

# FACTORS AFFECTING BUSINESS PERFORMANCE: A STUDY OF VIETNAMESE LISTED PLASTIC INDUSTRY ENTERPRISES IN THE VIETNAMESE STOCK MARKET

PhD. Tran The Nu\*

**Abstract:** *The business performance of enterprises is influenced by numerous internal and external factors. This study investigates six internal factors and two external factors that impact the business performance of plastic industry enterprises listed on the Vietnamese stock market and proposes several solutions. The research team employs a panel data regression model using data from 48 plastic industry companies listed on the HOSE and HNX stock exchanges over the period 2015-2022. The results reveal that 5 out of the 8 factors analyzed have a significant impact on business performance, namely: company size, quick ratio, total asset turnover, debt-to-total assets ratio, and business age.*

• Keywords: *plastic industry firms, financial performance, factors influencing business performance.*

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## 1. General Introduction

The plastic industry is vital to Vietnam's economy, driven by demand from construction, automotive, consumer goods, and packaging sectors. It contributes significantly to exports and employment, with steady growth over the past decade, according to the Vietnam Plastics Association (VPA).

However, the industry faces challenges such as intense international competition, rising raw material costs, and strict environmental regulations. These pressures force firms to improve performance, optimize resources, and enhance competitiveness. While studies on business performance in sectors like real estate, finance, and manufacturing are abundant, research specific to the plastic industry remains limited. Existing studies (Saeed et al., 2013; Hoàng, 2023) focus on factors like firm size, liquidity, and debt ratio but overlook the sector's unique challenges, such as raw material reliance and high operational costs. Research on the Vietnamese plastic industry, particularly during the period 2015-2022, is also scarce. This study aims to fill this gap by analyzing factors influencing the performance of listed plastic firms in Vietnam. Using econometric methods, it explores relationships between key variables, such as firm size, liquidity, financial leverage, asset turnover, and macroeconomic factors like GDP growth and inflation. The findings will provide practical recommendations for improving financial and operational performance and enhancing competitiveness in a challenging market.

The paper is structured as follows: Section 2 reviews the literature and theoretical framework; Section 3 outlines the research model and methodology; Section 4 presents empirical results; Section 5 concludes with recommendations for policymakers and business practitioners.

## 2. Literature Review

Numerous studies have explored the factors influencing business performance across various industries. Saeed et al. (2013) used multiple regression models to examine performance indicators like Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS). Their findings indicated that company size, short-term debt ratio, and total debt positively impact these indicators, while long-term debt has a negative effect. Interestingly, asset growth rate did not show a significant influence. Hoàng (2023) extended this research to the Vietnamese real estate sector, identifying five key factors-liquidity ratio, operational efficiency, debt ratio, company size, and cost ratio-that significantly affect business performance, while three other factors, including growth rate and fixed asset ratio, were not statistically significant.

These findings are consistent with earlier studies that emphasize the positive role of company size in enhancing operational performance. Saeed et al. (2013) reaffirmed that larger firms benefit from increased growth opportunities, leading to improved competitiveness. Furthermore, liquidity levels were found to positively correlate with financial performance,

\* International School - Vietnam National University, Hanoi; email: [nutt@vnu.edu.vn](mailto:nutt@vnu.edu.vn)

with firms holding higher liquidity exhibiting better efficiency and profitability.

The literature also highlights the importance of growth opportunities and firm age. Zeitun and Tian (2007) suggested that companies with greater growth potential tend to perform better, as they can generate higher profits from their investments. Kipsha (2013) further argued that a company's age, which reflects managerial experience, can enhance performance through better decision-making and operational expertise. However, aging firms may face challenges, such as reduced agility or resistance to change, which can impede performance.

Macroeconomic factors have also been examined for their influence on business performance. Anand-Kur et al. (2020) found a positive relationship between GDP growth and profitability, indicating that a thriving economy benefits firms across sectors. On the other hand, Syafri (2012) showed that inflation negatively impacts profitability, as it makes it harder for businesses to raise capital and can discourage debt financing due to rising costs.

More recently, Nguyen Anh Tuan & Tran The Nu (2022) explored the Vietnamese construction sector, identifying key factors such as operating profit margin, growth rate, capital structure, and business age that significantly affect performance. While the research across these industries provides valuable insights, there is a notable gap when it comes to the plastic sector, particularly in the context of Vietnam's economy between 2015 and 2022. This study aims to fill this gap by specifically examining the internal and external factors influencing the business performance of plastic industry enterprises in Vietnam.

### 3. Research Model and Methodology

Based on the review of existing studies, the research team has developed the following hypotheses and research model:

*Hypothesis H1:* Company size has a positive impact on business performance.

*Hypothesis H2:* Revenue growth has a positive impact on business performance.

*Hypothesis H3:* Quick ratio (liquidity) has a positive impact on business performance.

*Hypothesis H4:* Total asset turnover has a positive impact on business performance.

*Hypothesis H5:* Financial leverage has a negative impact on business performance.

*Hypothesis H6:* Business age has a positive impact on business performance.

*Hypothesis H7:* GDP has a positive impact on business performance.

*Hypothesis H8:* Inflation has a negative impact on business performance.

#### Research Model:

$$ROIC_{it} = \beta_0 + \beta_1 SM_{it} + \beta_2 TM_{it} + \beta_3 LEV_{it} + \beta_4 GDP_{it} + \beta_5 CPI_{it} + \beta_6 SIZE_{it} + \beta_7 AGE_{it} + \beta_8 GROWTH_{it} + e$$

In this model:

ROIC (Return on Invested Capital) is the dependent variable that measures the performance of the company.

$\beta_i$  are the coefficients of the respective independent variables.

The independent variables are as follows:

**SM (Quick Ratio):** A liquidity ratio that measures a company's ability to meet its short-term obligations using its most liquid assets.

**TM (Total Asset Turnover):** A measure of a company's efficiency in using its assets to generate revenue.

**LEV (Debt-to-Total Assets Ratio):** A financial leverage ratio that indicates the proportion of a company's assets that are financed through debt.

**GDP:** Gross Domestic Product, representing the economic growth rate of the country.

**CPI:** Consumer Price Index, which is used to measure inflation.

**SIZE:** Company size, typically measured by total assets or revenue.

**AGE:** The number of years a company has been in operation.

**GROWTH:** Revenue growth, indicating the year-over-year growth rate of the company's revenue.

Based on the research results, the author has constructed measurement scales for the variables in the model, which are summarized in the table below:

**Table 1. Summary of the measurement scales for the research variables**

Variable	Measurement Scale	Variable code	Source
Performance	Pre-Tax Profit / Invested Capital (Invested Capital = Debt + Equity - Cash and Cash Equivalents)	ROIC	Robert Higgin (2012)
Company Size	Natural logarithm of total assets	SIZE	(Saeed, M. M., Gull, A. A., & Rasheed, M. Y., 2013), (Hoàng, 2023), (Nguyen Anh Tuan & Tran The Nu, 2022)
Revenue Growth	= (Revenue in the current year - Revenue in the previous year) / Revenue in the previous year	GROWTH	(Zeitun & Tian, 2007)
Quick Ratio	= (Current Assets - Inventory) / Current Liabilities	SM	(Saeed, M. M., Gull, A. A., & Rasheed, M. Y., 2013),
Total Asset Turnover	= Revenue / Average Total Assets	TM	(Saeed, M. M., Gull, A. A., & Rasheed, M. Y., 2013), (Ding Hua and Sha Rui, 2011)
Financial Leverage	= Total Debt / Total Assets	LEV	(Konarasinghe, W. G. S., & Pathirawasam, C, 2013)

Variable	Measurement Scale	Variable code	Source
Business Age	= Number of years from establishment to the year of the study	AGE	(Kipasha, 2013)
Macroeconomic Growth and Development	= The growth (decrease) rate of GDP in the current year compared to the previous year	GDP	(Anande-Kur, F., Faajir, A., & Agbo, A, 2020)
Inflation	Measured by the Consumer Price Index (CPI)	CPI	(Syafri., 2012)

This study focuses on publicly listed plastic industry firms in Vietnam from 2015 to 2022. Financial data was collected from sources like Vietstock.vn and Fiiintrade.vn. The research model includes 9 variables (8 independent and 1 dependent), requiring a minimum sample size of 114. To ensure representativeness and enhance credibility, the study uses a sample of 384 observations from 48 plastic companies listed on the HOSE and HNX exchanges.

#### 4. Research Results

##### 4.1. Descriptive Statistics

The statistical data for the financial indicators are presented in Table 2, which includes the following: mean value, standard deviation, minimum value, and maximum value.

**Table 2. Descriptive Statistics Results**

Variable	Obs	Mean	Std. Dev.	Min	Max
ROIC	384	0.1042092	0.1025527	-0.1944641	0.6160003
SIZE	384	8.646943	1.699691	0	10.9046
GROWTH	384	0.1869485	0.6665698	-0.7614212	2.735022
SM	384	1.609167	1.613906	0	9.670999
TM	384	1.509083	1.7777	0	13.83561
LEV	384	0.4068783	0.2076347	0	0.8641241
AGE	384	31.58594	20.97251	0	115
GDP	384	5.91375	1.894385	2.58	8.02
CPI	384	2.5425	1.093794	0.63	3.54

The descriptive statistics table for the research variables includes 48 plastic industry enterprises listed on the stock exchanges, corresponding to 384 observations, covering the period from 2015 to 2022.

##### 4.2. Correlation Analysis

**Table 3. Autocorrelation Matrix Results**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) ROIC	1.000								
(2) SIZE	0.142	1.000							
(3) GROWTH	-0.004	0.073	1.000						
(4) SM	0.403	0.094	-0.091	1.000					
(5) TM	0.360	0.020	-0.017	0.095	1.000				
(6) LEV	-0.330	0.399	0.158	-0.581	-0.052	1.000			
(7) AGE	0.184	0.239	-0.112	0.072	-0.115	-0.088	1.000		
(8) GDP	-0.007	-0.067	0.029	0.009	0.008	-0.001	-0.032	1.000	
(9) CPI	-0.063	0.117	0.043	0.030	0.001	0.085	0.018	0.356	1.000

The authors checked the correlations between variables, noting that all correlation coefficients were below 0.80, with the highest at 0.581 between LEV and SM, indicating no multicollinearity. However, to confirm this, they conducted a Variance Inflation Factor (VIF) test using Stata 17 software to further assess multicollinearity.

**Table 4. Multicollinearity Test Results**

Variable	VIF	1/VIF
LEV	2.35	0.425357
SM	1.91	0.524575
SIZE	1.67	0.599451
CPI	1.18	0.850025
GDP	1.16	0.860366
AGE	1.16	0.862567
GROWTH	1.04	0.961543
TM	1.03	0.972715
Mean	VIF	1.44

The results of the multicollinearity test reveal that the highest VIF value is 2.35 (less than 10), indicating that the research model is free from multicollinearity issues.

##### 4.3. Regression Results

To examine the factors affecting the business performance of plastic industry enterprises, the authors used three regression models: OLS (Ordinary Least Squares), FEM (Fixed Effects Model), and REM (Random Effects Model) to analyze the panel data. The results are presented below:

**Table 5. Regression Results using OLS, FEM and REM Models**

Variable	Pooled-OLS	FEM	REM
	ROIC		
SIZE	0.012*** (0.000)	0.007 (0.107)	0.006* (0.089)
GROWTH	0.010 (0.118)	0.011** (0.03)	0.011** (0.034)
SM	0.012*** (0.001)	0.018*** (0.000)	0.018*** (0.000)
TM	0.020*** (0.000)	0.009 (0.124)	0.014*** (0.001)
LEV	-0.132*** (0.000)	-0.074 (0.101)	-0.082** (0.035)
AGE	0.001*** (0.001)	-0.002 (0.156)	0.001 (0.233)
GDP	0.002 (0.434)	0.000 (0.908)	0.001 (0.412)
CPI	-0.008* (0.056)	-0.006** (0.044)	-0.001** (0.010)

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$

The table shows the regression results for the OLS, FEM, and REM models with the independent variable ROIC (Earnings Before Tax / Invested Capital). After comparing and selecting the appropriate model, the study will perform tests for that model.

The OLS regression results show that SIZE, SM, TM, and AGE positively impact ROIC, with significance at 1%. LEV and CPI have a negative relationship with ROIC, significant at 1% and 5%, respectively. GROWTH and GDP are positively related to ROIC but lack statistical significance.

In comparison, the FEM model indicates that Revenue Growth (GROWTH), Quick Ratio (SM), and Inflation (CPI) significantly affect ROIC, with significance at 5%, 1%, and 5%, respectively.

GROWTH and SM have a positive effect, while CPI has a negative one.

The REM model shows that six variables-SIZE, GROWTH, SM, TM, LEV, and CPI-are significant. SIZE, GROWTH, SM, and TM have a positive effect, while LEV and CPI have a negative impact on ROIC.

**Selection between the OLS model and the FEM model:**

To select the appropriate model between the OLS and FEM models, the study uses an F-test with the following hypotheses:

**H<sub>0</sub>:** The OLS model is more appropriate than the FEM model.

**H<sub>1</sub>:** The FEM model is more appropriate than the OLS model.

Since the p-value = 0.0000 < 5%, the null hypothesis (H<sub>0</sub>) is rejected, and the alternative hypothesis (H<sub>1</sub>) is accepted. Through the F-test, we conclude that the FEM model is the more appropriate model.

**Selection between the REM model and the FEM model:**

The study used the Hausman test to choose between the REM model and the FEM model, with the following hypotheses:

**H<sub>0</sub>:** The REM model is more appropriate than the FEM model.

**H<sub>1</sub>:** The FEM model is more appropriate than the REM model.

Since the p-value = 0.3575 > 5%, the null hypothesis (H<sub>0</sub>) is not rejected, and the alternative hypothesis (H<sub>1</sub>) is rejected. Therefore, the study chooses the REM model as the more appropriate model.

**Table 6. Hausman Test for Model Selection**

*Hausman (1978) specification test*

	Coef.
Chi-square test value	8.82
P-value	0.3575

**Conclusion:** Among the three models OLS, FEM, and REM after using the F-test, it was found that the FEM estimates are more appropriate than the OLS estimates. Following the Hausman test, it was concluded that the REM estimates are more appropriate than the FEM estimates. Therefore, the REM model is the most suitable model for studying the impact of various factors on business performance, measured by the ROIC (Earnings Before Tax / Invested Capital) ratio.

Next, the authors will test whether the REM model exhibits any issues, such as multicollinearity, heteroscedasticity, and autocorrelation. Afterward, the study will conduct regression using the GLS model to address these potential issues.

**Testing the Model for Issues:**

To test for autocorrelation between the variables in the model, the authors used the Wooldridge Test with the following hypotheses:

**H<sub>0</sub>:** The REM model does not exhibit autocorrelation.

**H<sub>1</sub>:** The REM model exhibits autocorrelation.

**Table 7. Wooldridge Test Results**

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 47) = 8.965

Prob > F = 0.0044

The **Prob > F** coefficient = 0.0044 < 5%, so the null hypothesis (H<sub>0</sub>) is rejected. Through this test, it is determined that the model exhibits autocorrelation.

**Heteroscedasticity** occurs when the errors in the regression equation, estimated from the sample observations of the independent and dependent variables, change according to a certain pattern. The Breusch-Pagan test is used to check whether the REM model exhibits heteroscedasticity with the following hypotheses:

**H<sub>0</sub>:** The REM model does not exhibit heteroscedasticity.

**H<sub>1</sub>:** The REM model exhibits heteroscedasticity.

**Table 8. Breusch-Pagan Test Results**

Breusch and Pagan Lagrangian multiplier test for random effects

ROIC(NAME, t) = Xb + u[NAME] + e[NAME,t]

Estimated results:

	Var	SD = sqrt(Var)
ROIC	0.010517	0.1025527
e	0.0034136	0.0584261
u	0.0039289	0.0626813

Test: Var(u) = 0

chibar2(01) = 321.28

Prob > chibar2 = 0.0000

The **Prob > chi<sup>2</sup>** coefficient = 0.0000 < 5%, so the null hypothesis (H<sub>0</sub>) is rejected, and the alternative hypothesis (H<sub>1</sub>) is accepted. The study shows that the REM model exhibits heteroscedasticity.

Correcting the REM model using the GLS method.

**Table 9. GLS Model Regression Results**

ROIC	Coef.	St.Err.	t-value	p-value	[95% conf. interval]	Sig
SIZE	0.0046	0.0008	6.08	0.000	0.003 0.006	***
GROWTH	0.0019	0.0021	0.87	0.385	-0.002 0.006	
SM	0.0077	0.0015	5.11	0.000	0.005 0.0107	***
TM	0.0194	0.003	6.36	0.000	0.013 0.0253	***
LEV	-0.057	0.0073	-7.81	0.000	-0.071 -0.0427	***
AGE	0.0011	0.0001	7.09	0.000	0.000 0.0014	***
GDP	-0.0016	0.0005	-3.56	0.000	-0.003 -0.0007	***
CPI	-0.0004	0.0008	-0.50	0.618	-0.002 0.001	
Constant	0.0077	0.0047	1.66	0.097	-0.001 0.0169	

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The table shows the results of correcting the issues in the REM model using the GLS method, after selecting the appropriate model and testing for defects in the model.

After addressing the issues in the model, the results show that six variables have a positive impact on the dependent variable ROIC: SIZE, SM, TM, LEV, AGE, and GDP. These variables are all statistically significant at the 1% level. The remaining two variables, GROWTH and CPI, are not statistically significant in the model.

#### 4.5. Conclusion of Hypotheses Based on the Regression Model Analysis Results

Based on the estimation results, the regression model measures the extent to which various factors impact the ROIC index of companies in the plastic industry as follows:

$$ROIC = 0.0077 + 0.0046*SIZE + 0.0077*SM + 0.0194*TM - 0.057*LEV + 0.0011*AGE - 0.0016*GDP + e$$

The results show that financial leverage has the strongest negative impact on ROIC: as debt increases, ROIC decreases. This aligns with findings from Omondi & Muturi (2013), Bouraoui and Louri (2014), and Faisal Mahmood et al. (2019). Asset turnover also plays a significant role: higher turnover improves asset utilization, enhancing performance, consistent with Trương Đông Lộc and Nguyễn Đức Trong (2010), Ding and Sha (2011), and Seema et al. (2011). The liquidity ratio positively affects business performance, as higher liquidity helps cover fixed costs, improving profitability.

Company size has a positive impact on ROIC, suggesting that expanding business scale could improve profitability. Business age also matters: older companies find it easier to raise capital, reducing the cost of capital and boosting efficiency.

Finally, GDP negatively impacts business performance, contradicting some studies (Ray & Keith, 1995; Ma, 2011; Engin et al., 2011). This may be due to increased consumer demand for low-cost goods in a weak economy, benefiting certain companies. However, in other cases, rising GDP may not lead to better performance due to factors like increased competition or higher costs.

**Conclusion:** Based on the above results, the following conclusions can be drawn:

**Table 10. Summary of Research Results**

Hypothesis	Kết luận
H1: Company size has a positive impact on business performance.	Accepted
H2: Revenue growth has a positive impact on business performance.	Rejected
H3: Liquidity ratio has a positive impact on business performance.	Accepted
H4: Asset turnover has a positive impact on business performance.	Accepted
H5: Debt ratio to total assets has a negative impact on business performance.	Accepted
H6: Company age has a positive impact on business performance.	Accepted
H7: GDP có ảnh hưởng tích cực tới HQKD của DN.	Rejected
H8: Inflation has a negative impact on business performance.	Rejected

## 5. Conclusion

Based on the actual financial situation of listed plastic companies in Vietnam and the regression analysis to measure the impact of various factors on business performance, the author provides several recommendations for listed plastic companies to improve their financial situation as follows:

The research findings indicate a positive relationship between company size, liquidity ratio, and asset turnover and business performance. Therefore, expanding the company's scale is a strategy that helps strengthen the company's competitive position in the market while also potentially improving business performance. In addition, companies need to regularly monitor and update their payment situation and reconcile their debts. To ensure flexibility in paying upcoming debts, companies should have a reasonable debt management mechanism and set aside enough cash reserves to meet imminent loan repayments. Besides the upcoming debt obligations, companies must also be aware of risks from creditors who may demand immediate payment. Hence, maintaining adequate cash reserves for payment is essential. To quickly convert to cash when needed, companies can hold high-liquidity securities to ensure the payment of short-term liabilities. Additionally, managers should focus on increasing asset turnover to drive business performance.

The research also reveals that financial leverage negatively affects business performance. Therefore, companies should consider leveraging investment funds from existing shareholders, employees within the company, strategic partners, or new investors by issuing stocks. This is an effective form of capital raising as it allows for long-term use of funds without facing debt repayment pressure or interest costs, and it can be utilized for long-term investment projects.

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