

INVESTIGATIVE STUDY ON FACTORS AFFECTING THE DEBT MATURITY STRUCTURE OF REAL ESTATE COMPANIES LISTED ON HO CHI MINH STOCK EXCHANGE

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Abstract

In this study, the system generalised method of moment (Sys-GMM) was used to investigate the debt maturity structure of real-estate companies listed on Ho Chi Minh Stock Exchange (HOSE) in the period from 2008 to 2019. The decision on debt maturity structure was found to be influenced by firm size, liquidity and tangible asset. In addition, tangible asset had the largest impact on the possibility for companies to access long-term loans. This observation indicates that the companies mostly borrowed money from banks and collateral is very important to make decision on loans. This was supported by another finding that financial institutions had an impact on the debt maturity structure, while effects of financial market were insignificant. Besides, the companies seemed not to pay attention to changes in inflation, economic growth, and institutional quality, when making decision on the debt maturity structure.

Keywords: *Debt maturity structure, financial development, financial institutions, institutional quality.*

1. Introduction

1.1. Research question

The debt maturity structure is regarded as one of the most important financial decisions affecting the development of companies. The decision influences investment due to changes to the capital cost, as well as dividend due to effects on the cash flow. The debt maturity structure of companies is studied in both developed and developing countries. These studies not only used static models to investigate effects of firm and macroeconomic factors, but also utilised dynamic model to evaluate the rate of adjustment to the debt maturity structure (Barclay and Smith, 1995; Demirguc-Kunt and Maksimovic, 1999; Ozkan, 2000; Antoniou et al., 2006; Teruel and Solano, 2007; Cai et al., 2008; Deesomsak et al., 2009; Wang et al., 2010; Terra, 2011; Lemma and Negash, 2012; Krich and Terra, 2012; Matues and Terra, 2013; Bilgin, 2020). According to these studies, the debt maturity of structure of companies is determined by the ratio of long-term debt to total debt which

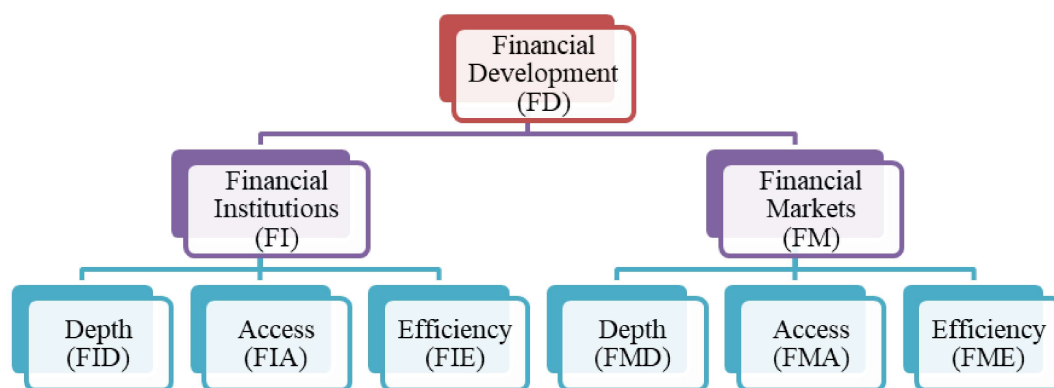
comprises long- and short-term debts. The focus of these studies is to investigate effects of firm and macroeconomic factors, thereby enabling financial administrators to make sound decisions on the debt maturity structure of companies.

The global financial crisis in 2008 has brought economic hardship to companies in Vietnam, including those in the real-estate sector. Nevertheless, real-estate companies are making significant contributions to the economy and require business loans to maintain and expand their operation. They however face difficulties in making decision on how, where and when to borrow money as well as the duration of loans. This study aims to give insights into how internal factors, representing the characteristic of firms, and external factors, reflecting the economy, especially the financial development and institutional quality, affect the debt maturity structure of real-estate companies listed on Ho Chi Minh Stock Exchange (HOSE).

According to IMF (International Monetary Fund, 2015) (Čihák, 2012), the financial development is the combination of (1) *the depth of the market*, including size and liquidity; (2) *the access to the market*, including the ability of individuals and organisations to access financial services; and (3) *the efficiency*, which is examined based on the performance of capital markets and the ability of credit institutions to provide low-cost financial services. In order to accurately assess the financial development of a country, IMF (2015) developed a set of financial development indices (FD indices), which comprise indices of depth, accessibility and efficiency of financial institutions (FI) and financial markets (FM) (Figure 1). Financial institutions and financial markets pose different impacts on financing decisions of companies, in particular the debt maturity structure. This study, therefore, also aims to examine the role of financial institution and financial market to uncover impacts of the financial development on the debt maturity structure of the real-estate companies in Vietnam.

In addition, the study aims to verify whether the real-estate companies adjust their debt maturity structure, thereby providing financial administrators with evidence to support their decision making in matters related to the debt maturity structure of companies.

Figure 1: Financial Development Index (Source: IMF, 2015).



1.2. Theoretical Framework and Empirical Research Results

The debt maturity structure of companies is determined by the ratio of the long-term debt to the total debt and is governed by Signalling theory (Diamond, 1991; Flannery, 1986), Agency-cost theory (Barnea et al., 1980; Jensen and Meckling, 1976; Myers, 1977), Tax-based theory (Brick and Ravid, 1985, 1991) and Matching theory (Morris, 1976). According to these theories, the debt maturity structure is resulted from when a company tries to balance costs and benefits by approaching debts having different maturities.

Empirical studies based on the aforementioned theoretical frameworks demonstrate that *firm factors* have major impacts on the debt maturity structure of companies. The study of Myers (1977), which was later supported by Barclay and Smith (1995), agreed with Agency-cost theory where, by reducing the debt maturity, companies will be able to control underinvestment problems. Large companies will issue many long-term debts and companies with asymmetric information will use short-term debts. It was found taxed-based theory does not influence the debt maturity structure of companies. Terra (2011) showed similar factors affecting the debt maturity structure of companies in the US and Latin American countries, despite differences in the financial and business environment between countries in the sample survey. Specifically, the factors of firm size, profitability, tangible assets do not affect debt maturity; debt ratio, asset maturity and liquidity have positive effects on debt maturity; taxes and growth opportunity have negative effects on debt maturity. The study of Costa et al. (2014) on SMEs (small and medium enterprises) in Portugal showed that small companies that have low liquidity tend to use many short-term debts. The tax rate has very small positive effect on asset maturity. The capital cost has a strong positive effect on long-term debt. The capital cost is opposite to the growth opportunity; companies that have more physical assets will less likely to grow and more likely to use such assets as collateral to borrow from banks. This observation agrees with Myers (1997) who found that companies that have many growth opportunities should use short-term debts. Chung and Phan (2020) showed that leverage, firm size and lagged debt maturities are the important factors for listed non-financial companies in Vietnam to decide the debt maturity structure.

External factor that reflects the characteristics of market and economy also affects the debt maturity structure of companies. The study of Krich and Terra (2012) showed that the debt maturity structure of companies in five South American countries including Argentina, Brazil, Chile, Peru and Venezuela are significantly influenced by the national institutional quality, whereas the financial development only has a minor impact. Lemma and Negash (2012) concluded that companies in low-income countries tend to use less long-term debts. Also, taxes, economic growth and development in the banking sector have negative effects on the debt maturity structure of companies in Africa. Deesomsak et al. (2009) found that the debt maturity structure of companies in Thailand, Malaysia, Singapore and Australia is strongly related to the characteristics of the economy. Accordingly,

economic growth, inflation, the level of the market capitalisation, the size of banks and the maturity structure of interests have an impact on the debt maturity structure. In China, Cai et al. (2008) showed that the debt maturity structure depends on the factors representing the characteristics of the economy, including the maturity structure of interest, the volatility of stock markets and interests. Similarly, according to Wang et al. (2010), taxes and growth opportunities have positive effects on debt maturity, whereas inflation and money supply have negative effects on debt maturity of companies. Bilgin (2020) concluded that, in addition to firm factors such as debt ratio, firm size, and growth opportunities, the debt maturity structure of companies in 30 selected developing countries is also influenced stock market development and bank concentration.

Besides, the studies of Antoniou et al. (2006), Deesomsak et al. (2009), Krich and Terra (2012), Ozkan (2000), Terra (2011) and Matues and Terra (2013) showed that companies in the United Kingdom, America, Eastern Europe and South America adjust the debt maturity structure towards their targets in order to reduce incurred cost of borrowing. However, the rate of adjusting the debt maturity is different between countries, depending on its economic context.

2. Method

2.1. Data collection and processing

The sample includes 48 real-estate companies categorised based on GICS and listed on HOSE in the period from 2008 to 2019. The data was collected from the companies' audited financial statement archived in the electronic database of www.vietstock.vn and www.bvsc.com.vn. Since the archived data was structured as panel data, the regression modelling was conducted using specialised methods.

2.2. Variables

The regression model of the company's debt maturity structure is based on Agency-cost, Signalling, Matching and Tax-based theories. The company's debt maturity structure is represented by the debt maturity variables, which is the dependent variable of the model and is defined as the ratio of the long-term debt to the total debt (Barclay and Smith, 1995; Cai et al., 2008; Deesomsak et al., 2009; Wang et al., 2010; Krich and Terra, 2012; Lemma and Negash, 2012; Costa et al., 2014; Bilgin, 2020). Factors affecting the debt maturity structure are represented by the variables listed in Table 1. In addition, the model includes the first-order lagged debt maturity to study the dynamic debt maturity structure (Ozkan, 2000; Antoniou et al., 2006; Deesomsak et al., 2009; Terra, 2011; Krich and Terra, 2012; Mateurs and Terra, 2013).

Table 1: Variables in the regression model.

Variable	Symbol	Definition	Expected correlation	Theories and empirical studies
Debt maturity	MR	$\frac{\text{Long term debt}}{\text{Total debt}}$		Barclay and Smith (1995), Demirguc-Kunt and Maksimovic (1999), Ozkan (2000), Antoniou et al. (2006), Teruel and Solano (2007), Cai et al., (2008), Deesomsak et al., (2009), Terra (2011), Krich and Terra (2012), Lemma and Negash (2012), Matues and Terra (2013), Costa et al., (2014), Chung and Phan (2020), Bilgin (2020).
Leverage	LEV	$\frac{\text{Total debt}}{\text{Book Assets}}$	Positive	Signaling theory; Costa et al., (2014), Krich and Terra (2012), Cai et al., (2008), Teruel and Solano (2007), Antoniou et al., (2006), Barclay and Smith (1995), Deesomsak et al., (2009), Lemma and Negash (2012).
Profitability	PROF	$\frac{\text{EBIT}}{\text{Book assets}}$	Negative	Signaling theory; Lemma and Negash (2012); Antoniou et al., (2006); Deesomsak et al., (2009); Cai et al., (2008).
Earnings volatility	VOL	Standard deviation of Earnings	Positive	Signaling theory; Antoniou et al., (2006), Cai et al., (2008), Deesomsak et al., (2009), Lemma and Negash (2012)
Liquidity	LIQ	$\frac{\text{Short term asset}}{\text{Short term liability}}$	Positive	Signaling theory; Antoniou et al., (2006); Teruel and Solano (2007); Cai et al., (2008), Deesomsak et al.,

Variable	Symbol	Definition	Expected correlation	Theories and empirical studies
				(2009), Matues and Terra (2013); Costa et al., (2014)
Tangibility	<i>TAN</i>	$\frac{\text{Net Fixed Assets}}{\text{Book Assets}}$	Positive	Matching theory; Krich and Terra (2012); Matues and Terra (2013), Costa et al., (2014).
Asset maturity	<i>AM</i>	$\left(\frac{\text{Current Assets}}{\text{Current Assets} + \text{Net Fixed Assets}} \times \frac{\text{Current Assets}}{\text{Cost of Goods Sold}} \right) + \left(\frac{\text{Net Fixed Assets}}{\text{Current Assets} + \text{Net Fixed Assets}} \times \frac{\text{Net Fixed Assets}}{\text{Deprecciation}} \right)$	Positive	Matching theory; Demirguc-Kunt and Maksimovic (1999); Ozkan (2000); Cai et al., (2008); Wang et al., (2010); Lemma and Negash (2012)
Firm size	<i>SIZE</i>	Logarithmic of Book assets	Positive	Agency theory; Barclay and Smith (1995); Ozkan (2000); Antoniou et al., (2006); Cai et al., (2008); Deesomsak et al., (2009); Wang et al., (2010), Krich and Terra (2012), Costa et al., (2014).
Grow opportunity	<i>GROW</i>	$\frac{\text{Liability} + \text{Capitalisation}}{\text{Book assets}}$	Negative	Agency theory, Barclay and Smith (1995); Ozkan (2000); Wang et al., (2010); Teruel and Solano (2007); Cai et al., (2008); Lemma and Negash (2012); Krich and Terra (2012)
Tax shield	<i>TAX</i>	$\frac{\text{The firm's total tax charge}}{\text{Total taxable income}}$	Negative	Tax-based theory; Ozkan (2000); Matues and Terra (2013); Costa et al., (2014); Cai et al., (2008); Krich and Terra (2012).
Inflation rate	<i>INT</i>	Consumer price index (CPI)	Negative	Demirguc-Kunt and Maksimovic (1999); Wang

Variable	Symbol	Definition	Expected correlation	Theories and empirical studies
				et al., (2010); Deesomsak et al., (2009)
GDP growth	<i>GDP</i>	GDP growth rate	Positive	Demirguc-Kunt and Maksimovic (1999); Deesomsak et al., (2009); Wang et al., (2010); Lemma and Negash (2012)
Financial Institution	<i>FI</i>	Financial Institution index	Negative	Kirch và Terra (2012)
Financial Markets	<i>FM</i>	Financial Markets index	Positive	Kirch và Terra (2012)
Institutional Quality	<i>IQ</i>	Governance Indicators	Positive	Demirguc-Kunt and Maksimovic (1999), Krich and Terra (2012)
Lagged debt maturity	MR_{t-1}	First-order lagged variable of the debt maturity		Ozkan (2000), Antoniou et al., (2006), Deesomsak et al., (2009), Terra (2011), Kirch and Terra (2012), Mateurs and Terra (2013).

(Source: the author)

2.3. Regression model

In this study, a dynamic model was adopted (Ozkan, 2000; Antoniou et al, 2006; Deesomsak et al., 2009; Terra, 2011; Krich and Terra, 2012; Matuers and Terra, 2013), in order to examine effects of internal and external factors on the debt maturity structure of the real-estate companies listed on HOSE, and thereby to provide evidence that the companies adjusted their debt maturity structure.

Assumed that the target debt maturity structure can be represented by an linear equation of k variables as follows:

$$MR_{i,t}^* = \sum_{k=1} \omega_k X_{k,i,t} + \epsilon_{i,t} \quad (1a)$$

where:

- $MR_{i,t}^*$ the target debt maturity of the company i in the year t ;
- $X_{k,i,t}$ k factor affecting the target debt maturity structure;
- $\epsilon_{i,t}$ error of the regression model.

Assumed the company adjusts the actual debt maturity structure with an adjustment coefficient ρ toward the target:

$$MR_{i,t} - MR_{i,t-1} = \rho (MR_{i,t}^* - MR_{i,t-1}) \quad (1b)$$

where:

$MR_{i,t}$ the actual debt maturity of the company i in the year t ;

$MR_{i,t-1}$ the actual debt maturity of the company i in the year $t-1$;

$MR_{i,t}^*$ the target debt maturity of the company i in the year t ;

$MR_{i,t} - MR_{i,t-1}$ change in the actual debt maturity

$MR_{i,t}^* - MR_{i,t-1}$ change in the target debt maturity

ρ adjustment coefficient.

From Equations 1a and 1b, the partial adjustment to the actual debt maturity is written as follows:

$$MR_{i,t} = (1 - \rho)MR_{i,t-1} + \sum_{k=1} \rho\omega_k X_{k,i,t} + \rho\epsilon_{i,t} \quad (1c)$$

Equation 1c indicates $0 \leq \rho \leq 1$

If $\rho = 1$: Change in the actual debt maturity structure equals to change in the target debt maturity structure

If $\rho = 0$: There is no adjustment to the debt maturity structure. It could probably be because the debt maturity in the year t equals that in the previous year, or the cost associated with adjusting the debt maturity structure is higher than the incurred cost due to deviation from the target.

If $0 < \rho < 1$: There is partial adjustment to the debt maturity structure, or the debt maturity structure is dynamic.

If the incurred cost due to deviation from the target debt maturity structure is higher than the cost associated with adjustment, then the adjustment coefficient ρ is expected to be higher. In fact, ρ is determined as the difference between 1 and the regression coefficient of the first-order lagged variable of the dependent variable.

Equation 1c can be re-written in more detail by incorporating all variables, to study effects of firm and macroeconomic factors on the debt maturity structure of the real-estate companies listed on HOSE:

$$\begin{aligned}
MR_{i,t} = & \alpha_0 + \alpha_1 MR_{i,t-1} + \alpha_2 LEV_{i,t} + \alpha_3 PROF_{i,t} + \alpha_4 VOL_{i,t} \\
& + \alpha_5 LIQ_{i,t} + \alpha_6 TAN_{i,t} + \alpha_7 AM_{i,t} + \alpha_8 SIZE_{i,t} \\
& + \alpha_9 GROW_{i,t} + \alpha_{10} TAX_{i,t} + \alpha_{11} INF_{i,t} + \alpha_{12} GDP \\
& + \alpha_{13} FI_{i,t} + \alpha_{14} FM_{i,t} + \alpha_{15} IQ_{i,t} + \epsilon_{i,t}
\end{aligned} \tag{2}$$

2.4. Regression method

In a dynamic model such as one used in this study, the lagged variable of the dependent variable is indeed an independent variable and can have correlation with other independent variables. Also, there is a concurrent relationship between the debt maturity variable *MR* and the leverage variable *LEV* (Krich and Terra, 2012), which can cause endogeneity and affect the accuracy of regression results. This is the disadvantage to some regression methods that are appropriate for panel data, such as Pooled OLS, FEM, REM and GLS. On the other hand, Antoniou et al. (2006) showed that the system generalised method of moment (Sys-GMM) method can resolve this issue and therefore, this method was applied in this study to estimate the regression model, together with Sargan and Arellano-Bond tests.

3. Results and Discussion

Table 2: Regression results

Variable	Predicted correlation	(1)	(2)	(3)	(4)	(5)
MR_1		0.4659*** (0.0020)	0.4006*** (0.0050)	0.3435** (0.0220)	0.4119*** (0.0020)	0.3897*** (0.0030)
LEV	+	0.4613** (0.0380)	0.3083 (0.1980)	0.2411 (0.3040)	0.3590 (0.1400)	0.2603 (0.2730)
PROF	-	-0.0118 (0.9320)	-0.0509 (0.6980)	-0.1008 (0.4520)	-0.0504 (0.6890)	-0.0916 (0.4690)
VOL	+	-0.0005 (0.1990)	-0.0006 (0.1610)	-0.0006 (0.1770)	-0.0007 (0.1040)	-0.0007 (0.1330)
LIQ	+	0.0165*** (0.0090)	0.0180*** (0.0030)	0.0190*** (0.0010)	0.0175*** (0.0020)	0.0182*** (0.0010)
TAN	+	0.2165* (0.0540)	0.1827* (0.0680)	0.1622 (0.1010)	0.1805* (0.0790)	0.1643* (0.0890)
AM	+	0.0000	-0.0001	-0.0001	0.0000	-0.0001

Variable	Predicted correlation	(1)	(2)	(3)	(4)	(5)
		(0.9730)	(0.7680)	(0.6750)	(0.8290)	(0.7190)
SIZE	+	0.0542***	0.0585***	0.0640***	0.0591***	0.0609***
		(0.0010)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
GROW	-	-0.1927*	-0.1246	-0.0950	-0.1471	-0.1041
		(0.0500)	(0.2400)	(0.3570)	(0.1720)	(0.3160)
TAX	-	0.0010	0.0010	0.0004	0.0006	0.0004
		(0.8090)	(0.7870)	(0.9240)	(0.8650)	(0.9200)
INF	+		-0.0018	-0.0055*	-0.0045	-0.0049
			(0.4320)	(0.0610)	(0.1720)	(0.1790)
GDP	+		-0.0511**	0.0184	-0.0297	0.0114
			(0.0430)	(0.6400)	(0.3180)	(0.7860)
FI	-			-2.3766*		-2.2292*
				(0.0760)		(0.0880)
FM	+			0.1530		0.1913
				(0.4900)		(0.3990)
IQ	+				-0.0144	0.0043
					(0.2890)	(0.7520)
No. obs		396	396	396	396	396
Prob>F		0.0000	0.0000	0.0000	0.0000	0.0000
Sargan test		0.0340	0.0270	0.0230	0.0410	0.0300
Arellano-Bond test		0.4680	0.3740	0.4670	0.4020	0.5070

(Source: Stata data processing by the author)

(The Sys-GMM method was applied to conduct the regression analysis for Equation 2 using five different groups of variables: (1) firm factors; (2) firm and macroeconomic factors; (3) firms and macroeconomic factors, and those representing the financial development (including financial institutions and financial markets); (4) firms and macroeconomic factors, and those representing the institutional quality; (5) all factors. *, ** and *** represent the statistical significance of 10%, 5% and 1%, respectively.)

The correlation in Table 2 suggests that effects of all factors on the debt maturity structure are in line predictions based on theories and previous empirical studies. The results of the regression analysis are in a good agreement with Cai et al. (2008), Deesomsak et al. (2009), Costa et al. (2014), Tayem (2018), and Bilgin (2020), as well as Agency cost, Signalling and Matching theories. The results suggest that the real-estate companies approached loans with longer maturities when the companies grew, improved their liquidity and possessed more tangible assets. While tangible asset is the firm factor that has the strongest effect on the debt maturity structure at 10% statistical significance, asset maturity is not significant. This shows the real-estate companies in Vietnam listed on HOSE pay less attention to debt maturity and asset maturity when making borrowing decision. In addition, the study found no evidence to support the tax-based theory.

Among other external factors, only financial institutions have significant influence on borrowing decision of the real-estate companies. This observation helps clarify the research aim stated in the previous section. Borrowing decisions are greatly affected by the financial development, in particular the development of financial institutions. The results of this study are consistent with financing and debt activities in the real-estate sector. The development of financial institutions helps reduce agency cost since they are better to monitor borrowers than other creditors. In such a financial environment, short-term debts are preferred by real-estate companies.

A dynamic debt maturity structure enables the companies to actively adjust the ratio between long-term debt and short-term debt. The regression analysis of Equation 2 shows that the first-order lagged variable of the debt maturity (MR_1) has the statistical significant of 1% to 5%, regardless of different groups of factors or dependent variables. This indicates the model is dynamic or, in other word, the debt maturity structure of the real-estate companies is dynamic. The regression coefficient of MR_1 varies from 34.35% to 46.59%, depending on the group of factors. In general, taking into account effects of firm factors and external factors including financial institutions, financial markets and institutional quality, the regression coefficient of MR_1 is 38.97%. Therefore, the adjustment coefficient ρ is $1 - 0.3897 = 0.6103$, i.e. 61.03%. This indicates the real-estate companies significantly adjusted their debt maturity structure because the cost associated with adjustment was lower the incurred cost due to deviation from the target maturity. Therefore, the real-estate companies listed on HOSE in the period from 2008 to 2019 adjusted their debt maturity structure and their financial administrators made decision based on specific firm characteristics such as liquidity, tangible assets and company size.

4. Conclusion

The real-estate companies listed on HOSE was found to have dynamic debt maturity structure and make relatively large adjustments to their debt maturity. This indicated high

incurred cost due to deviation from the target debt maturity. The study showed that the financial development, in particular the development of financial institutions, posed large impacts on decisions of long-term borrowing. In addition, the study identified factors that had significant influence on the debt maturity structure of the real-estate companies. In particular, the study provided evidence to support agency-cost, signalling and matching theories. Unlike other countries, tangible asset is the firm factor that affected borrowing decision the most. This proves that the real-estate companies listed on HOSE tended to borrow through banks and collateral enabled them to access long-term debt. The results of this study strongly suggest the development of financial institutions had large influence on the debt maturity of the real-estate companies, whereas inflation, economic growth, financial market and institutional quality had insignificant impact.

The study presented on this paper only focused on investigating influence of firm and external factors, especially the financial development, financial market, and institutional quality, on the debt maturity of structure of the real-estate companies in Vietnam listed on HOSE. This research will pave the way for future studies, using large samples to provide more insights into this topic in a Vietnamese context.

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