ENTERPRISE CHARACTERISTICS, CAPITAL STRUCTURE AND OPERATIONAL PERFORMANCE: THE CASE OF LISTED ENTERPRISES IN VIETNAM

Doan Ngoc Phi Anh*

*University of Economics, The University of Danang, 71 Ngu Hanh Son St., Danang, Vietnam

Abstract

This paper examines the relationship between enterprise characteristics, capital structure and operational performance among a sample of 592 companies listed on the Vietnamese stock exchange during the three years 2012-2014. Whilst most previous studies in this area have used multiple regression as the main method of analysis, the paper follows the examples of Titman and Wessels (1988) and Chang *et al.* (2009) and adopts a structural equation modeling (SEM) approach. Specifically, path analysis was employed to analyze simultaneous relationships among the various variables. The results suggest that for listed enterprises in Vietnam, operational performance has a negative effect on both of the measures of capital structure considered, namely long-term debt/total assets ratio (LDR) and short-term debt/total assets ratio (SDR), while the extent of state ownership has a positive effect on LDR and enterprise age has a positive effect on SDR only. The ratio of long-run to total assets affects the two capital structure measures in opposite ways: the effect is positive on LDR and negative on SDR. The evidence was considered to be inconclusive on the question of direction of causality between operational performance and LDR.

Keywords: Capital Structure, Performance, Listed Enterprises, Vietnam

1. INTRODUCTION

During the half-century or so since the introduction of the Modigliani and Miller (1958) theorem, considerable theoretical and empirical research has been conducted into the question of whether a firm's capital structure (leverage) has an impact on its performance, and if so what is the precise nature of this impact. For a small sample of this literature, see Baxter (1967), Jensen and Meckling (1976), Bradley et al (1984), Myers and Majluf (1984), Ross (1988), Stiglitz (1988), Williamson (1988), Harris and Raviv (1991), and Margaritis and Psillaki (2010). The weight of evidence appears to favor the proposition that in a variety of circumstances leverage does affect firm performance.

In recent years research in this area has tended to revolve around a second focal question, namely "what might be the determinants of observed variations in leverage across firms, industries, and economies?". Examples include studies by Meyers and Majluf (1984), Titman and Wessels (1988), Rajan and Zingales (1995), Hall *et al.* (2004), Chang *et al.* (2009), and Margaritis and Psillaki (2010).

A number of authors have extended the above literature, which focused mainly on developed economies, to take account of issues and factors of particular relevance to developing and transition economies. These include Majumdar and Chhibber (1999), Booth *et al.* (2001), Fan *et al.* (2008), Chen *et al.* (2009), de Vries (2010), and others.

Several studies related to this topic have dealt with Vietnam. Of these, San (2002) focused on a single industry (tourism) in a single locality (Thua Thien Hue Province) whilst Nguyen and Ramachandran (2006) focused on small and medium-sized enterprises (SMEs) only. By contrast, Vu (2003) and Doan (2010) analyzed companies listed on Vietnamese stock market. Although they are far less numerous than unlisted companies (most of the latter are SMEs), listed companies account for a larger share of economic activity while the small business sector produces only about 25% of GDP.

This study represents an effort to update the analysis of Vu (2003) and to complement the coverage of Nguyen and Ramachandran (2006), in that it investigates the determinants of leverage among the companies listed on both the Hanoi and the HCMC stock exchange during the period 2012-2014. In addition, the study also consider an issue which received little attention in the earlier studies, namely the possible effect of leverage on firm performance.

2. RESEARCH QUESTIONS

This study revolves around two main research questions:

1. How do firm characteristics and operational performance affect leverage among listed Vietnamese companies?

There is a sizable international literature regarding the effects on leverage of firm characteristics, such as firm size and/or growth, ownership, asset structure, profitability or

operational performance, business risk, and the likes. In some instances, the evidence accumulated to date is far from conclusive at the international level. It is therefore of interest to investigate the signs and magnitudes of the relevant effects in the Vietnamese context.

It is recognized that firm decisions regarding leverage may differ across categories of debt. Accordingly, the study will distinguish between long-term and short-term debt.

2. Does leverage affect operational performance among listed Vietnamese companies?

It is plausible that a firm's long-term debt level may be largely a result of its strategic or long-range considerations which tend to evolve relatively slowly. If this were to hold in practice, long-term debt would exert at least a contributing influence on the firm's operational performance.

By contrast, it is probably more natural to think of short-term debt as a residual response to, rather than a driver of, operational performance.

3. METHODOLOGY

3.1. Data sources

Data on firm characteristics were obtained from the stockbroker website http://stoxvn.stox.vn/ for 592 companies listed on the Vietnamese stock exchange over the period 2012-2014. Data were available for the following variables: firm age since establishment to 2014, sale revenue (in billions of Vietnamese dong), before-tax profit, long-term assets, total assets, short-term debt, long-term debt, and ratio of state ownership to equity.

3.2. Data definition and measurement

The main variables are defined and measured as follows.

- Operational performance is measured as: Return on assets (ROA) = Before-tax profit / Total assets
- Long-term assets ratio (LAR) = Long-term assets / Total assets
- Short-term debt ratio (SDR) = Short-term debt / Total assets
- Long-term debt ratio (LDR) = Long-term debt / Total assets
- Firm size is measured as the natural log of total assets

Business risk is proxied by the natural log of the standard deviation of profit over time.

3.3. Methods of analysis

Whilst most previous studies in this area have used multiple regression as the main method of analysis, in this paper we follow the examples of Titman and Wessels (1988) and Chang *et al.* (2009) and adopt a structural equation modeling (SEM) approach. Specifically, path analysis is employed to analyze simultaneous relationships between firm characteristics, operational performance, and debt ratios. In the current context, path analysis offers flexibility and facility in modeling alternative patterns of causation, estimating parameters across a system of simultaneous equations, and selecting models on the basis of overall goodness-of-fit statistics (Hoyle, 1995; Hair et al, 1998; Titman and Wessels, 1988; Chang *et al.*, 2009). The software used is AMOS 20.0, distributed by SPSS.

To test the model fit, a range of goodness-of-fit indices were applied, each of which has been strongly recommended in the recent literature; see for example Schumacker & Lomax (1996), Hu & Bentler (1995, 1999), Byrne (2001), Marsh, Hau & Wen (2004) and Arbuckle (2007). The indices used include:

- the ratio of Chi-square to degrees-of-freedom (*df*),
- Goodness-of-Fit Index (GFI),
- Tucker-Lewis Index (TLI),
- Comparative Fit Index (CFI),
- Root Mean-Square Error of Approximation (RMSEA), and
- PCLOSE.

The conventional rules of thumb are that a model is considered a good fit if chi-square/*df* is less than 2.5; GFI, TLI, CFI are larger than 0.90; RMSEA is smaller than 0.05; and PCLOSE is larger than 0.05.

4. RESULTS AND DISCUSSION

4.1. Descriptive statistics

Table 1 presents descriptive statistics for the main variables involved in the analysis. Of particular interest is that the mean SDR was 39.53 per cent, and the mean LDR was 11.63 per cent. Corresponding figures reported by Nguyen and Ramachandran (2006) were 42.0 per cent and 1.9 per cent, respectively. (Note that their data were for SMEs only and related to the period 1998-2001, whilst these figures are for medium-sized to large, listed companies, and relate to the period 2012-2014). On average, the state's share of listed companies in our sample was around 24.6 per cent.

Table 1. Descriptive statistics

Variable	*Unit*	*Mean*	*Standard deviation*	*Minimum*	*Maximum*
ROA	%	9.5363	7.20928	.1513	46.4512
Long-term assets ratio (LAR)	%	38.2642	20.9384	.8323	87.6748
Short-term debt ratio (SDR)	%	39.5325	19.2715	.3891	82.1664
Long-term debt ratio (LDR)	%	11.6287	14.5802	.0021	69.7646
State ownership ratio (SOR)	%	24.6319	23.5692	.0000	95.8000
Ln(Total assets)	Nat'l logs	7.6228	6.1789	2.8762	31.5839
Ln (Enterprise age)	Nat'l logs	2.8069	.6963	1.1969	4.2061
Business risk (ln(SD(profit)))	Nat'l logs	3.4632	4.2704	-2.6959	21.6417
Sale growth		1.314469	.5635971	.0652	5.6091

Note: The number of observations is 592 for all the above variables

4.2. Simple correlation

Table 2 reports coefficients of simple correlation between the main variables. From the table it can be seen clearly that both LDR and SDR are negatively related to ROA, and that LDR is positively correlated with the long-term assets ratio but SDR is negatively correlated with the same variable. There is also a remarkably strong and positive association between business risk (measured as Ln_SD_profit) and enterprise size (measured as Ln_assets).

Table 2. Correlation matrix

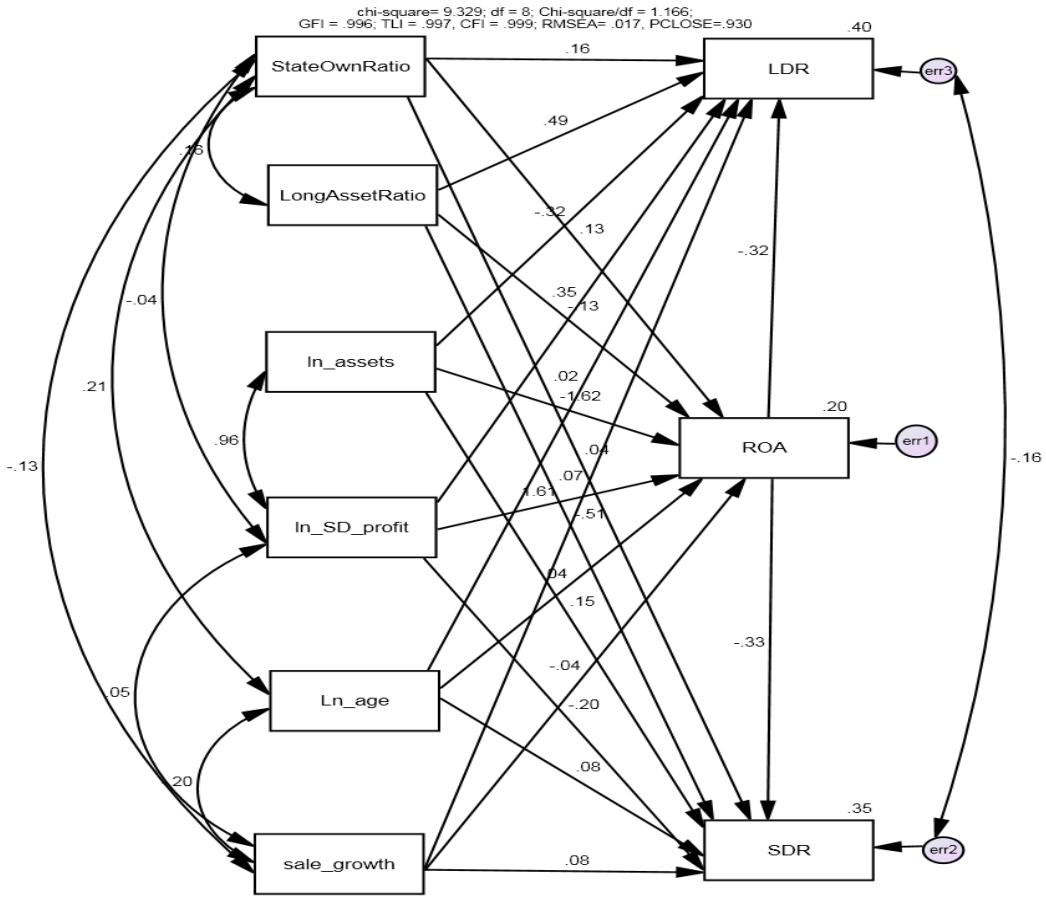
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
ROA (1)	1								
LongAssetRatio (2)	-.090*	1							
SDR (3)	-.295**	-.477**	1						
LDR (4)	-.311**	.548**	-.263**	1					
StateOwnRatio (5)	.070	.167**	-.051	.202**	1				
Ln_assets (6)	-.074	.083*	-.063	.081*	.013	1			
Ln_age (7)	.057	.037	.038	.043	.216**	.031	1		
Ln_SD_profit (8)	.035	.095*	-.116**	.074	-.047	.694**	.023	1	
Sale_growth (9)	.018	-.036	.063	.037	-.136**	-.017	-.203**	.032	1

*Note: **Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed)*

4.3. Model 1

Figure 1 provides a schematic representation of the first model. The six variables on the left hand side of this figure correspond to the main enterprise characteristics for which data are available: state ownership ratio, long-term assets ratio, firm size, firm age, business risk and firm growth. These are assumed to determine, in turn, LDR, ROA and SDR. In this model, ROA is also assumed to help determine both LDR and SDR.

Figure 1. Relationship between enterprise characteristics, capital structure and performance – Model 1



Fit indices for Model 1 are all satisfactory. However, inspection of the regression weights for this model (see Table 3) reveals that some of the postulated paths are insignificant. For example, the probability of Type I error in accepting the path from Ln_age to LDR is 46,8 per cent, suggesting that an enterprise's age did not have any impact on its long-term debt ratio. Another clearly insignificant path is the one from Ln_age to ROA (probability of Type I error = 33.7 per cent).

Table 3. Standardized regression weights for Model 1

Explanatory variables	*Dependent variables*					
	ROA		*Long-term Debt Ratio*		*Short-term Debt Ratio*	
	Estimate	*p*	*Estimate*	*P*	*Estimate*	*p*
LongAssetRatio	-0.134	***	0.487	***	-0.511	***
StateOwnRatio	0.134	***	0.159	***	0.044	0.213
Ln_assets	-1.620	***	-0.319	0.018	0.150	0.287
Ln_age	0.037	0.337	0.024	0.468	0.083	0.016
Ln_SD_profit	1.615	***	0.351	0.009	-0.204	0.148
Sale_growth	-0.039	0.301	0.070	0.033	0.082	0.017
ROA			-0.317	***	-0.335	***

*Note: ***indicates p < 0.001*

4.4. Deriving alternative models and model selection

By deleting from Model 1 paths which are clearly insignificant we derive Model 2. Table 4 compares the fit indices of these two models (as well as of Model 3, to be discussed below). The indices shown suggest that the loss in explanatory power in going from Model 1 to the more parsimonious Model 2 is relatively minor, compared with the gain in parsimony. Thus, Chi-square / df increase from 1.166 in Model 1 to 1.338 in Model 2. The figures for TLI, RMSEA and PCLOSE also suggest that Model 2 is a similarly fit for the data as Model 1.

As alternatives to Models 1 and 2, we also consider a series of models based on Model 1, but with the direction of the path between ROA and LDR reversed, so that the causality is now assumed to run from LDR to ROA. By eliminating clearly insignificant paths from the resultant model we obtain Model 3; see Figure 2. The overall fit statistics for Model 3 are slightly better than those of Model 2, as can be seen from Table 4. However, the squared multiple correlation (SMC), which is analogous to R^2 in linear regression analysis, for LDR is lower in Model 3 (0.32) than in Model 2 (0.40). This is offset by a rise in the SMC for ROA, which is 0.29 in Model 3 and 0.20 in Model 2. On the evidence available we do not feel there is sufficient justification for favouring either of these two models over the other.

Table 4. Comparative goodness of fit statistics

	Model 1	*Model 2*	*Model 3*
Chi-square	9.329	18.730	19.047
Df	8	14	16
Chi-square/df	1.166	1.338	1.190
GFI	0.96	0.993	0.993
TLI	0.997	0.995	0.997
CFI	0.999	0.998	0.999
RMSEA	0.017	0.024	0.018
PCLOSE	0.930	0.955	0.983
SMC for LDR	0.403	0.402	0.321
SMC for SDR	0.352	0.350	0.339
SMC for ROA	0.204	0.199	0.285

Note: SMC – Squared multiple correlation, analogous to R^2 in linear regression analysis

Table 5. Standardized regression weights for Model 2

Explanatory variables	*Dependent variables*					
	ROA		*Long-term Debt Ratio*		*Short-term Debt Ratio*	
	Estimate	*P*	*Estimate*	*p*	*Estimate*	*P*
LongAssetRatio	-0.133	***	0.487	***	-0.511	***
StateOwnRatio	0.146	***	0.170	***		
Ln_assets	-1.597	***	-0.296	0.026		
Ln_age					0.094	0.005
Ln_SD_profit	1.592	***	0.321	0.016		
Sale_growth			0.068	0.039	0.070	0.039
ROA			-0.313	***	-0.349	***

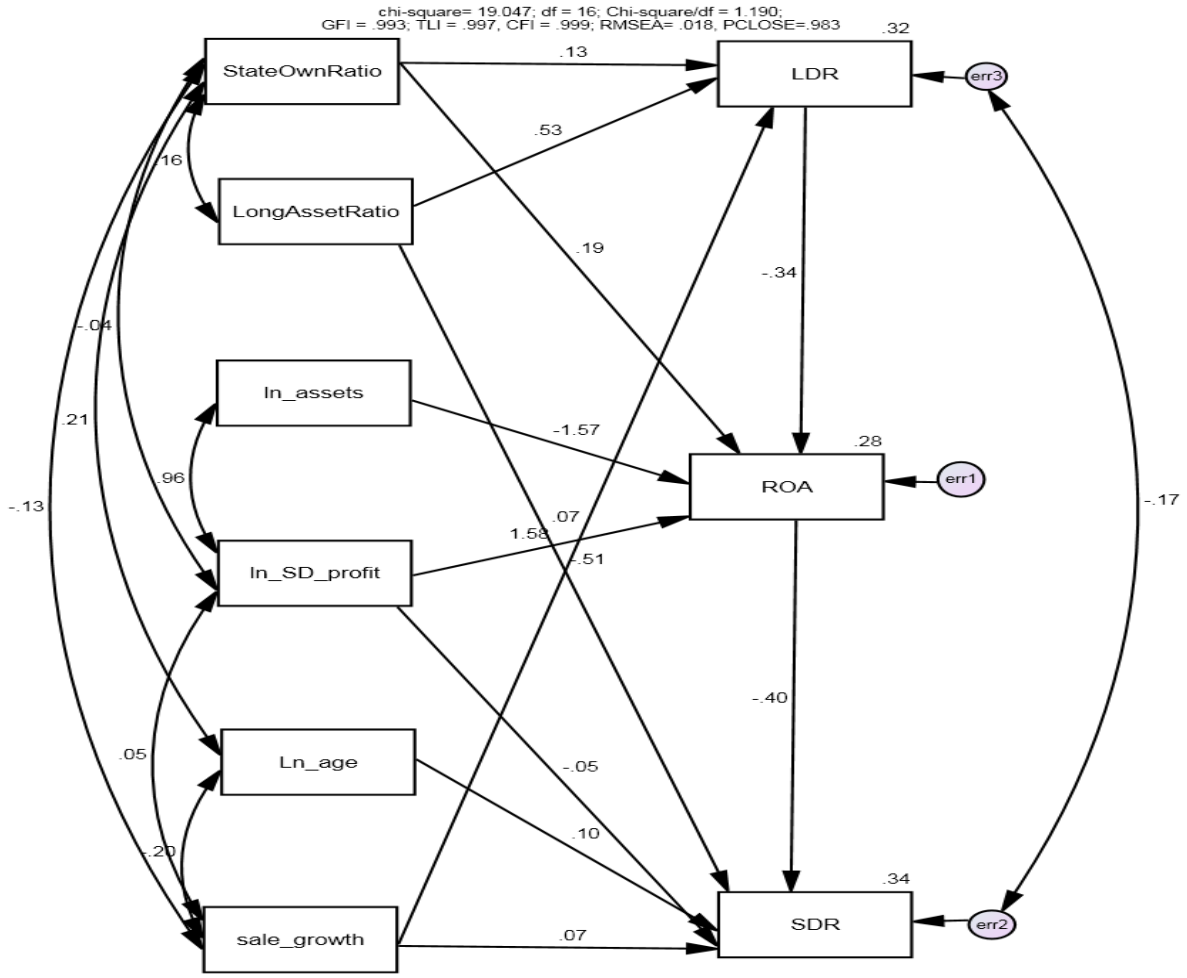
*Note: ***indicates p < 0.001*

Table 6. Standardized regression weights for Model 3

Explanatory variables	*Dependent variables*					
	ROA		*Long-term Debt Ratio*		*Short-term Debt Ratio*	
	Estimate	*p*	*Estimate*	*p*	*Estimate*	*P*
LongAssetRatio			0.527	***	-0.515	***
StateOwnRatio	0.193	***	0.132	***		
Ln_assets	-1.566	***				
Ln_age					0.097	0.004
Ln_SD_profit	1.578	***			-0.055	0.099
Sale_growth			0.074	0.030	0.074	0.031
ROA					-0.395	***
LDR	-0.343	***				

*Note: ***indicates p < 0.001*

Figure 2. Relationship between enterprise characteristics, capital structure and performance – Model 3



4.5. Implications of Models 2 and 3

The main difference between these two models is the assumed direction of the path between ROA and LDR. Model 2 assumes causality runs from ROA (operational performance) to LDR, whilst Model 3 assumes it runs in the opposite direction. Apart from this difference, the two models produce very similar estimates and implications.

Estimates presented in Table 5 for Model 2 and Table 6 for Model 3 are standardized regression weights, and are analogous to the slope coefficients in conventional regression analysis. In the current context, however, they indicate for each standard deviation of change in the explanatory variable, how much (in terms of standard deviation) the dependent variable would change. The estimates suggest that for listed enterprises in Vietnam, operational performance tends to have a negative effect on debt ratios. This is consistent with the findings of Nguyen and Ramachandran (2006) for Vietnam and previous authors for other countries.

The results for both models suggest that the extent of state ownership has a positive effect on LDR. Again, this accords with Nguyen and Ramachandran (2006), who pointed out that state-owned enterprises (SOEs) in Vietnam tend to receive more favourable treatment from state-owned commercial banks which represent the bulk of the banking sector. In both models, sale growth has a positive effect on both LDR and SDR, while enterprise age has a positive effect on SDR only. The long-term assets ratio affects the two measures of capital structure in opposite ways: positive effect on LDR and negative effect on SDR.

5. CONCLUSIONS

This paper investigates the relationship between enterprise characteristics, capital structure and operational performance among a sample of 592 companies listed on the Vietnamese stock exchange during the three years 2012-2014. The results suggest that operational performance has a negative effect on both of the measures of capital structure considered, namely long-term debt/total assets ratio (LDR) and short-term debt/total assets ratio (SDR) for listed enterprises in Vietnam, while the extent of state ownership has a positive effect on LDR. Enterprise size and business risk have no clear effect on LDR and SDR, while enterprise age has a positive effect on SDR only. The ratio of long-run to total assets affects the two capital structure measures in opposite ways: the effect is positive on LDR and negative on SDR. The evidence was considered to be inconclusive on the question of direction of causality between operational performance and LDR. It will be useful in future research how different economic and institutional factors impact on capital structure as well as enterprise performance.

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