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An Investigation of Credit Rating and Capital Structure: Empirical Evidence from Listed Companies on Vietnam Stock Market

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Abstract

Credit ratings have become a widely accepted measure of firms' creditworthiness in financial markets. The relationship between credit ratings and capital structures has received much attention over the last decade. To date, very few studies have examined this issue in Vietnam. This paper investigates the impact of credit rating changes on capital structure decisions after new Decree in 2009. Using 216 Vietnamese companies listed on the Hochiminh Stock Exchange (HOSE) from 2010 to 2013 and OLS and Generalized Method of Moments (GMM,) we test this potential relationship. Here Generalized Method of Moments (GMM) is adopted to overcome possible endogeneity, unobservable heterogeneity, and simultaneity problems. Our test results reveal that credit ratings relates to capital structures in Vietnam. Firms experiencing good or improved credit ratings tend to have relatively small debt amounts. On the other hand, firms experiencing low credit ratings or impaired credit seem to carry more debts than others.

Keywords: credit rating, capital structure, Vietnamese Listed Company, HOSE, GMM

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1. Introduction

A credit rating or system assesses abilities of firms and individuals to meet their financial obligation. Many institutions and individuals heavily rely on it to evaluate a firm's financial soundness, especially solvency before making final decisions of lending to or investment on the firm. Accordingly, any change of credit rating or system tends to influence operational or/and financial activities of firms which plan to bring in capitals for their growth.

Recently, several newly developing countries have tried to improve their own credit systems to facilitate international financing for their own economic growth. In 2009 Vietnamese government promulgated Decree No 53/2009/ND-CP on the issue of international bonds or borrowing. Under new Decree the credit rating assessment was officially required for governmental approval on international loans or financing. Since then receiving a good credit rating has become a major task to a firm which look for international loans or financing. Credit ratings also started to play an important role in evaluating general firms' financial stability in the Vietnamese financial market.

In Vietnam, firms generally receive free credit ratings issued by local credit rating agencies. Very few firms have received credit rating from S&P or Moody's. Until October in 2007, only three Vietnamese credit rating agencies - Vietnam Credit Information and Rating Company (C&R), Credit Information Center (CIC) and Credit Rating Vietnam Company (CRV) - provided to firms limited credit rating services. Thus the introduction of new credit rating assessment requirement in 2009 may have changed a rule in business. Many firms have started to focus on parameters associated with credit ratings, especially amounts of debts or capital structures.

In this paper, we explore how the credit rating assessment requirement under new Decree affects firms' capital structures in Vietnam. Firstly we explore whether credit ratings relate to the amount of debts which directly measures solvency in Vietnam. It is believed that the lower the credit rating is, the more the amount of debts in capital structure is. Secondly, we test how the change of crediting ratings affects capital structure. If a firm experiences upgraded credit rating, at least the firm may want to maintain its capital structure under new Decree. Thus overall debt amounts may be smaller than those of firms experiencing downgrading or no credit changing. On the other hand if a firm experiences a downgraded credit rating, the firm may try to reduce debt amounts. But it may not be easy to improve operation and overturn the credit changing in a short period. In the worst case, the firm may need to borrow more to maintain its operation or to invest on new projects. Thus the amounts of debts may be more than those of firms experiencing upgrading or no credit changing.

Using 216 firms listed at Hochiminh Stock Exchange, we test these arguments. Our OLS and GMM test results reveal: 1) good credit ratings tend to associate with low debt amounts. Interestingly the relationship between credit ratings and capital structures is nonlinear. This nonlinearity implies there is a certain level of a credit rating combined with the largest debt amounts within a range of capital structure. 2) Firms experiencing credit improvement tend to maintain relatively small debt amounts in the following period, compared to firms without credit improvement. On the other hand, firms experiencing impaired credit seem to carry more debts than those without impaired credit in the next period. These findings indicate that after new Decree is introduced, credit rating relates to capital structures in Vietnam.

In this paper Section 2 introduces hypotheses. Section 3 explains research methods. Section 4 shows test results and discussion. Section 5 concludes.

2. Hypothesis

Prior studies have shown that capital structure is affected by several factors, such as firm size, tangibility, profitability, tax, growth opportunities, etc. However, a credit rating and its impact on capital structure in emerging markets have not drawn much attention. Kisgen

(2006) argues the significant impact of credit ratings on capital structure and introduces a Credit Rating - Capital Structure Hypothesis (CR-CS). Under this hypothesis, credit rating agencies are allowed to access to inside information. Credit ratings may signal a firm's quality to investors. This signalling may influence managerial decisions on capital structure. Kisgen (2006) states that "firms close to a credit rating change (upgrade or downgrade) tend to use less debt relative to equity than firms no near a change in rating."

Mizruchi and Stearns (1994) argue that firms with low credit ratings may have to pay expensive costs of capital, compared to firms with good credit ratings. Therefore, they may want to have a low level of leverage or gearing. Moreover, Shivdasani and Zenner (2005) also state that firms with low credit ratings may be concerned about their reputation, which affects their business operations and disclosure requirements. To obtain better ratings, they may issue less debt relative to equity. Mittoo and Zhang (2010) point that credit ratings or gearing associate with bringing in alternative financing sources. In some cases, they also affect characters of debts such as secureness, maturity, and covenants.

Graham (2000) argues that firms with good credit ratings have the reputation of being safe firms with successful management. These positive reputations may assist those firms in easily accessing alternate financing resources. Thus, firms may not want to take additional risks by issuing much debts. Kisgen (2009) finds that firms that have been downgraded often try to reduce the amounts of debts in the following year, whereas upgraded firms have no significant leverage changes.

These arguments introduce some testable hypotheses regarding credit ratings and capital structures (measure by the relative debt amounts) in the Vietnamese market after new Decree is announced. Firstly new Decree emphasizes the importance of a crediting rating when a firm seeks an approval for raising capitals. Many firms may carefully control the amounts of debts, a key solvency measurement, to improve financial status for an easy access to capitals. This may lead to a positive relationship between bad credit ratings and debt amounts in Vietnam. Secondly we test how the change of crediting ratings affects debt amounts in capital structure. If a firm experiences upgraded credit rating, the firm may want to maintain or improve its capital structure by keeping or reducing debts. Even though there is a chance that the firm may explore recapitalization and tax sheltering benefits, it may not prefer to borrow a lot so as to degrade its credit rating. Thus overall firms experiencing credit upgrading may have the smaller debt amounts than those with downgrading or no credit changing. On the other hand if a firm experiences a downgraded credit rating, the firm may try to reduce debt amounts. But the firm may not be able to improve its operation in a short period and be limited to reduce the debts. In the worst case, the firm may need to borrow additional debts to maintain its operation. Thus the amounts of debts are believed to be more than those of firms experiencing upgrading or no credit changing.

3. Research method

To test those hypotheses above, we use non-financial firms listed on the Hochiminh Stock Exchange during the period 2010 to 2013 but exclude financial firms or firms without available information. A total of 216 firms meets our requirements for testing. We use the rating at the end of the fiscal year to see the change in capital structure for the following year. If a firm's rating is changed during the year, then the rating at the end of fiscal year is selected.

Firstly, to examine the relationship between a firm's credit rating and its capital structure, we employed a following model:

$$\mathbf{NetDiss_{it}} = \beta_0 + \beta_1 \mathbf{CR_{it}} + \beta_2 \mathbf{CR^2_{it}} + \beta_3 \mathbf{Dep/A_{it}} + \beta_4 \mathbf{SV/BV_{it}} + \beta_5 \mathbf{SIZE_{it}} + \beta_6 \mathbf{ROE_{it}} + \mathbf{u_{it}} \quad (1.1)$$

Dependent variables: $NetDiss_{it}$ is a measure of firm *i* capital structure at time *t* by dividing a difference between debts and equities by its total assets.

Independent variables: CR_{it} is the credit rating of the firm, with cardinalzed values of 1, 2,…..9, where AAA = 1 to C = 9; CR^2 is the square of the credit rating to test non-monotonous.

Table 1: Credit Rating Coding

Credit Rating	Rating coding	Number of firms in 2010	Number of firms in 2011	Number of firms in 2012	Number of firms in 2013
AAA	1	0	5	8	8
AA	2	49	52	66	58
A	3	45	46	53	67
BBB	4	36	55	45	41
BB	5	63	56	36	28
B	6	7	2	5	13
CCC	7	7	0	3	1
CC	8	9	0	0	0
C	9	0	0	0	0
Total		216	216	216	216

Control variables: A set of control variables is added to test the effect of a credit rating on capital structure under these interactions. Depreciation divided by total assets of a firm i in time t (Dep/A_{it}) is used to measure the non-debt tax shield of a firm. This means that a firm with more non-debt shields tends to use a lower debt level. The ratio of a stock price to book value per share for firm i in time t (SV/BV_{it}) is used to measure the growth opportunity of a firm (Booth, 2001). Titman and Wessels (1988) argue the size of the firm has a positive correlation with the leverage. The larger a firm is, the higher its ratio of debt to equity. Following Booth (2001) and Bevan and Danbolt (2002, 2004), the size of a firm ($SIZE_{it}$) is measured as a log value of total assets for firm i in time t. Profitability is found to have a negative relation with leverage in the US, Japan, Italy (Rajan and Zingales, 1995). The pecking order theory affirms that profitability has an inverse relationship with firm capital structure. However, Titman and Wessel (1988) find a positive correlation between two factors. We use ROE_{it} (return on equity) as a profitability measurement for firm i in time t.

OLS (Ordinary Least Square) is initially used to analyze the model. However, because of endogeneity and simultaneity problems, the results from OLS model may be biased. In other words, although a credit rating, theoretically and empirically, are expected to be an essential factor in determining capital structure, an inverse relationship may exist between the credit rating and capital structure. Thus, GMM (Generalized Method of Moments) is applied to deal with this problem. This approach takes first difference, which would eliminate any potential bias arising from unobserved heterogeneity of firm fixed effects and simultaneity. In addition, our GMM model employs one-year lagged variables as instruments. The model is presented as follows:

$$\mathbf{NetDiss_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 CR^2_{it} + \beta_3 Dep/A_{it} + \beta_4 SV/BV_{it} + \beta_5 SIZE_{it} + \beta_6 ROE_{it} + \beta_7 NetDiss_{it-1} + u_{it}} \quad (1.2)$$

Secondly, to estimate the impact of credit rating changes on capital structures, we use OLS specification with dummy variables and lag changes in control variables as follows:

$$\mathbf{NetDiss_{it} = \beta_0 + \beta_1 UG_{it-1} + \beta_2 DG_{it-1} + \beta_3 Dep/A_{it-1} + \beta_4 SV/BV_{it-1} + \beta_5 SIZE_{it-1} + \beta_6 ROE_{it-1} + u_{it}} \quad (2)$$

Where: UG_{it-1} is the dummy variable that takes the value of 1 if a firm was upgraded in the previous year or 0 otherwise; DG_{it-1} is a dummy variable taking the value of 1 if a firm was downgraded in the previous year or 0 otherwise.

4. Results

Table 2 shows the descriptive statistics of our sample data. On average, the relative amount of debt amounts is about 60% of a firm's total assets. The amount of depreciation is around 55% of the total assets and the ratio of stock price to book value is around 1. The size (log value) is about 7.3 and return on equity is 17.8%.

Table 2: Descriptive statistics

Variable	Mean	Median	Maximum	Minimum	Std.Dev
NetDiss	0.603	0.626	9.184	0.067	2.183
Dep/A	0.547	0 .547	0.914	0.018	0.526
SV/BV	1.001	0.832	6.329	0.421	1.734
SIZE	7.295	6.453	9.142	3.328	0.473
ROE	0.178	0.157	0.574	-0.382	0.163

Table 3 presents the Pearson correlations. The results indicate that explanatory variables and control variables are not highly correlated, except for CR, CR2, and dummy variables.

Table 3: Pearson correlation matrix

		NetDiss	CR	CR2	UG	DG	Dep/A	MV/BV	SIZE	ROE
NetDiss	Pearson Sig. (2-tailed)	1								
CR	Pearson Sig. (2-tailed)	0.139* (0.016)	1							
CR2	Pearson Sig. (2-tailed)	0.027* (0.023)	0.823** (0.000)	1						
UG	Pearson Sig. (2-tailed)	0.025 (0.645)	0.472* (0.012)	0.328 (0.051)	1					
DG	Pearson Sig. (2-tailed)	0.089 (0.663)	0.378 (0.139)	0.128 (0.429)	0.713** (0.000)	1				
Dep/A	Pearson Sig. (2-tailed)	-0.082* (0.012)	-0.345 (0.629)	-0.524 (0.073)	0.615 (0.066)	0.382* (0.036)	1			
MV/BV	Pearson Sig. (2-tailed)	0.431* (0.156)	0.211* (0.045)	0.268 (0.231)	-0.382 (0.791)	0.546 (0.029)	0.127* (0.034)	1		
SIZE	Pearson Sig. (2-tailed)	0.369** (0.000)	0.362 (0.519)	-0.118* (0.025)	0.299 (0.083)	-0.697* (0.012)	- 0.435 (0.724)	0.397 (0.185)	1	

ROE	Pearson	0.223*	-0.812	0.337	0.336	0.554	0.201**	-0.015*	- 0.556	1
	Sig. (2-tailed)	(0.018)	(0.067)	(0.163)	(0.839)	(0.294)	(0.006)	(0.023)	(0.392)	

***p <0.01; **p < 0.05; *p < 0.1

Using OLS and GMM, we estimate Equations (1.1) and (1.2). Table 4 presents the results. To examine the validity of instrumental variables and the success of instrumentation procedure, Sargan test is applied. Sargan p-value exceeds the significant level of 5%. Therefore, instrument variables are not simultaneous or of dynamic endogeneity.

As shown in Table 4, the coefficient of CR is positive and highly significant at the 1% level, while the coefficient of CR^2 is negative. These test results indicate firms with bad credit ratings tend to have more debts in their capital structure than with good credit ratings. There is an inverted U-shaped relationship between the credit ratings and capital structures. Under GMM estimation, as a credit rating moves to low ones, the leverage increases by 16.9% but at a decreasing rate. This finding implies that the change of relative debt amounts is not proportional to the change of a credit rating. Over a certain credit rating prior to the worst credit rating, firms tend to have the largest debt amounts. An adjusted R^2 of 0.338 means that independent variables tend to explain 33.8% of the change in NetDiss.

Table 4: Results of OLS and GMM models

	$NetDIss_{it}$			
	OLS		GMM	
	Coefficient	P-value	Coefficient	P-value
CR_{it}	0.187***	0.007	0.169***	0.003
CR^2_{it}	-0.021***	0.003	-0.017**	0.042
Dep/A_{it}	-2.281**	0.041	-0.128*	0.072
SV/BV_{it}	-0.816*	0.070	0.078	0.271
$SIZE_{it}$	-0.041	0.156	-1.701*	0.081
ROE_{it}	0.099*	0.083	0.529**	0.021
$NetDiss_{it-1}$			0.219**	0.017
Adj R^2	0.166		0.338	
Sargan value			0.429	

***p <0.01; **p < 0.05; *p < 0.1

Regarding control variables, no significant associations of SV/BV and ROE with capital structures (measured by the relative debts amounts) are found as the p-value exceeds 10%. An interesting finding is, however, that profitability positively relates to debt amounts. This does not support arguments by Lemmon and Zender (2010) that firms with a good rating may have better access to the debt market and eventually have a high level of leverage and by Rajan (1995) that profitable firms have a strong incentive to employ additional debts to decrease their tax burdens.

Table 5 reveal a test result about how the credit rating change relates to firms' debts in capital structures.

Table 5: Impact of credit rating change on capital structure

Variable	NetDiss	
	Coefficient	P-value

Upgrade (UG_{it-1})	-0.042*	0.065
Downgrade (DG_{it-1})	0.056***	0.002
Depreciation to Total Assets (Dep/A_{it-1})	0.74	0.114
Price to Book Ratio (SV/BV_{it-1})	0.013	0.17
Firm Size ($SIZE_{it-1}$)	-0.051	0.580
Return on equity (ROE_{it-1})	0.452	0.063
Adj R^2	0.3809	

***p <0.01; **p < 0.05; *p < 0.1

The dummy for upgrading shows a negative relationship at 10% significance, whereas the dummy for downgrading positively relates to the relative debt amounts. This means that firms that experienced credit upgrading tend to maintain smaller debts in the following year than others without credit upgrading. On the other hand, firms that faced a credit downgrading look like carrying more debts than others.

These finding are consistent with the argument of Mittoo and Zhang (2010) and the CR-CS hypothesis of Kisgen (2006). Firms with a low rating may confront both an increasing financing cost and a chance of bankruptcy. These may limit bad rated firms to use debt financing fully.

5. Conclusion

We confirm that after new Decree in 2009, credit rating affects capital structures (measured by the relative debt amounts), which supports that credit rating plays an important role in determining capital structure in the Vietnamese market. We also find that credit ratings are nonlinearly associated with debt amounts. Firms experiencing upgraded (downgraded) credit ratings tend to maintain the smaller (larger) amount of debts in the following period than firms without upgraded (downgraded) credit ratings. However at current research it is not clear why these patterns happened. They may be caused by governmental regulations, firms' operation, etc. We need to explore this issue more in the future.

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