Determinants of Corporate Debt Financing

Jiahua Zheng

Faculty of Social Sciences and Law, University of Bristol, BS81QU, British

Keywords: Debt; Debt determinants;Trade-off theory; Pecking order theory

Abstract: Capital structure has been a topic of heated discussion for several decades. Debt financing is one of the aspects of capital structure that reflects corporate governance practices. Optimal debt management may be helpful in firms' cash management and encouraging managers to perform well. This paper aims to investigate the determinants of debt level, between 2010 and 2017 for FTSE 250 firms, building on Alkhatib model (2012). The results of the analysis suggest that long-term debt plays an important role in debt structure; firm size, profitability and asset structure are negatively influence firm leverage; debt is positively related to growth opportunities; there is no evidence that profitability, asset structure and liquidity are positively associated with long-term debt.

1. Introduction

During the corporate operation, companies may face the problems about shortage of funds. Then they need to raise money by external ways, including issuing shares and debts. Capital structure has been a heated topic in corporate governance in several years. A proper selection of debt and equity security may help companies solve funds shortage problem and maximise firm value. However, wrong decisions about capital structure may make companies under stress and even have the risk of bankruptcy (Sheikh and Wang, 2011). Hence, it is necessary to find out the determinants of debt ratio. This study aims to investigate the determinants of corporate debt in FTSE 250 index over 2010-2017 sample period.

2 Literature review

2.1 Review of leverage theories

2.1.1 Trade-off theory

The trade-off theory suggests the amount of debt and equity financing that a company should choose to balance their benefits and costs (Alkhatib, 2012). Under the framework of this theory, management team in the firm should evaluate various optional leverage strategies and consider debt tax shields, agency cost and costs of bankruptcy when they assess firm's level of debt to value (Alkhatib, 2012). Banks are more likely to refuse to invest in weak firms while strong firms optimally gain both bank and market debts (Hackbarth et al., 2007). It shows that proper financing decision relies on the point where the tax deduction for additional dollar debt equals to the costs of increasing the financial distress probability (Sheikh and Wang, 2011). Meanwhile, Alipour, Mohammadi and Derakhshan (2015) assert that agency cost can determine firm's optimal level of debt and capital structure, because proper managerial ownership and debt structure can reduce agency costs and retain firm value. Trade-off theory states that profitability, firm size and growth opportunities are positively associated to capital structure because these factors are all proxies for high debt-related tax benefits and low costs of debt-related bankruptcy. Sheikh and Wang (2011) state that trade-off theory rationalizes moderate debt ratios since there is evidence that trade-off theory is consistent with lots of certain obvious facts. For example, companies which possess relatively safe tangible assets may borrow more than those have risky intangible assets. Previous literatures illustrate that the trade-off theory is sufficient to explain many facts about corporate debt structure.

  DOI: 10.25236/ssehr.2018.060

2.1.2 Pecking order theory

Pecking order theory presents the preference of managers in corporate finance. It plays an important role in debt ratio analysis (Mazur, 2007). Sheikh and Wang (2011) argue that there is no optimal capital structure because managers give priority to raising funds internally. If it is necessary to gain cash by external ways, debt funding is normally preferred by managers compared to equity funding. Company owners may want to retain ownership and control of the firm, which is the main reason for preferring debt financing (Kokemuller, n.d.). When a firm lend money by debt, it has the obligation to make periodic interest payments which may reduce the free cash flow amount (Alipour, Mohammadi and Derakhshan, 2015). It also can be an expense which may impact firms' profit. That is why lots of big companies do not choose external debt to finance. However, financing by debt has its advantages. It may force management team to perform well to cover service the debt and reduce the risk of bankruptcy. Chen (2004) states that Chinese listed companies have different order pattern: retained profit, equity financing then debt financing. Apart from the institution difference, financial distress in Chines banking, immature and incomplete legal and institution framework in China can explain the capital structure choice (Deesomsak, Paudyal and Pescetto, 2004).

2.2 Determinants in leverage

Hundreds of previous studies find out that leverage increases with fixed assets, tax shields and firm size but declines with firm volatility, the probability of bankruptcy, grow opportunities and profitability. This study focuses on firm size, profitability, grow opportunities (market-to-book ratio) and asset structure (fixed to total assets ratio).

2.2.1 Size

Firm size plays an important role in debt ratio (Remmers et al., 1974; Titman and Wessels, 1988; Alipour, Mohammadi and Derakhshan, 2015). It is widely accepted that leverage increases with size of firm. According to trade-off theory, firms may weigh the costs and benefits of different financing decision when they decide level and structure of debt (Alkhatib, 2012). Rajan and Zingales (1995) conduct a study to investigate what determine the capital structure of public firms across G-7 countries. However, they find out the positive relationship between leverage and firm size in all countries except German. Large size firms may also attract outside investors which prefer equity relatively to debt. This may be one of the explanations for negative association between firm size and leverage in German. Moreover, the negative relationship between firm size and debt can be analysed by pecking order theory (Chen, 2004). Larger firms usually have free cash flow to invest themselves, which is the prior option for firms to generate funds.

2.2.2 Profitability

There are different views about the relationship between profitability and leverage. Myers and Majluf (1984) predict a negative relationship. They believe that firms prefer internal funds rather than debt to finance, which is consistent with pecking order theory. Because firms do not need to suffer the interest burden and risk of information asymmetry. On the other hand, Jensen (1986) predicts a positive relationship if the market for corporate control is effective. Profitable companies are more likely to issue debt at low interest rate because they are regarded as less risky by the lenders (Alkhatib, 2012).

2.2.3 Grow opportunities

Rajan and Zingales (1995) expect negative correlation between grow opportunities (market-to-book ratio) and debt ratio. Firms usually issue stock when share price is high relative to earnings or book value. Then the proportion of equity securities may be larger than that of financing debt. It is consistent with trade-off theory, which suggests weighing the cost of financing. However, firms with high market-to-book ratios (M/B) may have higher costs of financial distress. If the M/B presents underinvestment costs related to leverage, then firms that have high M/B may have low

debt. Thus, these firms have temporarily low leverage. It is highly likely that mispricing has huge impact on the correlation (Rajan and Zingales, 1995).

2.2.4 Asset structure

Asset structure is a fundamental factor to determine firm's leverage. Auerbach (1985) finds evidence that firms with more intangible assets may receive less loan. Intangible assets are difficult to collateralize to raise additional funds to cover bankruptcy risk (Alkhatib, 2012). Meanwhile, tangible assets can retain more value in liquidation. If a firm has cash problems in return date, they can gain money by selling tangible assets. Therefore, the bigger the proportion of tangible assets the company has, the more willing should creditors be to supply loans and the company's leverage may be higher.

2.2.5 Liquidity

Liquidity ratios may have a mixed effect in making capital structure decisions (Alipour, Mohammadi and Derakhshan, 2015). According to pecking order theory, there is a negative relationship between liquidity and leverage. Firms which have greater liquidities tend to finance internally. However, the trade-off theory believes that companies with higher liquidity ratios may borrow more money because they are more likely to meet contractual obligations on time (Sheikh and Wang, 2011). Lenders also tend to support those firms which have high liquidity ratios to mitigate the bad debt risk.

Overall, previous studies show that firm size, profitability, growth opportunities, asset structure and liquidity have significant impact on capital structure. This study aims to investigate what factors determine corporate debt ratio by analysing FTSE 250 firms from 2010 to 2017. The research question is:

What determine the leverage in UK firms significantly?

Long-term debt is especially relevant in UK firms because it usually represents over 70% of total debt as shown in descriptive statistics section. This study further analyses the reason of this situation and the determinants of long-term debt.

3 Methodology

3.1 Data

3.1.1 Data sources and data collection

Using a sample of FTSE 250 companies from 2010 to 2017, this study evaluates the determinants of debt. Such data can be achieved directly from the Datastream, a global financial and economic data platform. This dataset provides detailed firm level information about financial statements including balance sheet, income statement, cash flow statements and financial index.

3.1.2 Data analysis

The multiple variables regression analysis is used to test the statistical significance of the relationship between leverage and the explanatory variables in the model. After the descriptive characteristic, correlation between each independent variable will be produced to test the individual relationship. Assumed no groups or individual effects among the firms, we estimated the pooled OLS model. Furthermore, F-test and adjusted R-square are used to test the overall significance of the regression model and the proportion of variance in the dependent variable. STATA is the statistical software used to perform these tests due to its powerful functionality and user-friendly interfaces.

Results of data analysis will be divided into two sections. Firstly, the data description is presented, providing a general overview of the used data in the models. Secondly, the detailed analysis of regression results is covered. Then this paper considers the influence factors of long-term debt by replacing the dependent variable.

3.2 Model design

Leverage is impacted by firm's financial situation. Alkhatib (2012) proposed the regression model to investigate the determinants of debt. Following prior research in developing the debt determinants model, this paper uses this regression model to investigate FTSE 250 firms' debt determinants:

$$Leverage_{it} = \alpha_{it} + \beta_{1t}Size_{it} + \beta_{2t}Profitablility_{it} + \beta_{3t}Growth\ opportunities_{it} + \beta_{4t}Asset\ structure_{it} + \beta_{5t}Liquidity_{it} + e_{it}$$

Where α_{it} is the constant; β_{nt} is the coefficients of debt determinants, measuring the relationships between leverage and debt determinants. In addition, long-term debt accounts for over 70% of total debt among FTSE 250 firms over the sample period, the relationship between long term debts and debt determinants is valuable to investigate. Table 1 shows all variables in this study.

Table 1 Description of dependent and independent variables

	Definition
Dependent variables	
$\text{Leverage}_{\text{it}}$	Ratio of total debt to total assets
$\text{Leverage(long)}_{\text{ it}}$	Long term debt to total assets ratio
Independent variables	
Size_{it}	The natural logarithm of annual sales
$\text{Profitablility}_{\text{it}}$	Earnings before interest and tax/total assets, estimating the profitability of companies
$\text{Growth opportunities}_{\text{it}}$	Market to book ratio, as an indicator of investors' future expectations and value of firm
$\text{Asset structure}_{\text{it}}$	Tangible assets/total assets, which can reveal the mobility of assets
$\text{Liquidity}_{\text{it}}$	Current assets/current liabilities, measuring firm's ability of generating cash

4 Findings and discussions

4.1 Descriptive statistics

This section presents the general descriptive statistics of variables that are exploited in the hypothesis testing procedure. Table 2 indicates the level and structure of debts. Average annual leverage experiences a slight increase from 2010 to 2014, from 19.20% 23.33%. It means that FTSE 250 firms have increasing demand for debt during this period. Then it declines to 20.18% in 2017. Long-term debt plays an important in debt structure, making up approximately 75% during the sample. The proportion of long-term debt in debt structure is relatively stable. It indicates that firms try to maintain their long-term debt level (Ozkan, 2001). Average firm size has an annual increase during the sample period, which means that FTSE 250 firms perform well. The average profitability fluctuates around 0.10 over the sample period. The market to book ratio changes significantly over the period. It may be due to the big differences in corporate strategies and profitability in FTSE 250 firms, as well as the external market changes in different years. The asset structure remains at around 56% during the sample period. It presents that tangible assets are the main type of firm's assets. The current ratio declines from 1.82 in 2010 to 1.61 in 2017. It demonstrates that firm's ability to generate cash in a short period becomes weaker.

Table 2 Descriptive analysis of variables

		2010	2011	2012	2013	2014	2015	2016	2017
Leverage	Mean	19.20	20.06	22.93	22.21	23.33	20.89	19.82	20.18
	SD	(18.30)	(20.99)	(29.66)	(27.49)	(31.21)	(23.30)	(21.22)	(21.01)
	Median	15.87	15.33	14.49	13.63	14.58	14.45	14.65	16.72
Long-term debt (%)	Mean	0.74	0.74	0.73	0.74	0.75	0.76	0.75	0.77
	SD	(0.33)	(0.33)	(0.35)	(0.35)	(0.34)	(0.33)	(0.34)	(0.32)
	Median	0.89	0.90	0.92	0.93	0.93	0.94	0.91	0.93
Size	Mean	12.57	12.67	12.73	12.86	12.96	13.05	13.09	13.23
	SD	(1.87)	(1.80)	(1.84)	(1.54)	(1.48)	(1.42)	(1.46)	(1.42)
	Median	12.89	13.00	13.11	13.02	13.09	13.21	13.19	13.33
Profitability	Mean	0.11	0.10	0.11	0.11	0.09	0.09	0.09	0.10
	SD	(0.11)	(0.16)	(0.18)	(0.18)	(0.12)	(0.10)	(0.11)	(0.11)
	Median	0.09	0.07	0.09	0.09	0.08	0.08	0.07	0.08
M/B	Mean	2.71	2.01	1.89	2.69	2.36	2.38	1.72	6.01
	SD	(4.65)	(3.18)	(5.61)	(2.95)	(3.22)	(5.21)	(12.00)	(50.14)
	Median	1.39	1.29	1.36	1.7	1.54	1.73	1.53	1.75
Asset structure	Mean	0.58	0.54	0.52	0.54	0.55	0.56	0.58	0.56
	SD	(0.36)	(0.31)	(0.41)	(0.40)	(0.38)	(0.34)	(0.38)	(0.47)
	Median	0.50	0.51	0.51	0.52	0.56	0.56	0.55	0.54
Liquidity	Mean	1.82	1.90	1.97	1.85	1.78	1.71	1.63	1.61
	SD	(1.50)	(2.34)	(2.31)	(1.72)	(1.49)	(1.18)	(1.10)	(0.99)
	Median	1.36	1.43	1.37	1.47	1.45	1.4	1.41	1.4

Next, the study presents the correlation matrix to detect the problem of multicollinearity. Table 3 presents the correlation between each two variables to detect the problem of multicollinearity. There is a significant positive correlation between leverage and firm size and market-to-book ratio ($p<0.01$). The result also suggests that leverage is negatively related to profitability, asset structure and liquidity ($p<0.01$). While neither asset structure nor the liquidity can affect the profitability of firms significantly. In addition, leverage is positively associated with the leverage (long) since they both have total assets in the numerator and just differ in the denominator. Moreover, correlations between each independent variable except asset structure themselves remain low, less than 0.19. It can be seen from the table that there is no sign of multicollinearity in the set of independent variables.

Table 3 Correlation for all variables

	1	2	3	4	5	6
1. $Leverage_{it}$	1.0000					
2. $Size_{it}$	0.1448	1.0000				
	(0.0000)**					
3. $\text{Profitability}_{it}$	-0.0964	-00868	1.0000			
	(0.0000)**	(0.0003)**				
4. M/B_{it}	0.0576	0.0305	0.01181	1.0000		
	(0.0182)**	(0.2198)	(0.0000)**			
5. $\text{Asset structure}_{it}$	-0.5977	-0.5138	0.0486	-0.0602	1.0000	
	(0.0000)**	(0.0000)**	(0.0402)	(0.0134)**		
6. Liquidity_{it}	-0.1900	-0.1899	-0.0466	0.0246	0.3190	1.0000
	(0.0000)**	(0.0000)**	(0.1217)	(0.4341)	(0.0000)**	
6. $\text{Leverage(long)}_{it}$	-0.0956	0.0024	0.1125	0.0320	0.0509	0.1274
	(0.0002)**	(0.9287)	(0.0000)**	(0.2323)	(0.0496)	(0.0001)**

Note: (1) *p<0.1; **p<0.05; ***p<0.01; (2) Standard errors are put in parentheses; (3) $Leverage(long)_{it}$:long-term debt/total assets

4.2 Analysis of the relationship between leverage and debt determinants

In the following sections, the thesis aims at testing the main model that investigates what determines leverage of firm significantly. Detailed results of the regression analysis are presented in Table 4.

Table 4 Debt determinants in FTSE 250 firms from 2010 to 2017

$Leverage_{it}$	Coef.	Std. Err	t	P>|t|
$Size_{it}$	-1.0929	0.5136	-2.13	0.034
$Profitability_{it}$	-29.7670	5.5557	-5.36	0.000
M/B_{it}	0.04199	0.0204	2.06	0.039
$Asset\ structure_{it}$	-34.9040	1.9013	-18.36	0.000
$Liquidity_{it}$	-0.6355	0.4705	-1.35	0.177
_cons	57.3156	7.6209	7.52	0.000
F (5, 980)			105.53	
Prob > F			0.0000	
Adj. R-Square			0.3467	

Note: pooled OLS

Firstly, profitability and asset structure have negative influence on firm leverage at 1% significance level. Firm size is negatively related to leverage at 5% significance level. A 10% increase in firm size corresponds to a decrease of 1.09 in leverage, while a unit increase in profitability leads to 29.77 decline in leverage ratio. A unit growth in tangibility results to 34.90 decrease in leverage. In other words, firms with the larger size, better profitability and larger proportion in tangible assets, may be less active in debt financing. The negative relationship between debt and asset structure as well as firm size may result from less asymmetric information problems in larger firms which possess more fixed assets (Mazur, 2007). Regarding asset structure, Chang et al (2009) argue that firms with less tangible assets may issue more debt to limit managers' consumption of perquisites. Because firms with high debt may have increased threat of bankruptcy and be closely monitored by bondholders. Chen (2004) also finds significantly negative relationship between profitability and overall leverage, which can support the pecking order theory. Retained profit is the quickest and easiest source of finance for most profitable companies. Less profitable companies tend to rely on outside debt financing (Chang et al., 2009). There is a positive relationship between growth opportunities and overall leverage at 5% significance level. According to the trade-off theory, firms with future growth opportunities as intangible assets may borrow less because growth opportunities cannot be collateralised. However, Ross (1977) puts forward that firms with high market-to-book ratio may be able to use more debt because firm valued can be reflected by share price. High-valued firms are usually recognized as the companies with best earnings, growth prospects and less bankruptcy risk. Therefore, creditors may offer loans to firms with good growth opportunities. Moreover, there is no statistically significant relationship between liquidity and leverage ratio. A unit growth of liquidity may lead to 0.64 decrease of leverage. This may be inconsistent with the pecking order theory. Firms tend to use internal funds effectively before considering external debt financing. The constant is positive and extremely significant. The general model does have power in explaining the determinants of leverage. Particularly, the F-test ($p>F = 0.0000$) proves that the null hypothesis stating all coefficients are equal 0 is rejected. Adjusted R-square is 0.3467, indicating that 34.67% of dependent variables can be explained by this model.

4.3 The determinants of long-term debt in FTSE 250 from 2010 to 2017

To test the determinants of long-term debt in this sample, this paper uses long-term debt/total assets instead of total debt/total assets in the regression model.

Table 5 Long-term debt determinants in FTSE 250 firms from 2010 to 2017

Leverage(long) $_{it}$	Coef.	Std. Err	t	P>|t|
$Size_{it}$	0.0723	0.2610	0.28	0.782
$Profitability_{it}$	12.3235	3.5561	3.47	0.001
M/B_{it}	0.04702	0.0777	0.61	0.545
$Asset\ structure_{it}$	3.6090	1.6304	2.21	0.027
$Liquidity_{it}$	0.8579	0.2604	3.29	0.001
_cons	-4.5554	4.0183	-1.13	0.257
F (5, 829)			10.57	
Prob > F			0.0000	
Adj. R-Square			0.0542	

Note: pooled OLS; leverage(long)=long-term debt/total assets

Profitability and liquidity are positively associated with long-term debt level at 1% significant level. Asset structure has significant relationship to long-term debt level (coefficient 3.6090 with t-statistic 0.027). There are also insignificantly positive relationships between long-term debt level and M/B as well as firm size. This finding suggests that large firms may use more long-term finance and less long-debt debt. Based on trade-off theory, large firms which are more diversified and profitable, are expected to have high debt capacity and less exposed to the risk of bankruptcy (Chen, 2004). Then, they can receive the debt financing easily. Regarding tangibility and liquidity, creditors tend to invest firms with more current and tangible assets. This result is consistent with the trade-off theory about financial distress and bankruptcy costs and the pecking order theory in asset mispricing (Chen, 2004). In addition, firms with more tangible assets tend to issue debts to take the advantage of the low cost (Chang et al., 2009). F statistic shows that all coefficients equal to zero can be rejected at 1% significant level. However, adjusted R-square shows that only 5.42% of dependent variables can be explained in this model.

5. Conclusion

To investigate determinants of debt financing in the United Kingdom, this study uses a sample of FTSE 250 firms from 2010 to 2017. It finds that overall debt ratio is negatively influenced by firm size, profitability and tangibility. Pecking order theory, indicating that firms prefer raising funds internally, may be useful in explaining the finding. Firms which are large and profitable may have free cash flow. These companies may use these cash to buy facilities and expand market. However, growth opportunities (M/B) has significantly positive impact on overall leverage. It presents that firms with higher M/B may attract more investors and issue equity. The current study indicates that long-term debt is dominant in total debt, accounting for over 70%. Moreover, this study finds that profitability, asset structure and liquidity have positive influence on long-term debt. Companies with better profitability may have larger long-term debt financing, which can be interpreted as demonstrating their demand for constructing buildings and purchasing equipment. Firms who have more tangible assets and liquidity may have higher long-term debt financing, which means that suppliers consider companies' bankruptcy risk.

References

[1] Ahmed Sheikh, N. and Wang, Z., 2011. Determinants of capital structure: An empirical study of firms in manufacturing industry of Pakistan. Managerial Finance, 37(2), pp.117-133.

[2] Alkhatib, K., 2012. The determinants of leverage of listed companies. International journal of business and social science, 3(24).

[3] Alipour, M., Mohammadi, M.F.S. and Derakhshan, H., 2015. Determinants of capital structure: an empirical study of firms in Iran. International Journal of Law and Management, 57(1), pp.53-83.

[4] Auerbach, A.J., 1985. Real determinants of corporate leverage. In Corporate capital structures in the United States(pp. 301-324). University of Chicago Press.

[5] Bathala, C.T., Moon, K.P. and Rao, R.P., 1994. Managerial ownership, debt policy, and the impact of institutional holdings: An agency perspective. Financial Management, pp.38-50.

[6] Bancel, F. and Mittoo, U.R., 2004. Cross-country determinants of capital structure choice: a survey of European firms. Financial Management, pp.103-132.

[7] Chang, C., Lee, A.C. and Lee, C.F., 2009. Determinants of capital structure choice: A structural equation modeling approach. The quarterly review of economics and finance, 49(2), pp.197-213.

[8] Chen, J.J., 2004. Determinants of capital structure of Chinese-listed companies. Journal of Business research, 57(12), pp.1341-1351.

[9] Deesomsak, R., Paudyal, K. and Pescetto, G., 2004. The determinants of capital structure: evidence from the Asia Pacific region. Journal of multinational financial management, 14(4-5), pp.387-405.

[10] Florackis, C. and Ozkan, A., 2009. Managerial incentives and corporate leverage: evidence from the United Kingdom. Accounting & Finance, 49(3), pp.531-553.

[11] Fosberg, R.H., 2004. Agency problems and debt financing: leadership structure effects. Corporate Governance: The international journal of business in society, 4(1), pp.31-38.

[12] Grigore, M.Z. and Stefan-Duicu, V.M., 2013. Agency theory and optimal capital structure. CKS Journal, Bucharest, pp.862-868.

[13] Hackbarth, D., Hennessy, C.A. and Leland, H.E., 2007. Can the trade-off theory explain debt structure?. The Review of Financial Studies, 20(5), pp.1389-1428.

[14] Jensen, M.C., 1986. Agency costs of free cash flow, corporate finance, and takeovers. The American economic review, 76(2), pp.323-329.

[15] Mazur, K., 2007. The determinants of capital structure choice: evidence from Polish companies. International Advances in Economic Research, 13(4), pp.495-514.

[16] Myers, S.C. and Majluf, N.S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. Journal of financial economics, 13(2), pp.187-221.

[17] Ozkan, A., 2001. Determinants of capital structure and adjustment to long run target: evidence from UK company panel data. Journal of Business Finance & Accounting, 28(1-2), pp.175-198.

[18] Rajan, R.G. and Zingales, L., 1995. What do we know about capital structure? Some evidence from international data. The journal of Finance, 50(5), pp.1421-1460.

[19] Remmers, L., Stonehill, A., Wright, R. and Beekhuisen, T., 1974. Industry and size as debt ratio determinants in manufacturing internationally. Financial Management, pp.24-32.

[20] Titman, S. and Wessels, R., 1988. The determinants of capital structure choice. The Journal of finance, 43(1), pp.1-19.

[21] The Advantages of Using Debt as Capital Structure' (Way, J.), retrieved June, 2018 from https://smallbusiness.chron.com/advantages-using-debt-capital-structure-22011.html.

[22] Why Do Companies Prefer Long-Term Debt?' (Kokemuller, N.), retrieved (n.d.) from https://smallbusiness.chron.com/companies-prefer-longterm-debt-61041.html.