DEBT MATURITY, UNDERINVESTMENT PROBLEM AND CORPORATE VALUE

Karren Lee-Hwei Khaw[*] and Benjie Chien Jiang Lee

School of Economics, Finance and Banking
College of Business
Universiti Utara Malaysia
06010 UUM Sintok, Kedah, Malaysia

[*]Corresponding author: lhkhaw@uum.edu.my

ABSTRACT

This study examines how Malaysian public listed firms with low and high corporate values use debt maturity as a tool to mitigate underinvestment problem. This study employs panel data methodology instead of the commonly used pooling regression. Results show that firms with low Tobin's Q ratio, a proxy for corporate value, maintain lower level of long-term debt to mitigate agency costs of debt caused by underinvestment problem, whereas firms with high Tobin's Q ratio are indifferent with the debt maturity decision. This study extends the literature on the determinants of debt maturity structure by highlighting the importance of recognising the firms by the corporate values in relation to the underinvestment problem. The findings also provide additional justification for the existing literature in explaining the negative relationship between agency costs of debt and debt maturity structure using a sample of firms from a developing market.

Keywords: debt maturity, agency costs of debt, underinvestment problem, Tobin's Q, corporate value

INTRODUCTION

Studies on capital structure have placed more emphasis on various attributes of debt instead of the conventional debt-equity choice (Johnson, 2003). When a firm decides to finance its operations and growth opportunities with debt, the firm has to decide on the maturity of debt (short-term versus long-term debt), types of debt, and the sources of debt because each of these decisions can affect the firm's value. Different debt maturity has different advantages and shortcomings. For example, firms use long-term debt to mitigate agency costs of equity or overinvestment problem (Hart & Moore, 1998; Harvey, Lins & Roper, 2004; Jensen, 1986; Stulz, 1990) and/or to mitigate the risks related to short-term debt such as interest rate, liquidity and refinancing risks (Diamond, 1991; Sharpe, 1991), but long-term debt is costly and subject to restrictive covenants for years.

On the other hand, firms with greater growth opportunities face greater underinvestment problem that would lead to suboptimal investment decisions. Underinvestment occurs when shareholders reject value enhancing investment opportunities if the benefits of accepting these projects accrue mostly to debtholders instead of shareholders' wealth (Myers, 1984), which leads to higher agency costs of debt. Therefore, firms are found to use less long-term debt but more short-term debt to mitigate the underinvestment problem (Barnea, Haugen, & Senbet, 1980; Custódio, Ferreira, & Laureano, 2013; Myers, 1977). However, this raises a question as to whether the negative relationship between debt maturity and underinvestment problem holds for firms with low and high corporate values.

Low corporate value firms are defined as firms with Tobin's Q less than one. These firms are considered as poorly managed firms, in which the growth opportunities are either not recognised by the outside investors or are insufficiently valuable to overcome the effect of debt overhang problem (Diamond & He, 2014; Lang, Ofek, & Stulz, 1996). Conversely, high corporate value firms have Tobin's Q ratio greater than one. These firms are perceived by the markets to be well managed and have good future growth opportunities, hence would not have problem raising external debt financing (Lang et al., 1996).

Existing evidence on firms' debt maturity are mainly generated from the developed markets such as the US. Limited research works are found to examine debt maturity structure using evidence from the developing market, such as Malaysia. Firms in Malaysia are found to prefer bank borrowing and unlikely to use debt maturity as a tool to mitigate underinvestment problem given the close relationship with banks and highly concentrated ownership (Deesomsak, Paudyal, & Pescetto, 2009). Nonetheless, low corporate value firms may not have the close relationship with banks as compared to high corporate value firms. If this is

the case, debt maturity composition could be a significant tool to mitigate agency problems when low corporate value firms seek for alternative external debt financing.

To answer the question, a sample of 612 non-financial Malaysian public listed firms with 7379 firm-year observations from 1995 to 2013 is split into two subsamples by the firms' Tobin's Q ratio, a measure for corporate value (Doukas, 1995; McConnell & Servaes, 1995; Lang et al., 1996). For the full sample, agency cost is insignificant to explain the debt maturity structure of the firms. This evidence is consistent with Deesomsak et al. (2009). Nonetheless interesting results are reported when this study recognise the firms by the corporate values. Results show that agency cost of debt is negatively related to debt maturity for firms with Tobin's Q less than one. These firms prefer less long-term debt in the presence of underinvestment problem. However, the negative relationship does not hold for high Tobin's Q firms that are indifferent with debt maturity decision. Results remain consistent when the analysis controls for potential bias that may be driven by financial shocks. In addition, for robustness purpose the analysis is repeated to confirm that the findings are not driven by the identification of the subsamples. The full sample is split at the mean value of each firm's Q ratio over the observation period. Results are found to remain consistent, and therefore this study claims that low corporate value firms have greater incentives to use debt maturity than high corporate value firms, as a tool to mitigate underinvestment problem.

This study identifies three important contributions. First, this study highlights the importance of recognising firms by the corporate values. By doing so, this study is able to provide additional justification beyond the neoclassical fundamentals to explain the negative relationship between debt maturity and agency costs of debt. Second, this study contributes to the theory of agency costs of debt and debt maturity literature related to the motivation to use debt maturity as a disciplining tool to mitigate underinvestment problem among low corporate value firms. Third, this study adds to the literature by providing empirical evidence from the perspective of a developing market.

LITERATURE AND HYPOTHESES DEVELOPMENT

Firms can shorten the maturity of debt to mitigate underinvestment problem because short-term debt is considered a disciplining tool due to the need for frequent roll over (Barclay & Smith, 1995; Dennis, Nandy, & Sharpe, 2000; Guedes & Opler, 1996; Johnson, 2003; Myers, 1977; Ozkan, 2000). Firms are also found to shorten the maturity of debt to preserve future debt capacity if future growth opportunities are recognised sufficiently early (Aivazian, Ge, &

Qui, 2005a; Diamond & He, 2014). Moreover, trade-off theory argues that firms should use less long-term debt because growth opportunities that are considered as intangible assets cannot be used as collaterals for debt financing. In brief, empirical evidence shows that debt maturity is negatively related to growth opportunities (Barclay & Smith, 1995; Barclay, Marx, & Smith, 2003; Childs, Mauer, & Ott, 2005; Diomand & He, 2014; Guedes & Opler, 1996; Scherr & Hulburt, 2001).

Firms' leverage are claimed to be influenced by private information on future growth (Diomand & He, 2014; Lang et al., 1996), but having many investment opportunities would financially constrained the firms specifically when the financing needs exceed the internal resources (Demirguc-Kunt & Maksimovic, 1998). As a result, underinvestment hypothesis states that these firms would end up rejecting value enhancing investment opportunities if the benefits of accepting these investment projects accrue mostly to the debtholders instead of the shareholders (Myers, 1977). Firms with greater growth opportunities face greater underinvestment problem, but firms are claimed to mitigate the problem by shortening the maturity of debt (Aivazian et al., 2005a).

Mixed results are also reported. For example, Stohs and Mauer (1996) find that firms have little incentives to minimise agency costs of debt if the firms have relatively low levels of leverage. Debt maturity is found to be positively related to growth opportunities after controlling for firms' leverage. Scherr and Hulburt (2001), on the contrary, report little evidence between growth opportunities and debt maturity when the analysis controls for firm size. Similar results are reported by Deesomsak et al. (2009). No evidence is found to explain the effect of growth opportunities on debt maturity for firms in the Asia Pacific region. Firms are also reported to be unlikely to use debt maturity as an instrument to mitigate underinvestment problem (Deesomsak et al., 2009).

Lang et al. (1996) further contend that the negative relationship between debt maturity and growth only holds for firms with low Tobin's Q ratio, but not for firms with high Tobin's Q. Based on Lang et al. (1996), a number of studies incorporate the heterogenous argument in examining the relationship between corporate debt financing and investment decisions (see for example, Aivazian et al., 2005a, 2005b; Dang, 2011). Accordingly, this study recognises the firms by their corporate values or the Q ratio to further examine the negative relationship between debt maturity and underinvestment problem.

Low Tobin's Q firms are defined as firms with fewer investment opportunies and/or do not have valuable investment opportunities known to outside investors (Barclay & Smith, 1995; Lang et al., 1996; Myers, 1977). When future growth opportunities are not recognised by the market, investors are

doubtful as to whether additional fund that are raised to finance the firms investment projects would contribute positively to the shareholders' wealth. Investors are also concerned about the likelihood of managers wasting resources in these firms. To compensate the uncertainties, investors would require higher rate of return when investing in these firms. This also explains the increasing firms' cost of capital with leverage. Therefore, to mitigate these problems low Tobin's Q firms tend to use less long-term debt.

> H1: Low Tobin's Q firms maintain lower level of long-term debt
> to mitigate underinvestment problem.

On the contrary, the growth opportunities of high Tobin's Q firms are less likely to cause underinvestment problem since the good investment opportunities are recognised by outside investors. As a result, these firms can always find external funding without worrying about the firms' balance sheet (Lang et al., 1996).

> H2: High Tobin's Q firms are indifferent between short-term and
> long-term debt.

DATA AND METHODOLOGY

Sample Selection

Sample consists of Malaysian firms publicly listed on the Main board of Bursa stock exchange. 144 firms in the financial industry are excluded from the sample selection due to the differences in the financial structure and regulation as compared to other industries (Rajan & Zingales, 1995). Final sample is further reduced to 612 firms, with 7379 firm-year observations for the fiscal year covering from 1995 to 2013 after excluding all equity firms. Any firm-year observations with missing financial information are also excluded. Table 1 reports the sample firms by industry groups based on the Global Industry Classification Standard (GICS) available at the Bloomberg database. 32.19% of the sample firms consist of industrial firms, followed by firms in the materials (19.12%) and consumer discretionary (18.30%) industries.

To examine Hypotheses 1 and 2, the sample firms are divided into two subsamples. Subsample Tobin's Q < 1 consists of firms with Q ratio less than one, while subsample Tobin's Q > 1 includes of firms with Q ratio greater than 1. The concept of Tobin's Q is based on the argument that market value of a firm should approximately equal to the cost of replacing the firm's assets. Therefore, the Q ratio of a firm is measured by the firm's market value (market capitalisation + liabilities + preferred equity + minority interest or non-controlling interest)

scaled by the total asset value or the replacement value of the firm's total assets. In general, poorly managed or a firm with low corporate value (undervalued) has an average Q ratio less than 1. Conversely, a well-managed or a high corporate value firm (overvalued) would have an average Q ratio greater than unity.

Table 1
Distribution of sample firms by industry groups

Industry	Number of Firms	Percentage (%)	Number of Observations	Percentage (%)
Industrials	197	32.19	2399	32.51
Materials	117	19.12	1423	19.99
Consumer Discretionary	112	18.30	1385	18.77
Consumer Staples	77	12.58	958	12.98
Information Technology	42	6.86	437	5.92
Energy	22	3.59	210	2.85
Health Care	14	2.29	150	2.03
Utilities	9	1.47	59	0.80
Telecommunication Services	5	0.82	211	2.86
Others	17	2.78	147	1.99
Total	612	100.00	7379	100.00

Variables Selection

The data for the identified variables are also collected from the Bloomberg database. Debt maturity is measured by long-term debt ratio scaled by total debt (Antoniou, Guney, & Paudyal, 2006; Barclay & Smith, 1995). Debt with maturity greater than a year is considered as long-term debt, whereas debt with maturity less than a year is considered as short-term debt.

The market-to-book ratio (*Agency cost*) is a commonly used proxy for agency costs of debt, which measures the future growth opportunities of firms (Lang et al., 1996; Rauh & Sufi, 2010). Higher growth opportunities lead to higher agency costs (Myers, 1977). To mitigate the agency costs, firms tend to maintain less long-term, but more short-term debt (Barnea et al., 1980; Guedes & Opler, 1996; Johnson, 2003; Myers, 1977). Moreover, the negative relationship between agency costs and long-term debt is predicted to hold only for firms with low Tobin's Q, but not firms with high Tobin's Q (Lang et al., 1996). Therefore, undervalued firms (Tobin's Q < 1) are expected to have less long-term debt,

whereas overvalued firms (Tobin's Q > 1) are expected to be indifferent between short-term or long-term debt.

Control variables such as business risk, firm size, tangibility, profitability, and tax proxy are also included to account for the effects of trade-off theory and pecking order hypothesis on debt maturity structure. Business risk (*Business risk*) is measured as the standard deviation of earnings before interest and taxes (EBIT) scaled by total sales over four years. Trade-off theory argues that less risky or lower risk firms have the capacity to take up more debt to increase the firms' value and the opposite holds for risky firms. Risky firms use less long-term debt to decrease the probability of bankruptcy risk. Empirical studies find that less risky firms use long-term debt to finance their investment (Guedes & Opler, 1996; Stohs & Mauer, 1996) to take advantage of the tax shield on interest. Hence, an inverse relationship is expected between long-term debt and business risk.

Firm size (*Size*) is measured by the natural logarithm of total assets. The size of a firm is claimed to be positively related to debt maturity (Titman & Wessels, 1988; Stohs & Mauer, 1996). Large size firms tend to have lower degree of asymmetric information because large firms tend to be more established (Smith, 1977). In addition, firm size may measure the magnitude of financial distress. Large size firms are considered to have lower bankruptcy risk that enable these firms to tolerate higher levels of long-term debt financing (Chittenden, Hall, & Hutchison, 1996). Conversely, small size firms are found to prefer less long-term debt (Smith, 1977; Titman & Wessels, 1988).

Tangibility is commonly measured by net fixed assets scaled by total assets. Tangible assets (*Tangibility*) are physical form of assets that can be used as collateral against external borrowing. Tangibility is found to be positively related to debt maturity structure (Fan, Titman, & Twite, 2012; Kirch & Terra, 2012; Rauh & Sufi, 2010). Firms with higher tangibility have lower bankruptcy costs because more assets can be collateralised for borrowing in comparison to firms with lower tangible assets. Therefore, the former firms are expected to borrow more long-term debt. Moreover, for the emerging markets, tangible assets play an important role because the levels of collateralised assets determine if a firm has the capacity to borrow longer-term debt (Kirch & Terra, 2012).

Profitability (*Profitability*) is measured by return on assets (ROA). Profitable firms are expected to utilise less debt (Rauh & Sufi, 2010) due to the informational asymmetry between managers and investors (Deesomsak et al., 2009). Accordingly, firms would follow a financing hierarchy, in which retained earnings are the most preferred choice, followed by debt and equity. A negative relationship is expected between profitability and long-term debt. Tax proxy

(*Tax*) is measured as the income tax scaled by pre-tax income. Tax hypothesis suggests that leverage increases the value of the firm by reducing the taxable income. Brick and Ravid (1985), Kane, Marcus and McDonald (1985), and Stohs and Mauer (1996) argue that when firms use long-term debt, the saving from the present value of tax shield is accelerated from the increasing debt payment proportion allocated to long-term debt on an upward sloping yield curve in a healthy economy. For this reason, firms with high tax proxy are predicted to use more long-term debt.

Methodology

The dataset of this study have both cross sectional and time-series dimensions, thus it is more robust to employ panel data methodology (Akhtar, 2005). Hausman test is performed to determine either fixed or random effects panel regression better explained the dataset of this study. Results from Hausman test consistently support firm fixed effects over random effects. For brevity, only the estimates from fixed effects are reported in the following section. The firm fixed effects panel data regression is written as:

$$\frac{\text{Long term debt}_{i,t}}{\text{Total debt}_{i,t}} = \beta_0 + \beta_1 \text{ Agency cost}_{i,t} + \beta_2 \text{ Business risk}_{i,t} + \beta_3 \text{ Size}_{i,t} +$$
$$\beta_4 \text{ Tangibility}_{i,t} + \beta_5 \text{ Profitability}_{i,t} + \beta_6 \text{ Tax}_{i,t} + \gamma_i + \varepsilon_{i,t}$$

RESULTS AND DISCUSSION

Long-term Debt and Agency Costs of Debt by Corporate Value

Table 2 reports the summary statistics and mean difference of the identified variables for the full sample together with the subsamples. Overall, the sample firms are found to use less long-term debt but more short-term debt, which is consistent with previous studies (see for example, Barclay & Smith, 1995; Antoniou et al., 2006). On average, the sample firms maintain 36.43% of long-term debt and 63.57% of short-term debt in the debt structure. Low corporate value firms are found to use less long-term debt (34.1%) but more short-term debt (65.9%) as compared to high corporate value firms that have 39.4% of long-term debt and 60.6% of short-term debt in the debt structure. The difference is statistically significant at the 1% level. The low Tobin's Q firms are shown to have lower agency costs of debt than the high Tobin's Q firms, which is also significantly different at the 1% level. In addition, the undervalued firms are found to have lower risk, smaller firm size, lower profitability, but higher tangibility and tax in comparison to the overvalued firms.

Table 2
Summary statistics and mean difference test

Variables	Full Sample		Tobin's Q < 1		Tobin's Q > 1		(Tobin's Q < 1) – (Tobin's Q > 1)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean Difference	*t*-value
Long-debt debt ratio	0.3643	0.3036	0.3410	0.2847	0.3940	0.3236	–0.0532***	–7.3643
Short-term debt ratio	0.6357	0.3036	0.6590	0.2847	0.6060	0.3236	0.0302***	7.3643
Agency cost	1.2270	3.3503	0.5135	0.2279	2.1318	4.8924	–1.6183***	–18.8496
Business risk	0.0930	1.2062	0.0656	0.1851	0.1279	1.8043	–0.0623**	–1.9619
Size	5.8560	1.4230	5.7164	1.1811	6.0331	1.6639	–0.3167***	–9.1845
Tangibility	0.4121	0.2044	0.4169	0.2001	0.4059	0.2096	0.0110**	2.2792
Profitability	0.0320	0.1094	0.0178	0.0724	0.0501	0.1412	–0.0323***	–11.8874
Tax	0.1873	2.3854	0.2148	2.8741	0.1523	1.5587	0.0625	1.1919
Number of Observations	7379		4126		3253		7379	

Note: *, ** or *** indicates significance at the 90%, 95% or 99% confidence levels, respectively.

Table 3 presents the correlation analysis of the explanatory variables. The analysis suggests that the selected variables do no suffer from multicollinearity problem. This finding is further confirmed using the variance inflation factor test (mean VIF = 1.01).

Table 3
Correlation matrix of the identified variables

	Agency cost	Business risk	Size	Tangibility	Profitability	Tax
Agency cost	1.0000					
Business risk	0.0023	1.0000				
Size	0.0141	–0.0078	1.0000			
Tangibility	–0.0341***	–0.0105	0.0215*	1.0000		
Profitability	0.0273**	–0.0321***	0.1248***	–0.1035***	1.0000	
Tax	–0.0044	–0.0029	–0.0141	–0.0084	0.0122	1.0000

Note: *, ** or *** indicates significance at the 90%, 95% or 99% confidence levels, respectively.

The regression estimates that examine the effect of agency costs of debt on the long-term debt level are reported in Table 4. For the full sample, agency cost is reported to have insignificant effect on the level of long-term debt. This

finding is consistent with Deesomsak et al. (2009)'s study that find firms in Malaysia are unlikely to use debt maturity as a tool to mitigate underinvestment problem. Nonetheless, when this study recognises the sample firms by the corporate value, interesting results are reported. For subsample Tobin's Q < 1, agency cost is shown to have significant negative relationship with the level of long-term debt, at the 1% level. Supporting the theory of agency costs, these firms are found to decrease the level of long-term debt to mitigate underinvestment problem that growth firms are more likely to suffer (Myers, 1977; Barclay & Smith, 1995; Childs et al., 2005; Diomand & He, 2014; Guedes & Opler, 1996; Dennis et al., 2000; Ozkan, 2000).

Table 4
Long-term debt and agency cost of debt by corporate value

Variables	Expected Sign		Full Sample	Tobin's Q < 1	Tobin's Q > 1
	Q < 1	Q > 1			
Agency cost	−	Indifferent	−0.0012	−0.0705***	−0.0002
			(−1.40)	(−3.94)	(−0.22)
Business risk	−	−	−0.0083***	−0.0332*	−0.0078***
			(−3.63)	(−1.71)	(−3.16)
Size	+	+	0.0923***	0.0925***	0.0952***
			(17.57)	(10.13)	(12.39)
Tangibility	+	+	0.2576***	0.2832***	0.1514***
			(11.54)	(9.56)	(3.96)
Profitability	−	−	0.1685***	0.2961***	0.0802**
			(6.12)	(5.70)	(2.25)
Tax	+	+	0.0013	0.0018	0.0003
			(1.18)	(1.63)	(0.10)
Constant			−0.2855***	−0.2729***	−0.2441***
			(-8.51)	(−4.87)	(−4.73)
Firm fixed effect			Yes	Yes	Yes
Industry fixed effect			Yes	Yes	Yes
Year fixed effect			Yes	Yes	Yes
R-squared			0.1594	0.1022	0.2002
Number of Observations			7379	4126	3253

Note: The *t*-values are reported in the parentheses. *, ** or *** indicates significance at the 90%, 95% or 99% confidence levels, respectively.

This is because low Tobin's Q firms suffer from investors' lack of confidence in the ability of these firms to invest in value added investment projects (Myers, 1977; Barclay & Smith, 1995; Lang et al., 1996). Since the growth opportunities of low Tobin's Q firms are not recognised by the capital markets, these firms have to tolerate increasing cost of capital as leverage increases (Lang et al., 1996). Therefore, to mitigate the problem these firms tend to use less long-term debt in the debt structure. The significant negative relationship between agency cost and long-term debt is therefore, supporting Hypothesis 1.

On the contrary, for subsample Tobin's Q > 1 the agency cost variable is insignificant. High Tobin's Q firms are found to be indifferent with the debt maturity decision as conjectured in Hypothesis 2. When firms are known to the market to have good investment opportunities, these firms can always find external funding without worrying about the firms' balance sheet (Lang et al., 1996). In other words, the growth opportunities of high Tobin's Q firms are less likely to cause underinvestment problem since the good investment opportunities are recognised by the outside investors.

On the other hand, the firms' (full sample and subsamples) levels of long-term debt are consistently and significantly affected by business risk, firm size, tangibility and profitability. Consistent with the trade-off theory, firms with higher level of business risk are found to maintain less long-term debt because of the increasing financial distress as the business risk increases. Furthermore, large firms are more likely to maintain higher level of long-term debt. This positive relationship also supports the trade-off theory. Large firms are more mature, well established and have lower level of asymmetric information (Smith, 1977) as well as bankruptcy risk that enable these firms to tolerate higher level of long-term debt financing (Chittenden et al., 1996).

The significant and positive coefficient of the tangibility variable is consistent with the expected sign. Firms with higher tangible assets are found to borrow more long-term debt because more assets can be used as collateral against the borrowing (Fan et al., 2012; Kirch & Terra, 2012), which also implies lower bankruptcy risk. However, the profitability variable loads positive. Though the reported positive relationship between profitability and long-term debt is inconsistent with the expected sign, the finding is still justifiable in accordance to the financing hierarchy argument of pecking order hypothesis. When profitable firms have insufficient or fully utilised their internal resources to finance their investment opportunities, these firms would seek external financing. Long-term debt would be the next preferred financing choice instead of equity, and hence explains the positive coefficient of profitability.

In addition, tax is found to be insignificant, which is inconsistent with previous studies. Previous studies argue that firms use long-term debt to benefit from the present value of tax shield and the savings is accelerated on an upward sloping yield curve (Brick & Ravid, 1985; Kane et al., 1985; Stohs & Mauer, 1996), but it is not the case for Malaysia firms. Potentially, the insiginificant relationship can be explained by the low effective tax rate and flat yield curve in Malaysia.

Robustness Check

The analysis is repeated by excluding the financial crisis years of 1997 and 2008 to control for any potential bias driven by the financial shocks. The number of observations of the full sample reduce to 6,643 firm-year observations. Subsample Tobin's Q < 1 and Tobin's Q > 1 have 3595 and 3048 firm-year observations, respectively. Results are reported in Table 5. The negative relationship between agency cost and long-term debt remains significant at the 1% level for firms in subsample Tobin's Q < 1. On the other hand, firms in subsample Tobin's Q > 1 are indifferent with the debt maturity decision. These results further support the arguments of Hypotheses 1 and 2. Moreover, the results of the control variables are found to be qualitatively similar to those reported in Table 4.

Also for robustness purpose, the subsamples are re-categorised by the average Tobin's Q value of individual firm over the observation period to control for firms that have both observations in Tobin's Q < 1 and Tobin's Q > 1 during the sample period. A firm is considered as a low Tobin's Q firms if the average Tobin's Q over the observation period is less than one, and the opposite for high Tobin's Q firms. This method reduces the subsample size of Tobin's Q < 1 to 1494 firm-year observations. But, subsample Tobin's Q > 1 now has 5888 firm-year observations. Table 6 reports consistent results. Low Tobin's Q firms are found to maintain lower level of long-term debt when agency cost increases. Consistently, the negative coefficient of agency cost is significant at the 1% level, but the coefficient is found to be insignificant for the high Tobin's Q firms. High corporate value firms are indifferent with the debt maturity decision. Again, these results support the arguments of Hypotheses 1 and 2 of this study.

Table 5
Excluding observations during financial shock (Year 1997 and 2008)

Variables	Expected Sign		Full Sample	Tobin's Q < 1	Tobin's Q > 1
	Q < 1	Q > 1			
Agency cost	−	Indifferent	−0.0013	−0.0657***	−0.0004
			(−1.48)	(−3.31)	(−0.40)
Business risk	−	−	−0.0080***	−0.0470**	−0.0073**
			(−2.62)	(−2.39)	(−2.22)
Size	+	+	0.0913***	0.0911***	0.0928***
			(16.51)	(9.02)	(11.60)
Tangibility	+	+	0.2594***	0.2896***	0.1518***
			(10.91)	(9.02)	(3.81)
Profitability	−	−	0.1753***	0.2944***	0.0839**
			(6.02)	(5.30)	(2.24)
Tax	+	+	0.0014	0.0019*	0.0053
			(1.20)	(1.67)	(1.31)
Constant			−0.2824***	−0.2714***	−0.2319***
			(−7.99)	(−4.40)	(−4.31)
Firm fixed effect			Yes	Yes	Yes
Industry fixed effect			Yes	Yes	Yes
Year fixed effect			Yes	Yes	Yes
R-squared			0.1629	0.1059	0.1993
Number of Observations			6,643	3,595	3,048

Note: The *t*-values are reported in the parentheses. *, ** or *** indicates significance at the 90%, 95% or 99% confidence levels, respectively.

However business risk becomes insignificant for the low Tobin's Q firms, but is negatively related to long-term debt for the high Tobin's Q firms at the 1% level. Potentially, these results may suggest that the relative impact of agency cost outweighs the impact of business risk in affecting the levels of long-term debt among the low Tobin's Q firms. As for the high Tobin's Q firms, the negative impact on the levels of long-term debt is relatively driven by business risk instead of the firm's underinvestment problem. The results of the other

control variables are found to be qualitatively similar to the results reported in Table 4.

Table 6
Subsamples of firms by average Tobin's Q over the sample period (1995 to 2003)

Variables	Expected Sign		Full Sample	Tobin's Q < 1	Tobin's Q > 1
	Q < 1	Q > 1			
Agency cost	−	Indifferent	−0.0012	−0.0262***	−0.0008
			(−1.40)	(−4.39)	(−0.85)
Business risk	−	−	−0.0083***	0.0235	−0.0084***
			(−3.63)	(0.68)	(−3.59)
Size	+	+	0.0923***	0.0854***	0.0927***
			(17.57)	(5.94)	(16.28)
Tangibility	+	+	0.2576***	0.2089***	0.2697***
			(11.54)	(4.24)	(10.27)
Profitability	−	−	0.1685***	0.3334***	0.1507***
			(6.12)	(4.28)	(5.07)
Tax	+	+	0.0013	−0.0005	0.0027*
			(1.18)	(−0.32)	(1.78)
Constant			−0.2855***	−0.2334***	−0.2891***
			(−8.51)	(−2.71)	(−7.83)
Firm fixed effect			Yes	Yes	Yes
Industry fixed effect			Yes	Yes	Yes
Year fixed effect			Yes	Yes	Yes
R-squared			0.1594	0.1212	0.1660
Number of Observations			7379	1491	5888

Note: The *t*-values are reported in the parentheses. *, ** or *** indicates significance at the 90%, 95% or 99% confidence levels, respectively.

CONCLUSION

The theory of agency costs argues that firms with high-growth opportunities tend to use less long-term debt, but more short term debt to mitigate underinvestment problem. In this study, the negative relationship is examined whether the relationship still holds if the firms are recognised by the corporate values that is

measured by the commonly used Tobin's Q. Using a sample of 612 Malaysia public listed firms, this study finds that low Tobin's Q firms are likely to use less long-term debt to mitigate underinvestment problem. Potentially, the firms' corporate value either lack of market recognition or poorly managed, and thus increases the cost of debt. Contrary, the negative relationship does not hold for firms with Tobin's Q greater than one. These firms are found to be indifferent with the debt maturity decision. In addition, the control variables consistently provide significant evidence to support the agency costs and trade off theories. In brief, this study provides additional insight to determinants of debt maturity by highlighting the importance of recognising the heterogeneity of firms, in this case the corporate value in relation to the agency costs of debt. Evidence of this study also contributes to the literature from the developing market's perspective.

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