THE FACTORS AFFECTING THE FINANCIAL LEVERAGE OF NON-FINANCIAL FIRMS LISTED ON VIETNAM STOCK EXCHANGE

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ABSTRACT: *This study analyzes the factors affecting the financial leverage of 178 non-financial firms listed on the Ho Chi Minh City Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX) during the period from 2018 to 2022. The research uses STATA software to conduct panel data analysis through regression models such as OLS, FEM, REM and finally FGLS using R software to overcome defects in the model. Research results show that the factors: Return on assets ratio (ROA), fixed asset ratio (FAR), liquidity ratio (LR), firm size (FS) and non-debt tax shield (NDTS) negatively affect financial leverage. In contrast, firm age (FA) has a positive effect. Consequently, the authors make some recommendations for business managers to increase the effectiveness of using financial leverage.*

KEYWORDS - *Capital structure, non-financial firms, financial leverage, FGLS*

I. INTRODUCTION

Despite the fluctuations in recent years, the Vietnamese stock market is still growing strongly, contributing to the increase in the number and quality of listed enterprises (Nguyen Duc Chi, 2023). The scale of enterprises is constantly expanding, and listed enterprises are increasingly diversifying their fields and markets of operation. In that context, abundant capital has become a key factor for enterprises to meet the needs of breakthrough growth and expand market share. Although capital from owners plays an important role, it cannot fully meet the increasing demands of enterprises. Therefore, enterprises must seek funding sources from credit institutions, bank loans, or other sources of capital mobilization such as issuing bonds, stocks, etc. to develop business activities. However, the abuse of borrowed capital is the cause of the increasing wave of defaults globally, leading to a series of bankruptcies.

According to Moody's forecast, the global default rate will continue to increase in 2024. It is expected to reach 4.6% in the 12 months to January 2024, higher than the historical average of 4.1%. Therefore, choosing the optimal capital structure or determining the appropriate financial leverage ratio (FL) is an important issue in financial management those global enterprises in general and Vietnamese enterprises in particular need to consider carefully to avoid being caught up in the wave of defaults leading to the risk of bankruptcy. However, determining the appropriate FL is a difficult problem that most enterprises need to face because FL will change based on the influencing factors. Therefore, accurately identifying the factors affecting the selection of appropriate FL is the most important issue to help businesses make wise choices about using borrowed capital, contributing to increasing profits and improving operational efficiency. In addition, according to statistics from HOSE and HNX as of the end of 2022, the number of listed non-financial enterprises accounts for more than 60% of the total number of listed enterprises. This proportion shows the importance of non-financial enterprises in the market, contributing greatly to the operation and development of the Vietnamese stock market.

Determining the appropriate FL ratio and understanding the factors affecting the FL ratio have become the top concerns of non-financial firms. Therefore, to specifically analyze the impact of factors affecting FL, the group of authors has conducted the topic "The factors affecting the financial leverage of non-financial firms listed on Vietnam stock exchange". Research data is collected from the annual financial reports of 178 major non-financial firms listed on HOSE and HNX during the period from 2018 to 2022, this research period is important because it includes the period when the economy was affected by the Covid-19 pandemic and the period when the economy recovered after Covid-19.

II. LITERATURE REVIEW

The study "On the Existence of an Optimal Capital Structure: Theory and Evidence" by Bradley et al. (1984) is considered one of the pioneering studies on the relationship between FL and influencing factors. The study analyzed the impact of three factors: research and development costs, non-debt tax shields, and profit

volatility on the FL of 851 US enterprises during the period from 1962 - 1981. Based on the optimal capital structure model and the OLS regression method, the research results showed that the non-debt tax shield factor has a positive effect on FL. Conversely, both research and development costs and profit volatility have a negative effect on FL.

Rajan and Zingales (1995) used data from enterprises in the G-7 countries including the US, Japan, Germany, France, Italy, the UK, and Canada during the period 1986 - 1991. The study showed that fixed asset ratio and firm size have a positive effect on the FL in the G-7 countries. Meanwhile, the return on assets ratio and market-to-book value ratio has a negative effect on FL in these countries.

In 2020, Bilen and Kalash analyzed data from 52 service firms listed on the Istanbul Stock Exchange over ten years from 2008 to 2017 to measure the impact of various factors on the FL of enterprises in Turkey. The authors employed a panel data approach using the OLS model, and the research results indicated that non-debt tax rate and enterprise size have a positive effect on FL. Conversely, the return on fixed assets, the fixed asset return, and the liquidity ratio negatively affect FL.

Kenneth and Ibobo (2022) analyzed the factors affecting the leverage of 177 public firms in Nigeria over six years from 2015 to 2020. The results from the regression model indicated that firm size and return on assets were negatively correlated with FL, while firm age, growth opportunities, and fixed asset ratio were positively correlated. The study concluded that these factors are strong determinants of leverage in public firms in Nigeria.

Focusing on 22 Vietnamese commercial banks during the period from 2009 to 2014, Le Thi Tuan Nghia and Pham Manh Hung (2016) used the OLS regression model to measure the impact of independent variables on FL. The results showed that firm size and fixed asset ratio have a positive effect on FL. Conversely, growth opportunities, return on assets, and GDP growth have a negative effect on FL.

In 2017, Nguyen Thi Thuy Hanh used data from 14 tourism firms in Vietnam listed on the HOSE and HNX stock exchanges during the period from 2009 to 2015 for the study "Factors Affecting the Financial Leverage of Vietnamese Tourism Firms." The results indicated that the fixed asset ratio and firm size have a positive effect on FL. Conversely, the return on assets has a negative effect on FL.

In 2020, Le Thi Nhung collected and used data from the annual financial statements of 31 joint-stock firms in the construction materials sector and 48 joint-stock firms in the real estate sector during the period from 2013 to 2017 to measure the impact of various factors on the FL of these enterprises. The results indicated that, for the real estate sector, firm size positively affects FL, while return on assets negatively affects it. However, in the construction materials sector, besides firm size, growth opportunities, specific characteristics of the firm's assets, and taxes also positively affect FL. Conversely, in the construction materials sector, liquidity ratio, return on assets, and non-debt tax shields negatively affect FL. When analyzing the combined data of both sectors, the results showed that firm size and firm age positively affect FL, while return on assets and liquidity ratio negatively affect it. The author also affirmed that return on assets has the strongest impact compared to other factors.

Also in 2020, Nguyen Thi Dieu Chi and colleagues, in their study "Factors Affecting Financial Leverage: The Case of Vietnam Firms," used data collected from the financial statements of 448 listed firms in Vietnam during the period from 2010 to 2019. They concluded that firm size positively affects FL. Conversely, fixed asset ratio, liquidity ratio, growth opportunities, return on assets, and firm age negatively affect FL. Additionally, firm age does not significantly affect FL in the OLS model.

Focusing on 205 firms listed on HOSE during the period from 2018 to 2022, Nguyen Thi Diem Huong (2023) used OLS, FEM, REM, and FGLS regression methods to analyze the factors affecting FL. The research results indicated that firm age, independent board members, return on assets, fixed asset ratio, state ownership ratio, and liquidity ratio negatively affect FL. Conversely, firm size and revenue growth rate positively affect FL. Additionally, the factor of the CEO concurrently serving as the chairman of the board positively affects market value leverage but is not significant for book value leverage. Conversely, the size of the board of directors negatively affects book value leverage but is not significant for market value leverage.

Researching the factors affecting the financial leverage of non-financial firms listed on the Vietnam Stock Exchange, using data from 178 enterprises on the Ho Chi Minh City Stock Exchange and the Hanoi Stock Exchange during the period from 2018 to 2022, various regression models such as OLS, FEM, REM, and FGLS were used to analyze the relationship between financial leverage and six independent variables: Return on assets, fixed asset ratio, liquidity ratio, firm size, non-debt tax shields, and firm age. The research aimed to test the impact of these factors on financial leverage, thereby providing recommendations for enterprise managers to enhance the effective use of financial leverage.

III.   RESEARCH METHODOLOGY

3.1   Research model

The research model is selectively inherited from both domestic and international studies. The authors use

the OLS regression model to construct the research model with the dependent variable being financial leverage and six independent variables, including Return on assets, fixed Asset Ratio, liquidity ratio, firm size, non-debt tax shields, and firm age. The authors use the OLS regression model to construct the following research model:

$$FL_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 FAR_{it} + \beta_3 LR_{it} + \beta_4 FS_{it} + \beta_5 NDST_{it} + \beta_6 FA_{it} + \varepsilon_{it}$$

Where:

FLit: Financial leverage of firm i at time t.

ROAit: Return on assets of firm i at time t.

FARit: Fixed asset ratio of firm i at time t.

LRit: Liquidity ratio of firm i at time t.

FSit: Firm size of firm i at time t.

NDSTit: Non-debt tax shields of firm i at time t.

FAit: Firm age of firm i at time t.

εit: Error term of firm i at time t.

The calculation methods for the variables in the model are shown in Table 1:

Table 1. Measurement of Variables

Variables	Symbol	Measurement
Dependent Variable		
Financial Leverage	FL	Total Liabilities / Total Assets
Independent Variables		
Return on Assets	ROA	Net Income / Total Assets
Fixed Asset Ratio	FAR	Fixed Assets / Total Assets
Liquidity Ratio	LR	Current Assets / Current Liabilities
Firm Size	FS	Ln (Total Assets at the end of the fiscal year)
Non-Debt Tax Shields	NDTS	Depreciation Expense / Total Assets
Firm Age	FA	Number of years since the firm's establishment

3.2   Sampling Method and Quantitative Method
3.2.1   Sampling Method

The data includes indicators of firms listed on the HOSE and HNX stock exchanges in Vietnam during the period 2018 – 2022. The authors have set criteria to select suitable firms:
- Non-financial firms with complete financial data for 5 years on the Balance Sheet and Income Statement during the period 2018 – 2022.
- Firms with a high proportion of fixed assets in their structure.
- The diversity of business types such as services, information technology, pharmaceuticals, consumer goods, etc. contributes to making the research sample highly representative.

When selecting firms based on the set criteria, the authors excluded firms that were no longer operating and those without complete financial data. Therefore, the final sample collected includes 178 non-financial firms in Vietnam.

The study uses secondary data collection methods from the annual financial statements of 178 non-financial firms listed on the HOSE and HNX stock exchanges, specifically 96 firms listed on HOSE and 82 firms listed on HNX during the period 2018 – 2022, which have been audited and published. The collected data includes 6 indicators selected from the annual financial statements and calculated based on the financial statement criteria, including ROA; FAR; LR; NDTS; FS; and FA. After compiling the data and calculating these indicators, the group compiled a dataset of 890 observations, combined with evaluations from previous studies, and proceeded to process the data.

3.2.2   Quantitative Method

The research team conducts descriptive statistical analysis, correlation analysis, and regression analysis for estimating panel data regression models using four linear regression models: the Ordinary Least Squares (OLS) model, the Fixed Effects Model (FEM), the Random Effects Model (REM), and the Feasible Generalized Least Squares (FGLS) method. Specialized statistical softwares namely Stata and R are used to provide accurate and reliable results for research results.

IV.RESEARCH RESULTS AND QUANTITATIVE ANALYSIS

4.1 Descriptive Statistics

Descriptive statistics were performed using STATA 17, yielding the following results: Mean; standard deviation; minimum value; and maximum value for 178 non-financial firms listed on HOSE and HNX during the period 2018 – 2022 in Table 2.

Table 2. Descriptive Statistics Results from STATA 17

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
FL	890	0,41	0,21	0,01	1,17
ROA	890	0,07	0,09	-0,30	0,65
FAR	890	0,22	0,18	0,00	0,89
LR	890	3,10	4,33	0,01	45,39
FS	890	27,33	1,72	23,49	32,58
NDTS	890	0,25	0,30	0,00	3,06
FA	890	28,66	15,13	2,00	70,00

Source: Authors calculated using STATA 17 software

Non-financial firms listed on HOSE and HNX during the period 2018 - 2022 have an average debt usage of approximately 41%, generating about 7% post-tax profit relative to the assets held by the firms. The fixed asset ratio and non-debt tax shields also indicate stability in asset management and depreciation. The liquidity ratio and firm size show that these firms have the ability to pay short-term debts and maintain stable operational scales. The large variation in the data on firm size and firm age may contribute to the heterogeneity of the study sample, indicating that this study covers a wide range of sizes and ages.

4.2   Quantitative Results

4.2.1   Correlation Analysis

The correlation matrix indicates the relationship between the independent variables in the research model. The results of the correlation coefficient matrix in Table 3 show that the correlation levels range from -0.0041 to 0.3127, all of which are less than 0.8. This means that the correlation coefficients between the independent variables are relatively low, and multicollinearity is not a significant concern.

Table 3. Correlation Matrix of Variables in the Model

Variable	ROA	FAR	LR	FS	NDTS	FA
ROA	1,0000					
FAR	-0,0172	1,0000				
LR	0,0763	-0,0957	1,0000			
FS	-0,0317	0,0842	-0,2586	1,0000		
NDTS	0,0231	0,3172	0,0041	-0,1127	1,0000	
FA	0,0904	0,1155	-0,1006	0,0429	0,2165	1,0000

Source: Authors calculated using STATA 17 software

4.2.2   Regression Analysis

Panel data regression methods such as least squares (OLS), fixed effect model (FEM), random effect model (REM) are first performed to select the most appropriate method for the research data set.

F-test: Choose between the FEM and OLS models, the authors conducted an F-test using STATA software and proposed the following hypotheses: H0: Choose the OLS model and H1: Choose the FEM model. The authors performed the test on the research model with the dependent variable being FL. The F-test results showed Prob > F = 0.0000 < 5%. Therefore, we reject the null hypothesis H0 and accept the alternative hypothesis H1: Choosing the FEM model is more appropriate for the study than the OLS model.

After conducting the F-test, the study proceeded with the Hausman test to compare the FEM and REM models with the following hypotheses: H0: Choose the REM model and H1: Choose the FEM model. The Hausman test results showed Prob > chi2 = 0.0000 < 5%, meaning we reject the null hypothesis H0 and accept the alternative hypothesis H1: Choosing the FEM model is more appropriate for the study than the REM model.

From these analyses, the authors concluded that the Fixed Effects Model (FEM) is the most suitable for the research sample with the dependent variable being FL.

The authors examined the two defects of the selected model, which are heteroscedasticity and autocorrelation. The results showed that the Wald test and the Wooldridge test both supported the hypothesis that this model had the above two defects. Therefore, the research team determined to apply the feasible general least squares (FGLS) model because this method facilitates eliminating the above two defects.

Table 4. Regression Analysis Results

Variable	OLS	FEM	REM	FGLS
ROA	-0,660***	-0,242***	-0,304***	-0,350***
FAR	-0,039	0,138***	0,101***	-0,118***
LR	-0,024***	-0,008***	-0,011***	-0,020***
FS	0,032***	0,093***	0,047***	-0,015***
NDTS	-0,034*	-0,203***	-0,148***	-0,055***
FA	0,001	-0,004**	0,000	0,003***
Intercept	-0,340***	-1,966***	-0,813***	0,823***

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels

Source: Authors calculated using STATA 17 software

Table 5. F-test and Hausman Test Results

Test	P-value	Selected Method
F-test	Prob > F = 0,0000	Choose FEM instead of OLS
Hausman	Prob > chi2 = 0,0000	Choose FEM instead of OLS

Source: Authors calculated using STATA 17 software

Table 6. Modified Wald and Wooldridge Test Results

Test	P-value	Model Defect
Modified Wald	Prob>chi2 = 0,0000	Model exhibits heteroscedasticity
Wooldridge	Prob>chi2 = 0.0000	Model exhibits autocorrelation

Source: Authors calculated using STATA 17 software

4.2.3 Research Discussion

The regression results of the FGLS model above show that the ROA factor has a negative impact on the dependent variable financial leverage. When ROA increases by 1%, financial leverage will decrease by 35%, which has the greatest impact on the dependent variable among the independent variables. This reinforces the view that companies with high return on assets can generate their own capital for their business operations, contributing to reducing the need for debt. In addition, these companies can mobilize capital from investors to avoid relying on debt (Nguyen Hong Anh, 2018).

The FAR variable also negatively affects FL. Using debt to invest in fixed assets burdens firms with high interest costs. When firms face financial difficulties, repaying loans and interest becomes harder, increasing the risk of bankruptcy (Truong The Quang, 2022). The pecking order theory also explains this relationship, suggesting that firms with high fixed asset ratios often face higher bankruptcy costs due to difficulties in liquidating fixed assets and the depreciation of their value over time. The LR variable negatively impacts FL as well. Reviewing previous studies, most conclude that LR negatively affects FL, supported by the pecking order theory but contrary to the trade-off theory. Firms with high liquidity and good solvency tend to use more internal funds for business operations and rely less on debt (Myers and Majluf, 1984).

The regression coefficient of the LR variable is -0.02 and similar to the ROA and FAR variables, the LR variable also has a very high statistical significance level of 1%, showing that when LR increases by 1%, FL decreases by about 2% when other variables are held constant. That is, enterprises with high liquidity ratios will have lower financial leverage than enterprises with low liquidity ratios. This result is similar to domestic and international studies such as Pham Thi My Thuan (2019); Le Thi Nhung (2020); Nguyen Thi Dieu Chi et al. (2020); Nguyen Thi Diem Huong (2023), (Myers and Majluf, 1984); Deesomsak et al. (2004); Bilen and Kalash (2020).

The FS variable also negatively affects the FL of non-financial firms in Vietnam. Larger firms typically have higher revenues and profits, enabling them to generate abundant internal funds for business operations and easily raise capital from the stock market or other channels such as bonds and unsecured loans (Pham Thi Minh Hieu, 2018). Therefore, they are less dependent on external investors.

Similarly, the NDTS variable negatively affects FL, as firms use debt to reduce tax costs. When firms already have significant tax deductions from non-debt tax shields, using debt for additional interest deductions offers little tax benefit. This is supported by Le Thi Nhung (2020), who found that firms with high depreciation tend to use less debt.

However, the FA variable has a positive impact on financial leverage. This shows that long-standing businesses often have high reputation and brand value, so they have many advantages in borrowing from banks and financial institutions. In addition, they also have a lot of experience, which allows them to get better investment profitability, so they manage cash flow better and use debt more effectively than young businesses (Vo Minh Long, 2017).

V. CONCLUSION AND SOLUTIONS

5.1   Conclusion

Firstly, the results show that all six factors included in the model significantly affect the FL of firms, with a statistical significance level of 1%. The adjusted R^2 is relatively high at 78.04%, indicating that the factors in the model explain 78.04% of the variation in FL. However, the direction of these effects varies. Specifically, five out of six factors, including ROA, FAR, LR, FS, and NDTS, negatively impact FL with a significance level of 1%. This means that firms with higher return on assets, higher fixed asset ratios, better liquidity, larger size, and higher non-debt tax shields tend to use less debt, resulting in lower FL. On the other hand, FA has a positive influence on financial leverage at the 1% significance level, which indicates that the older the company is, the higher the financial leverage it uses. In terms of impact magnitude, the results show that ROA has the strongest effect on FL with a regression coefficient of 0.3. Therefore, changes in ROA will significantly affect the FL

ratio. In contrast, FA has the least impact on FL, meaning changes in FA will not significantly affect the FL ratio of firms.

In addition, this study contributes to the strengthening of empirical evidence on the impact of different factors in the company on the use of financial influence. The results of the studies will contribute to the discussions on this topic and open up other research avenues in the future.

5.2 Solutions

Non-financial companies should retain earnings to reinvest in business operations, use efficient cash flow management and depreciation methods, and regularly evaluate and upgrade fixed assets to grow in scale. This allows the company to gain more internal strength and financial autonomy, thus reducing the need for external debt. On the other hand, it is necessary to maintain and expand relationships to easily access capital resources.

On the part of investors and lenders, it is necessary to carefully examine the indicators in the financial reports, especially ROA, FAR, LR, NDTS, FS and FA, to analyze the financial situation and predict the growth potential of the business that needs to borrow or invest in order to make wise decisions.

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