hausman test gives a p-value = 0.0000 <0.05, so H_0 is rejected, so the fixed effects model (FEM) is used to analyze the factors affecting the future profitability of listed construction enterprises. After selecting the FEM model as the appropriate model, the authors tested the model for defects using the Wald test.

The result obtained was prob=0.0000 < 0.05, showing that the FEM model was defective. The result of the model was corrected by removing the two variables DRt and RSt from the model, showing

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that the independent variables DRt and RSt have no correlation with future profitability. The remaining variables of the model can explain 74.61% of the meaning for the dependent variable.

The Prob values of the remaining variables all have $p < 0.05$, showing that the independent variables ROAt, SIZt, GROt, NWCt, DIVt, all have an impact on the dependent variable ROAt+1.

The Prob values of the independent variables SIZt, GROt, DIVt have $p < 0.01$, these are factors that have a large impact on ROAt+1, the variables ROAt and NWCt have $p < 0.05$ and have a moderate impact on ROAt+1. In which, GROt, NWCt have a positive correlation with ROAt+1 while ROAt, SIZt, DIVt have a negative correlation with ROAt+1.

The model of factors affecting the future profitability of construction enterprises listed on the Vietnamese stock market is:

$$ROAt+1 = 0.9585 - 0.1569ROAt - 0.0792SIZt + 0.0811GROt + 0.0832NWCt - 0.0533DIVt$$

In Table 4, in the selected FEM model, R2 = 0.7461 shows that in the regression model, the selected variables have a large impact on ROAt+1, capable of explaining 74.61% of the fluctuations in ROAt+1, meaning that 74.61% of the changes in ROAt+1 of construction enterprises listed on the Vietnamese stock market are caused by the impact of the selected variables.

+ β_1 = -0.1569 reflects the negative impact of ROA of the previous year on ROA of the following year, which is explained by the reversal in the average value of the return on assets. This result is similar to the research of Allen * and Salim [7]; Fama and French [8] and Freeman, et al. [9].

+ β_2 = -0.0792 means the previous year's business size has an inverse effect on the following year's profitability, similar to the research results of Czarnitzki and Kraft [15] and Yoo and Kim [12]. Construction businesses have the characteristic of paying according to the progress of the project, when the project is completed (usually several years), the remaining part is paid, this part is often very large when expanding the size of assets, that is, the business size in the previous year has not yet generated sales in the following year, therefore, the profitability in the following year will often be lower.

+ β_3 = 0.0811 reflects the growth rate of assets with the expected profitability of the enterprise have a positive relationship with each other.

This result is similar to previous studies by Yoo and Kim [12] in Korea, Jiang, et al. [19] in Taiwan, but different from the results of Richardson, et al. [16] and Dickinson and Sommers [11] in the US, showing that the impact direction of asset growth on the profitability of enterprises in East Asian economies is similar to each other but different from the European and American economies.

+ β_4 = 0.0832, this means that the NWC variable has a positive impact on the profitability of the following year. One of the components that accounts for a large proportion of the working capital of construction enterprises is inventory, which mainly includes the value of unfinished construction works with a fairly long inventory period.

Therefore, if the net working capital is not guaranteed, the financial risk of the enterprise is very large, affecting the profitability.

+ β_5 = -0.0533 shows the negative impact of dividends paid in the current period on ROA of the following year, because the firm that pays more dividends in the previous year will have less internal capital in the following year and therefore must mobilize more external capital, such as issuing more shares, leading to an increase in the cost of financing and causing future profits to decrease. This result is consistent with the research results of Freeman, et al. [9]; DeAngelo, et al. [21]; Benartzi, et al. [22] and Grullon, et al. [23].

5. Conclusion and Recommendations

The study has shown empirical evidence on the impact of internal factors in the past year on the profitability of listed construction enterprises in the following year. Accordingly, the asset growth rate is positively correlated with the profitability of the next year, while the three factors of profitability in the previous year, size in the previous year and dividends paid in the previous year are all negatively correlated with the profitability of the following year. In addition, the study also shows that the capital

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structure, regular working capital and revenue structure of listed construction enterprises in Vietnam in the period of 2019-2023 do not affect the forecast of profitability in the following year.

For construction enterprises, financial managers need to consider internal characteristics to forecast the profitability of the enterprise, in which managers need to pay attention to the following issues:

5.1. Strengthening asset Investment Management

The test results indicate that when a new enterprise invests in additional assets, it will have a negative impact on the profitability of the following year, due to the characteristics of the construction industry. However, when the enterprise's products and construction projects are completed, they will bring high profits to the enterprise. On the other hand, the growth rate of assets has a positive impact on profitability.

This means that in analyzing the impact of asset investment on profits, it is necessary to take into account the delay impact of about 1 year or more and integrate this delay into the impact analysis model. In terms of corporate financial planning, the existence of this delay also implies that if an enterprise plans to improve future profits based on increased asset investment, it is necessary to plan and make investments several years in advance and monitor the corresponding consequences over a period of several years.

5.2. Ensure Net Working Capital

To ensure a regular source of working capital, businesses need to focus on accurately determining capital needs, effectively managing receivables, inventories and cash flows, and building risk prevention measures. Although ensuring a regular source of working capital will require higher financial costs, this is necessary to maintain the profitability of the business in the future.

5.3. Perfecting Dividend Policy

Enterprises need to develop a dividend policy that is consistent with their profit goals. If the enterprise focuses on profit growth in the coming year, it should not pay too much in dividends because that will reduce the enterprise's internal capital and make it more dependent on external capital, issuing more shares will lead to an increase in the cost of capital in the next period.

In other words, retaining more profits will help the enterprise take advantage of the benefits from this self-generated capital, reduce the cost of capital and ensure the profit of the next period. This is especially necessary for enterprises whose profits have dropped recently and are expected to face many difficulties in the coming period.

Essentially, these businesses should prioritize a passive retained earnings policy, whereby the required retained earnings size is determined in advance based on the investment needs and target capital structure of the next period, and then the dividend size that can be paid in the period is determined based on the difference between after-tax profit and the above retained earnings needs.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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