Determinants of Financial Leverage for a Panel Data of Industrial Product Sector in Malaysia

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Abstract: As an indicator that gives impact to the long term performance of a company in term of its profit and valuation, financial leverage has been extensively investigated. This study analyzes the determinants of financial leverage for a panel of 54 industrial product sector companies listed in the Busar Malaysia, as they contribute 41.5% of Malaysia Gross Domestic Product (GDP). The debt ratio has been proxies for leverage. The dynamic tests are performed for a period of 2006-2014 using STATA 10. The empirical results reveal that liquidity, firm size and tangibility are negatively and significantly associated with leverage while profitability is positively and insignificantly related. These signs suggest that two capital structure theories are at work. Even though the explanatory variables selected are all internal factors with the exception for profitability, they all have a high influence on the industrial product companies' capital structure.

Key words: Financial leverage, panel data, profitability, liquidity, firm size, tangibility, industrial product sector

INTRODUCTION

Financial leverage is a use of borrowed money (debt) as capital at work by using different sources of funds such as either in the form of specific short term debt and long term debt, common equity and preferred equity. Usually, the short term debt is working capital requirement while the long term debt is in the forms of bond issues or long term payables while the equity is classified as common stock, preferred stock or retained earnings. Debt is also one of the methods being used by the manager of a company to finance their capital. To gain a general idea of how much leverage is being used by a company, a total debt is compared to its total assets. A higher percentage means it is more dependent on leverage and is risker. It can be determined as an overall level of financial risk a company faced.

In the increasing business competition, companies need to know how to utilize leverage in order to increase its competitive advantage. A business concern can have various financing options and go for different levels of mixture of capital in an effort to maximize the firm's value. Financial leverage does affect the liquidity and profitability of a firm (Raheman *et al.*, 2007). However, a standardized capital structure is not a choice for all business firms. Therefore, they differ in their financial decisions in various terms. A business can have too little or too much debt, in its capital structure. Each will have its own limitations. Too little can affect its size, efficiency, growth and earning capacity or too much can lead to have financial inefficiency, accelerating financial losses and finally to bankruptcy. To determine the capital structure that has risk and cost that are minimum is a difficult task for firm's decision makers. Many influencing factors are at work: internal factors (size, growth, profitability and liquidity) and external factors (nature of industries, government regulations and business environment) affect the company's capital structure design. Over 3,500 UK's Small and Medium-sized Enterprise (SMEs) were found having an existence of industrial effect and companies in one industry tends to be similar with each other (Hall *et al.*, 2000). This capital structure design which is applied in developing economies may not be applicable to other developed economies (Fan *et al.*, 2012). Therefore, capital structure behavior amongst companies may vary.

Industrial products sector consists of the mining, manufacturing and electricity sectors which contribute to almost half of Malaysia Gross Domestic Product (GDP). It

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is also an important contributing element to export of Malaysia. According to Asid (2010), Malaysia as a commodity-based producer has transformed to a manufacturer of industrial products which geared towards exports. As at September 2015, the Industrial Production Index (IPI) increase by 5.1%, as compared to the same month of the previous year. The expansion in September 2015 was driven by positive growth in all indices namely manufacturing (5.6%), mining (4.4%) and electricity (2.6%). Hence, this study will look at the explanatory variables such as firm size, profitability, tangibility and liquidity to identify their impact on debt financing. In turn, it would help in making careful decisions on capital structure changes that affect the industrial sector's performance that is vital for the Malaysian economic growth. The objectives of this study are to analyze the relationship between the explanatory variables and financial leverage and analyze the most significant factor that determines the financial leverage.

Literature review: Capital structure theories which have been developed and advanced to explain the capital structure behavior include Peaking Order Theory, Trade-off Theory, Agency Theory and Signaling Effect Theory. Peaking Order Theory indicates company prefer internal financing to external financing by initially meeting its financial needs using retain earning then debt and finally its equity (Myers and Majluf, 1984). According to this theory hypothesis, a firm that generates high earning uses less debt capital. Trade-off Theory posits that firm maximize its value when the benefits of using debt (e.g., tax shield on interest payment) is equal to the additional cost added (increased cost of borrowing, e.g. bankruptcy cost) of getting one extra loan (Modigliani and Miller, 1963). As such, the company should use as much debt as possible in building up the capital structure design in order to maximize its value. Agency Theory depicts balancing the manager/shareholders and debt holders conflicting interests through the costly monitoring device of contractual covenants. The free cash flow problem should be controlled by increasing ownership of the managers or increasing debt in the capital structure design (JAffee and Russell, 1976). Signaling Effect Theory is based on asymmetric information existing in the capital market. Insiders of the firm signaling higher rate of debt the company has is perceived to the outsiders, as having the higher quality and results in higher cash flow in the future. Therefore, higher quality companies taking more debts than lower quality companies (Schoubben and Hulle, 2004).

Two forms of capital used to finance the company's overall operation and growth are equity capital and debt capital. The use of debt capital at work is known as financial leverage. Total debt which contains both short and long term liabilities is used to gaze the amount of leverage being used by a company. According to Cuong and Canh (2012), total debt divided by the total assets of the firm is used to define the debt ratio. Previous studies used this as the measure to financial leverage (Voulgaris *et al.*, 2002). However, McLaney and Atrill (2006) suggested gearing as debt ratio which is used to ascertain a company's burden of debt and to measure how much the profit of the company would be driven out before paying the shareholders.

Profitability is proxies by Return on Assets defined as Net income divided by Total Asset (Akinlo, 2011). Hadlock and James (2002) argued that companies anticipate higher returns thus they prefer debt financing. They believed that there is a positive relationship between both of them. Other than that Petersen and Rajan (1994) finding is consistent with Trade-off Theory. However, Gurcharan (2010) suggested a negative relationship exists between them. Profitability of the firm and debt level are negatively associated. As the profitability decreases, firms prone to use more debt in the firm. This finding supported Pecking Order Theory. Furthermore, the disagreement on the profitability's findings do exist in the theoretical literature as well as in the empirical strand. A negative effect of debt on profitability was confirmed by Goddard *et al.* (2005), Rao *et al.* (2007), Zeitun and Tian (2007) and Nunes *et al.* (2009).

According to Cuong and Canh (2012), liquidity is a determinant of financial leverage. Many researchers believe that there will be an inverse relationship between the debt ratio of the firm and liquidity. This pecking order view has been supported by Sharif *et al.* (2012), Liu and Zhuang (2009) and Eriotis *et al.* (2011). They use the current ratio to measure liquidity which is the current assets divided by current liabilities. However, Ozkan (2001) suggested that liquidity has an ambiguous effect on the financial leverage decision. He said that the proportion of current assets to current liabilities is chosen as a proxy for liquidity. Sibilkov (2009) study on US public companies concluded that liquid assets increased leverage and debt of the companies. Therefore, firms with more liquid and thus reversible assets are more leveraged. The increase of liquidity shows the increase in debt ratio.

The size of the company is another feature that has influence on financial leverage and many studies have developed in this area. Larger firms are likely to be more diversified and less to fail. They can lower costs and may avoid the bankruptcy. So, it is expected that the small firms and private firms will have lower meanwhile the large

and listed firms will have higher debt. Therefore, size has a positive effect on leverage. The Pecking order theory also expects this positive relation. Most of the studies showed disagreement on the measure of firm size. It can be measured through total assets, total sales and employment or through total profits. The size of the firm is proxies by using the natural log of total assets (Shamsur, 2012). Although, many studies show that there is a positive relationship between firm size and debt ratio (Baharuddin *et al.*, 2011; Frank and Goyal, 2003; Booth *et al.*, 2001; Hall *et al.*, 2000), argued that previous studies overlooked the difference between long debt and short term debt, which might hide the different relation of the two sorts of debt with firm size. This finding is also supported by Suhaila and Mahmood who studied the characteristics of 17 Malaysian public listed companies and concluded that the size is negatively correlated with total debt ratio. Kremp however argued the negative relationship was rather due to the characteristics of the German bankruptcy law and the Hausbank system which offer better protection to creditors than is the case in other countries.

In the case of the default risk of borrowers to its creditors, tangible assets of a firm can be used as a collateral to ensure guarantees. The trade-off theory predicts a positive relationship between measures of leverage and the proportion of tangible assets. However, the direction of influence has not been clear yet. Empirical studies that confirm the above theoretical prediction include Shah and Hijazi (2004), Akthar (2005), Shah and Khan (2007), Akhtar and Oliver (2009) and Serrasqueiro and Ragao (2009). Since, small firms are not as big as large firms, collateral is vital for them to borrow. So, it is expected to have a positive relation between leverage and asset tangibility for both small firms as well as large firms. Finally, Sogorb-Mira (2005) also has found a positive relation between asset tangibility and long term debt and an inverse relation between asset tangibility and short term debt. Therefore, we expect asset tangibility to be positively related to long term debt while negatively related to short term debt. On the other hand, there is also a negative relationship between tangibility of assets and debt ratio which was confirmed by findings of Ahmed and Wang (2011) and Sayilgan *et al.* (2006). The ratio of total fixed assets to total assets will be applied for measuring tangibility. On the basis of the review of literatures, the following hypotheses have been developed:

- H_1: there is a positive relationship between profitability and debt financing
- H_2: there is a positive relationship among size of firm with debt financing
- H_3: there is a positive relationship between tangibility and debt financing

- H_4: there is a negative relationship between liquidity and debt financing

MATERIALS AND METHODS

This study employs 54 yearly panel data of the industrial product companies from the period 2006 until 2014. The variables involved are debt ratio, profitability, liquidity, tangibility and firm size. The data is retrieved from Star on Line Busar Malaysia and OSIRIS and inserted into the Microsoft Excel. Table 1 shows a summary statistic which includes maximum, minimum, mean, coefficient of variance and variance for dependent variables and independent variables. The R^2 of 0.48 indicates that about 48% of leverage can be explained by the variables chosen.

Panel data model: Before the processing of data using STATA 10, the data is then converted into a log-log model so that the estimated coefficients can be estimated as elasticity. The log-log equation is as follows:

$$\ln(\text{Debt Ratio, i, t}) = \alpha + \beta 1\ln(\text{Profitability, i, t}) + \beta 2\ln(\text{Liquidity, i, t}) + \beta 3\ln(\text{Firm Size, i, t}) + \beta 4\ln(\text{Tangibility, i, t}) + ui$$

Where:
ln = Log of the variables
I = The number of company
α = Constant value and
ui = Random error term

The log-log model was then regressed using Pooled Ordinary Least Square (POLS) approach.

Breusch and Pagan Lagrangian multiplier test: It introduces the Lagrangian Multiplier (LM) test for heteroskedasticity problems in linear regression model. The purpose of this test is to choose between the Pooled and random effect based on the p value of Chi^2. The value of prob < Chi^2 is 0.000 which is less than 0.05 and it is significant. In conclusion, we reject the null hypothesis thus Random Effect Model (REM) will be applied.

Hausman fixed test: Hausman test is used to choose between REM verses Fixed Effect Model (FEM). If the null hypothesis is rejected, FEM will be chosen to analyze the data with the extension of FEM-two-way estimation by

Table 1: Descriptive statistics of debt ratios

Stats	Debtra~o	Profit~y	Liquid~y	Firm size	Tangib~y
Max.	3.689600	0.786900	1590.861	9.319736	1.568100
Min.	0.000200	-1.000500	0000.007	4.359836	0.015700
Mean	0.355998	0.363091	19.37275	6.122030	0.547631
CV	0.967278	3.922665	5.804259	0.198276	0.415592
Variance	0.118601	0.020286	12643.76	1.473435	0.051798

Table 2: Random-effect GLS regression

Debtra~o	Coef.	SE	Z-values	p>|z|	95% Conf.	Interval
Profit~y	0.004787	0.095285	0.050	0.960	-0.18197000	0.1915380
Liquid~y	0.000256	0.000124	-2.060	0.040	-0.00050000	-0.0001200
Firm size	-0.050230	0.013130	-3.830	0.000	-0.07596000	-0.0244919
Tangib~y	-0.213220	0.073531	-2.900	0.004	-0.35733540	-0.0691008
Cons	0.785031	0.088966	8.820	0.000	0.61066130	0.9594009
Sigma-u	0.209763	-	-	-	-	-
Sigma-e	0.265198	-	-	-	-	-
rho	0.384852	-	-	-	-	-

xtreg debt ratio profitability liduidity firmsize tangibility, No.of Obs. = 486, Group variable: code, No.of groups = 54, R^2: within = 0.0813, obs per group: min = 9, between = 0.0081, Avg. = 9.0, Max. = 9, Random effect u-i~Gussian, wald $\chi^2(4)$ = 36.00, corr(u-i, x) = 0 (asumed), Prob>χ^2 = 0.0000

taking the year as a variable. If it is the other way around, REM is selected with the extension of the General Least Square (GLS) two-way estimation. The value of prob <Chi^2 is 0.1636 which is more than 0.05 and it is insignificant. Therefore, do not reject the null hypothesis and as a conclusion REM is selected.

RESULTS AND DISCUSSION

Table 2 is the estimated results from all the regressed panel data. The reported results are for a panel data as a whole. Table 2 with the exception of profitability, liquidity, firm size and tangibility are negatively and significantly affecting the debt ratio at 5% level. For liquidity, the finding is supported by Sharif *et al.* (2012), Lui and Zhuang (2009) and Eriotis *et al.* (2011). This also shows that Pecking Order Theory is at work. The argument behind this negative relationship for the liquidity is that as liquidity increases, the debt ratio decreases since companies decrease their debt when the liquidity increases at hand and is able to meet their credit obligation. On the other hand, as liquidity decreases, the debt ratio increases. Ability to meet its short term obligation is running out making companies look for external money. As for the firm size, with the coefficient of 0.50 (z-statistic of 3.83) is the most significant variable that influences leverage due to the highest z-statistics compared to other independent variables. Increase in firm size will lead to a decrease in leverage rate. This finding is supported by Hall *et al.* (2000). However, the finding does not support the Trade-off Theory. It proposes that the larger a firm is having a need to diversified has more reason for it to apply more leverage in its capital structure. In the meantime, tangibility findings also do not support the Trade-off Theory which predicts a positive relationship. Collateral usage decreases the debt holder's risk and bankruptcy cost by selling of these assets in the case of default. From Pecking Order Theory perspective, firms with few tangible assets are sensitive to information asymmetric thus will issue debt rather equity if the external financing need arises (Harris and Raviv, 1991) which leading to a negative relation between the

importance of intangible assets and leverage. The negative relationship between tangibility and debt ratio is supported by Ahmed and Wang (2011) and Sayilgan *et al.* (2006). Profitability variable is not significant with financial leverage in this sector and shows positive effects on leverage. This finding supports the Trade-off Theory which states that companies with high level of profit prefer debt to benefit from tax shield.

CONCLUSION

This study has applied panel data technique to investigate the influence of four internal explanatory variables namely profitability, liquidity, firm size and tangibility towards a better understanding of the leverage behavior of the industrial product sector companies. A yearly dataset of 54 industrial product companies traded in Busar Malaysia over the period of 2006-2014 are utilized.

The findings of this study imply that financial leverage of the companies is highly influenced by internal factors especially liquidity, firm size and tangibility. Therefore, the company might use these selected explanatory variables as indicators in deciding on its mixture of capital structure changes that finances its overall operation and growth for a better performance. Industrial product sector companies' capital structures had also adjusted their behavior to Pecking Order Theory and Trade-off Theory.

In the future studies, it is proposed that more studies are done on different industry sectors to have a different perspective of findings. Different industry may have different needs and these needs are shown as behavior of how they finance their capital structure needs. More external economic variables could be added in the future to see the period effect, even though this study emphasized only on company's internal factors. Besides that, the length of the research period of the study should be extended in order for the data to be reliable and valid. The results and findings from this study are still relevant, despite its limitations and can contribute to the body of knowledge in this area.

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