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DEBT MATURITY AND STOCK RETURNS: AN INTER-SECTORAL COMPARISON OF MALAYSIAN FIRMS

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ABSTRACT

This firm-level study examines whether the effects of financial leverage on stock returns of 12 Bursa Malaysian sectors can be explained by debt maturity. When total leverage is used, only 3 out of 12 sectors exhibit a significant relationship with stock returns. However, when the leverage is divided by using short-term and long-term debt, regressions in 9 out of 12 sectors reveal that either form of disaggregated leverage exhibits a significant relationship with returns at least at a 5% significance level. The results suggest that the return-leverage relationship could be indirect in terms of maturity. The panel regressions also show that sector-specific analysis is more meaningful and practical due to the mixed relationship identified. The empirical conclusions are further supported by using two indicators of financial leverage, i.e. book leverage and market leverage. The results are robust when the firm and the time effects are taken into consideration.

Keywords: Financial leverage, debt maturity, stock returns, sector-specific firm-level analysis.

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INTRODUCTION

In the literature of financial leverage, different proportions in capital structure are generally claimed to have different impacts on the firm's value, financial performance or profitability of a firm. Despite various capital structure theories that have tried to rationalise the impact of leverage, past literature often provides mixed empirical evidence on the role of leverage in return predictability. Among some well-known studies, Hamada (1972), Masulis (1983), and Bhandari (1988) in early years found that stock returns are positively associated with leverage. Fama and French (1992), as well as Strong and Xu (1997), later discover the negative relationship between book leverage and returns, but the relationship becomes insignificant when book-to-market is considered. Gomes and Schmid (2010) find returns to be positively related to market leverage, but have no effect when book leverage is used. On the other hand, the works by George and Hwang (2010), and later by Muradoglu and Sivaprasad (2012), suggest a negative relation between leverage and returns.

Over the years, many studies have been proposing a reasonably straight forward relationship between financial leverage and stock returns, by considering leverage as a whole. Nevertheless, other than how much debt is owed by firms, an equally important issue is when the debt should be repaid to debt holders. Existing literature has acknowledged that the maturity decisions could carry various implications on the firm's performance and its value. Theories and empirical findings have suggested that maturity selection is a crucial financing decision. Kose (2012) argues that the opposite directions separated by maturity help explain why the relation between leverage and returns has been mixed in previous studies. The study shows that the positive short-maturity return spread is significant and not explained by factors like size or book-to-market ratio.

Using micro data across major Bursa Malaysian sectors, this study aims to provide empirical evidence of the relationship between financial leverage and stock returns in consideration of debt maturity by using short-term and long-term debt. As highlighted, the impact of financial leverage is often found mixed on the firm's returns. This study tries to explain such mixed results by adopting sector-specific analysis and by disaggregating the total leverage into long maturity (more than a year) and short maturity (less than a year). If there is discrepancy between the impacts of long-term and short-term leverage, investors, managers, or financial policy makers should be more aware of the choices of debt maturity other than purely focusing on the conventional debt-equity capital structure decisions.

Debt maturity plays a role if firms are to consider flexibility in financing, cost of financing, and refunding risks. The liability structure of firms may also be purposely aligned to the asset structure. A firm that funds its projects with short-term debt may face financial stress if the debt cannot be extended, or the cost of debt unexpectedly surges. Similarly, a firm that finances its short-term investments with long-term debt may unnecessarily risk mismanagement of resources after project life. This is generally known as maturity mismatch and widely claimed as one of the main factors that exaggerated the Asian financial crisis in the 1990s. This paper acknowledges the importance of debt maturity decision from the perspective of shareholders' value creation by considering the general current and non-current definitions of debt in a firm's financial statements.

Though debt maturity structure has yet to receive extensive attention, in recent years, researchers have been interested in how the choice between short-term and long-term debt is determined. The theories of debt maturity were first considered during the 1980s and the empirical studies to assess the related hypotheses only started during the mid-1990s (for e.g. Barclay & Smith, 1995; Stohs & Mauer, 1996; Stephan, Talavera, & Tsapin, 2011; Terra, 2011). Based on theories, different debt maturities are claimed to have their respective advantages and disadvantages in the context of firm value creation. For instance, the tax-based theories explain the increasing present value of tax benefits due to long-term debt. Assuming a tax advantage to corporate borrowing, Brick and Ravid (1985, 1991) show that firm value is increasing in the amount of long-term debt when the term structure is upward sloping. Based on the tax minimisation objective, the interest tax shield can be enhanced by increasing the proportion of debt payments allocated to long-term debt.

In contrast, the theories based on signalling, information asymmetry, and agency costs generally favor the use of short-term debt (see Myers, 1977; Barnea, Haugen, & Senbet, 1980; Flannery, 1986; Leland & Toft, 1996). Myers (1977) argues that maturity matching can control agency conflicts between shareholders and debtholders by ensuring that debt level are reduced to match the decline in the value of assets in place. At the same time, short-term debt is less sensitive to shifts in the risk and imposes more frequent monitoring by investors. It also mitigates the underinvestment problem or debt overhang in the firm's investment decisions (Myers, 1977; Diamond & He, 2014). Studies by Titman and Wessels (1988), Barclay and Smith (1995), and Guedes and Opler (1996) support such arguments and find that smaller firms with more growth opportunities have a smaller proportion of long-term debt. Besides, higher business risk stocks in the industries with higher earnings volatility tend to have higher short-term debt.

The signalling explanation states that issuance of short-term debt is a positive signal of the high-quality firms with low credit risk (Flannery, 1986; Diamond, 1991). Flannery argues that a firm's choice of debt maturity structure can signal insiders' information about firm quality. Undervalued firms choose high priority claims (e.g. secured short-term debt) to indicate their creditworthiness, while their low-quality counterparts prefer long-term debt because they cannot afford to roll over short-term debt due to positive transaction costs. Debt maturity is therefore negatively related to firm quality, strongly supported by the findings of Goyal and Wang (2013). Chen, Xu and Yang (2012) further conclude that firms with high systematic risk generally favour longer debt maturity.

While short-term debt allows for a reduction in borrowing costs when a firm receives good news and the debt is refinanced, Diamond (1991) argues that short-term debt exposes the firm to liquidity risk and develops a model focusing on the liquidity risk associated with short-term debt. The trade-off leads to interesting cross-sectional predictions and arguments about the type and maturity of debt that firms employ conditional on their private information on credit rating (see Custódio, Ferreira, & Laureano, 2013; Gopalan, Song, & Yerramilli, 2014). He and Xiong (2012) further warn that short-term debt may intensify the rollover risk of firms when the market liquidity premium becomes high. Johnson (2003) also proposes that firms trade off the cost of underinvestment problems against the cost of liquidity risk when selecting short maturity.

Decisions on debt maturity also gain considerable attention from the macro-level perspective (see Kim, Mauer, & Stohs, 1995; Diamond & Rajan, 2001; Antoniou, Guney, & Paudyal, 2006; Benmelech & Dvir, 2013). As such, in understanding the leverage maturity-returns relationship, the industry effect should not be ignored due to its significance on firm performance (Cheng, Fung, & Lam, 1998; Goddard, Tavakoli, & Wilson, 2009). Even since very early years, Schwartz and Aronson (1967) and Baker (1973) have agreed that financial leverage ratios across different firms within a similar industry show similarity. Therefore, firms are found to actively adjust their debt ratios toward the industry average (Hovakimian, Opler, & Titman, 2001). Zhang (2012) concludes that pooling all firms from different industries in a regression analysis may simplify the estimation process but indeed ignore the industry-related heterogeneities, which is not financially sensible.

The similarity of firms' financial structures within a specific industry can be partly explained by industry-related factors (Mackay & Phillips, 2005). Factors that have received research attention include, but are not limited to, product market strategy, characteristics of product inputs (see Harris & Raviv, 1991; Campello, 2003), concentration of supplier and customer (see Kale & Shahrur, 2007), barrier of entry (Hou & Robinson, 2006), regulation (Ovtchinnikov, 2010), etc. For instance, a decline in firm leverage is found following deregulation. This is consistent with a study by Muradoglu and Sivaprasad (2012), which further reveals the doubt that mixed empirical evidence on firm leverage and stock returns is mainly attributable to ignorance of industry leverage.

While many empirical studies have been done in order to validate the various theories by looking into the determinants of debt maturity, this paper attempts to focus on the possible impacts of maturity on stock returns, which is a direct and real return to shareholders. Based on the existing literature, the mixed impacts of debt with different maturities on firm value could therefore be expected. For example, long-term debt should be in a positive relationship with returns under normal yield shapes due to tax benefits. However, the effect could be more than offset by the underinvestment cost as proposed by the agency theory. Similarly, higher short-term debt is desirable in reflecting the credibility of a firm, but at the same time accompanied by higher liquidity risk. In respect to the context of industry characteristics, long-term leverage should be more favourable in the capital-intensive industries, which usually involve long-life investment assets. Short-term leverage is expected to be more desirable, from the perspective of maturity matching, in certain project-based industries, which usually emphasise short-term rollovers for working capital needs.

Generally, this study emphasises the relationship between firm-level financial leverage and stock returns. Specifically, it attempts to address a basic yet regularly overlooked issue by disaggregating financial leverage into short-term and long-term debt. If the impacts of leverage on returns are found to be due to maturities, market practitioners and researchers should manage borrowings with greater care. We examine the return-leverage relationship within the 12 selected sectors as the literature has suggested that pooling all firms would not be practical in terms of financing policy applications. Both indicators, book leverage and market leverage, are covered to provide a more comprehensive set of empirical evidence. Last but not least, this study looks into the Malaysian market, as one of the highest market capitalisations among emerging markets, which is not covered much in previous research. The rest of this paper is organised as follows: methodology and data; empirical results and discussion; and conclusion with recommendations.

METHODOLOGY AND DATA

Empirical Model

In this study, the hypothesis is that a relationship exists between stock returns and firm-level financial leverage. The common direct relationship can be expressed as:

$$R_{it} = \beta_1 LEV_{it} + \varepsilon_{it} \quad (1)$$

where R_{it} is the firm-level adjusted returns, LEV_{it} is the firm-level financial leverage, and ε_{it} is the error term. Besides the conventional definition of firm leverage, it is of interest of this study to determine the separate impact of long-term leverage (more than a year) and short-term leverage (less than a year) on equity returns, i.e.:

$$R_{it} = \beta_0 + \beta_1 LLEV_{it} + \beta_2 SLEV_{it} + \varepsilon_{it} \quad (2)$$

where $LLEV_{it}$ is the long-term financial leverage and $SLEV_{it}$ is the short-term financial leverage. However, there are other factors that would affect the stock returns' expectations as suggested by the previous literature.

First, the impact of overall market conditions on firm-level stock returns can be taken care of by using the market risk premium as a proxy for overall macro environment impacts. Most of the firm-level returns are expected to be positively related to market risk premium. Second, book-to-market ratio can be used as a risk factor to account for the difference between book and market equity, which can also be used as a proxy to growth opportunities (see Rajan & Zingales, 1995). Previous studies largely confirm its importance as the determining factor of stock returns (Rosenberg, Reid, & Lanstein, 1985; Chan, Hamao, & Lakonishok, 1991; Fama & French, 1992; Penman, Richardson, & Tuna, 2007; Dempsey, 2010). Additionally, size effect is found to be significant in many stock return studies in the U.S. market (see Banz, 1981; Basu, 1983; Fama & French, 1992) and Asian markets (see Wong, 1989; Rouwenhorst, 1999; Shum & Tang, 2005). Lastly, the price-to-earnings ratio, or the reciprocal of earnings yield, is a conventional stock valuation that has drawn attention since early years (Basu, 1977, 1983; Jaffe, Keim, & Westerfield, 1989). The ratio contains effects on the value strategy (Li, 2009) and the empirical evidence suggests a significant predictive power of earnings yield. Moreover, the ratio can demonstrate the efficiency of markets, which is especially a controversial issue in emerging markets. Thus the models extended from Equation (1) and Equation (2) respectively can now be expressed as:

$$R_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_3 MRP_t + \beta_4 SIZE_{it} + \beta_5 BM_{it} + \beta_6 EY_{it} + \varepsilon_{it} \quad (3)$$

$$R_{it} = \beta_0 + \beta_1 LLEV_{it} + \beta_2 SLEV_{it} + \beta_3 MRP_t + \beta_4 SIZE_{it} + \beta_5 BM_{it} + \beta_6 EY_{it} + \varepsilon_{it} \quad (4)$$

where R_{it}, LEV_{it}, $LLEV_{it}$, $SLEV_{it}$ and ε_{it} are as defined above, MRP_t is the market risk premium, $SIZE_{it}$ is the firm size, BM_{it} is the ratio of book-to-market value, and EY_{it} is the earnings yield.

Estimation Methods

In this sector-specific analysis, the relationship between leverage and returns is examined on individual stocks by adopting panel regressions. According to a survey by Petersen (2009), 42% of the finance papers did not adjust the standard errors for possible dependence in the residuals. In normal finance data sets, there are two generally seen forms of dependence. Firm effect is seen when the residuals of a given firm are correlated across several years. Likewise, if the residuals of a given year are correlated across different firms, time effect is noticed. Unawareness of these correlations of error terms across firms or across time may cause the estimated standard errors to be biased, so as the analysis results. T-statistics can be over- or underestimated and make the inferences less meaningful. This study will contribute to the empirical evidence by considering both the firm and the time effects by clustering the standard errors accordingly in panel regressions to avoid biased standard errors if there is presence of firm fixed effect or time effect (Petersen, 2009). If the standard errors estimated under different adjustments are found to be robust, then the robustness of this leverage maturity analysis can be verified.

The Data

Financial data covering from 1986 to 2012 for 815 listed firms in the Main Market of Bursa Malaysia is collected from Thomson Reuters DataStream. The firms are grouped into 12 sub-sectors with codes according to the Industrial Classification Benchmark of Dow Jones and the FTSE (see Table 1). As industry classification is a good proxy for business risks and industry factor has high influence on leverage ratios (Bradley, Jarrell, & Kim, 1984; Hou & Robinson, 2006), panel regressions are run for data across different industries. All financial companies, including banks, investment companies, insurance, and life assurances, are excluded because the debts found in their balance sheets do not carry similar financing meanings as for ordinary nonfinancial firms. The analysis for these financial firms should be treated in a different way and are thus not covered by this study. Due to the filtering process, the sample is not free of survivorship and selection bias. In some circumstances, there might be missing values in the time series of firm characteristics used to run the regressions.

Generally, financial leverage is defined as the ratio of debt, including but not limited to, total assets to total equity, total liabilities to total equity, total debt to total equity, or total long-term debt to total equity. Most of the previous studies focus on a single measure of leverage due to the robustness claims on key results under different alternative (but similar) sense definitions. Particularly, this study defines financial leverage as total financing to total equity, as shown in Equation (5).[1]

$$\text{Leverage, } LEV_{it} = \left[\frac{\text{Total Equity + (Long-term Debt + Short-term Debt)}}{\text{Total Equity}} \right]_{it} \quad (5)$$

As discussed in this study of leverage maturity, the firm leverage will be further broken down into long-term and short-term as shown in Equation (6) and Equation (7) respectively:

$$\text{Long-term Leverage, } LLEV_{it} = \left[\frac{\text{Total Equity + Long-term Debt}}{\text{Total Equity}} \right]_{it} \quad (6)$$

$$\text{Short-term Leverage, } SLEV_{it} = \left[\frac{\text{Total Equity + Short-term Debt + Current Portion of Long-term Debt + Long-term Debt}}{\text{Total Equity}} \right]_{it} \quad (7)$$

The leverage is then adjusted to accommodate market value and book value, where book leverage and market leverage can be calculated. Accounting equity is used as the total equity to compute book leverage, while market capitalisation is substituted as the total equity to compute market leverage. In the empirical studies of financial leverage or capital structure, either book leverage or market leverage is widely adopted.[2] In this study, both measures are considered and reported.

Book leverage represents cash flows generated by the financing activity and refers to assets already in place. In contrast, market leverage is important in presenting future growth opportunities (Myers, 1977). Since market values are difficult to predict, supporters of book leverage do not agree that market leverage is suitable as a guide for financial policy. It is also not a usual practice to rebalance leverage in response to market fluctuations (Graham & Harvey, 2001). Nevertheless, advocates of market leverage argue that book equity is merely a plugged accounting number and is not much relevant to managerial decisions (Welch, 2004). The forward-looking market is more critical than the backward-looking market. Therefore, there is no reason as to why these two measures should match and be interpreted as the same (Barclay, Morellec, & Smith, 2006).

The dependent variable of interest is the firm-level adjusted stock returns. Previous studies have used various proxies of returns, such as return on assets (Hall & Weiss, 1967), accounting profit (Hamada, 1972), inflation-adjusted returns (Bhandari, 1988), risk-adjusted returns (Dimitrov & Jain, 2008; Korteweg, 2010), and abnormal returns (Muradoglu & Sivaprasad, 2012). This study adopts the adjusted firm-level stock returns in excess of the risk-free rate because it is straightforward and could be easily applied.

Control variables are calculated using the annual data covering the sample period. Market risk premium is the excess return of the market portfolio to the risk-free rate, where the market index FBMKLCI is used as the proxy of overall market portfolio and the market deposit rate is taken as the risk-free rate. Firm size is commonly represented by a firm's market value, which is taken as the natural logarithm of market capitalisation or market value of equity. Market capitalisation is computed by multiplying the closing share price by the total number of ordinary shares outstanding. The book-to-market value is measured by dividing a company's net asset per share by the closing share price. Earnings yield, which represents the firm's accounting profitability to market capitalisation, can also be obtained by calculating the ratio of earnings per share-to-share price.

EMPIRICAL RESULTS AND DISCUSSION

Table 1 displays the descriptive statistics of adopted variables of interest and control variables employed in the firm-level analysis. Tables 2 and Table 3 mainly report the regression results with the respective adjusted standard errors clustered by firm. Leverage is represented as book leverage in Table 2 and total market leverage in Table 3. In each table, regression results using total leverage and disaggregated leverage (into long-term and short-term) are reported for the selected sectors.

As can be observed from the overall results presented in Table 2 and Table 3, leverage exhibits a significant relationship with stock returns in most of the sectors when it is defined as total leverage, short-term leverage, or long-term leverage. This is partly consistent with the previous literature such as by Hamada (1972), Masulis (1983), Bhandari (1988), George and Hwang (2010), and Muradoglu and Sivaprasad (2012), that total leverage has a direct significant relationship with returns. The results also suggest that the control variable of book-to-market may not be able to fully capture the effects of financial leverage on stock returns alone, as suggested by some previous researchers (see Fama & French, 1992; Strong & Xu, 1997; Penman et al., 2007; Lewellen, 2015). The mixed impacts of financial leverage across sectors confirm the importance of sector-specific analysis. This is

consistent with claims that much of the variation in firm leverage can be explained by industry classifications (Baker, 1973; Bradley et al., 1984; Hovakimian et al., 2001; Mackay & Phillips, 2005; Muradoglu & Sivaprasad, 2012; Zhang, 2012). This could also be the factor to which the mixed empirical results are attributed. If the analysis is carried out in an aggregate manner by grouping all firms, the results may not provide meaningful inferences.

The results also ratify that the use of market leverage and book leverage in such a study is equally important as both exhibit significance in the analysis but may carry different impacts in terms of magnitude of effects and signs of coefficients. As indicated in Tables 2 and 3, control variables in the models are mostly significant or within expectations. Market risk premium exhibits a strong direct relationship to stock returns as claimed by most of the empirical findings whereas for size and earnings yield, the impacts and significance levels show some mixes. For some industries, investors value growth more than value. For others, the opposite holds true. Overall results confirm the validity of our model specifications.

As shown in Table 2, when total book leverage is used, only two out of twelve sectors exhibit a significant relationship with stock returns at least a 5% significance level. They are food and beverage and technology. In these two sectors, aggregated book leverage provides a better guide in financing policy. The negative relationship reveals that firms within these two sectors should reduce the total leverage level at best to improve shareholders' returns. The other nine sectors, at the same time, indicate that total leverage does not show a significant relationship with returns after controlling for the previously discussed factors. Firm size, book-to-market, earnings yield, and market risk premium serve to become better determinants for stock returns across industries.

Nevertheless, Table 2 also reveals that in order to better understand the impact of leverage, it should at least be divided into two simple classifications, i.e. short-term and long-term. In the sectors of chemical, construction and materials, automobile and parts, travel and leisure, utilities and telecommunication, long-term leverage exhibits a negative relationship with returns. Only the retail sector exhibits a positive relationship whereas basic resources, industrial goods and services, food and beverage, personal household and goods, real estate, and technology do not show a significant relationship. However, in the sectors of chemical, and automobiles and parts, short-term leverage shows a positive association with returns while in basic resources and real estate, it shows a negative association. In other words, in eight out of 12 sectors, leverage impact is only identified when it is disaggregated into long-term and short-term leverage. The leverage impact is

not fully absorbed by the other control variables when it is specified in different maturities.

When market leverage is adopted, Table 3 suggests a consistent conclusion on the importance of debt maturities. Only the sector of utilities and telecommunication shows that total leverage has an important direct impact on stock returns. However, as many as eight out of 12 sectors reveal that disaggregated leverage, in either form of long-term or short-term, carries a significant relationship with returns. Basic resources and retail sectors indicate that long-term leverage has a positive correlation with returns. Construction, automobile and parts, travel and leisure, and utilities and telecommunication show the opposite. Short-term leverage, at the same time, shows a positive relationship with returns in automobile and parts, and travel and leisure, but is negative in industrial goods and services, and real estates.

When the results are analysed on a sectoral basis (referring to both Table 2 and Table 3), disaggregated book leverage is dominant in chemical sectors, i.e. negative long-term leverage impact accompanied with a positive short-term leverage impact on returns. Returns are less correlated with market value of leverage. The coefficient of long-term leverage is −0.0520 whereas the short-term leverage coefficient is +0.0344. Both are at a 1% significance level. Such relationship implies that a unit increase in long-term leverage (or 100% by definition) would associate with a decrease of 5.2% in annual return on average. Nevertheless, an increase of short-term leverage by 100% would see an increase of average annual return by 3.44%.

The similar relationships are found in the construction and materials sector, but are significant for both book leverage and market leverage. Long-term leverage is not favourable with a coefficient of −0.0881 and −0.0691 as compared with a short-term leverage of +0.0314 and +0.0142. The positive effect of short-term debt over long-term debt, for both book and market measures of leverage, is perhaps consistent with the nature of the construction business, which usually rolls over the borrowed funds during stages of projects rather than having its own huge cash pile in place ready for use from time to time. Having long-term funds in place to finance short-term rollovers could be viewed as inefficient capital management. Automobile and parts displays the identical characteristics. Long-term leverage carries a negative impact with coefficients of −0.2755 and −0.1410 for book and market leverage respectively, while the short-term leverage coefficients are 0.1790 and 0.1023.

Table 1
Descriptive statistics of each sector

Sector (Code)	Chemical (1300)	Basic resources (1700)	Construction and materials (2300)	Industrial goods and services (2700)	Automobile and parts (3300)	Food and beverage (3500)	Personal and household goods (3700)	Retail (5300)	Travel and leisure (5700)	Utilities and telecommunication (6500 and 7500)	Real estate (8600)	Technology (9500)
Return												
Mean	0.0180	0.0061	-0.3751	-0.0039	0.0094	0.0858	0.0070	0.0512	0.0801	0.0989	0.0321	0.0163
S.D.	0.3880	0.4978	0.4559	0.4351	0.4390	0.4416	0.4823	0.5295	0.6021	0.5188	0.5053	0.6315
Minimum	-0.8970	-0.9945	-1.0318	-0.9901	-0.9373	-0.9464	-1.0019	-0.8722	-0.8962	-0.9723	-1.0028	-0.9310
Maximum	1.1750	1.8850	1.7235	1.4772	1.5536	2.8715	3.7766	3.1776	4.7150	2.4534	2.6012	3.3199
Long-term Leverage												
Mean	1.3028	1.3272	1.2542	1.2435	1.1387	1.1643	1.1652	1.5375	1.4691	1.8048	1.2857	1.3090
S.D.	1.8090	0.9396	0.4619	0.5105	0.2098	0.5351	0.3442	1.7768	0.7193	0.8573	0.5563	0.7234
Minimum	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Maximum	25.9844	16.6097	6.2932	7.9263	2.3462	10.4222	4.5674	18.8165	8.5652	4.3798	7.6578	8.1187
Short-term Leverage												
Mean	1.5894	1.5819	1.4569	1.4006	1.2688	1.2686	1.3631	1.5624	1.4202	1.3131	1.2092	1.3641
S.D.	2.5247	1.0203	0.8474	0.6878	0.4476	1.0427	0.5660	1.3012	1.6913	1.3892	0.3666	0.8145
Minimum	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Maximum	31.6474	15.6264	8.8299	9.3644	4.8381	28.7403	7.9995	11.9088	30.4552	19.8305	5.0101	9.4473
Book to Market												
Mean	1.1878	1.3582	1.4423	1.3627	1.8091	1.0782	1.5469	1.2719	2.6458	0.8461	1.7048	1.0321
S.D.	0.9222	1.0884	1.0644	0.9676	2.1262	0.8842	1.5758	1.0018	8.2723	0.5889	1.2679	0.7596
Minimum	0.0596	0.0333	0.0174	0.0285	0.1518	0.0545	0.0155	0.0728	0.0140	-0.1705	0.0096	0.0284
Maximum	5.8449	6.9696	7.4218	8.0641	13.0418	10.0470	14.3403	5.9513	76.2365	3.2930	7.6376	4.4344

(*continued on next page*)

Table 1: (*continued*)

Sector (Code)	Chemical (1300)	Basic resources (1700)	Construction and materials (2300)	Industrial goods and services (2700)	Automobile and parts (3300)	Food and beverage (3500)	Personal and household goods (3700)	Retail (5300)	Travel and leisure (5700)	Utilities and telecommunication (6500 and 7500)	Real estate (8600)	Technology (9500)
Firm size												
Mean	12.2878	12.1868	11.8094	11.7251	11.9755	12.6315	11.3229	12.6054	13.5541	14.659	12.2390	12.286
S.D.	1.4957	1.1281	1.3561	1.3827	1.5359	1.4091	1.4653	1.3734	1.5877	1.9599	1.0552	1.3908
Minimum	9.1661	8.8893	8.3891	8.5811	9.3057	9.6561	8.4791	8.6305	9.7780	9.7241	8.9753	7.6285
Maximum	15.4530	15.6269	15.8510	17.8335	15.9424	17.6132	16.3853	15.743	17.5393	17.621	15.4789	15.8813
Earnings Yield												
Mean	0.0316	0.0247	-0.0464	0.0264	0.0513	0.0461	0.0039	-0.0274	0.0677	0.027	0.0002	-0.1111
S.D.	0.2063	0.2671	0.6555	0.2367	0.2306	0.1913	0.3238	0.7038	0.5221	0.192	0.4373	0.7979
Minimum	-1.9977	-2.2299	-16.8636	-2.3109	-1.8411	-3.1649	-2.3345	-4.4133	-1.5865	-1.4686	-10.6041	-6.7970
Maximum	0.7686	1.1845	1.9031	0.9932	0.4946	1.5923	2.5742	8.3915	6.2035	0.2915	0.6619	1.5158
Market Risk Premium												
Mean	0.0430	0.0363	0.0428	0.0505	0.0506	0.0439	0.0551	0.0416	0.0353	0.0458	0.0368	0.0462
S.D.	0.2435	0.2440	0.2415	0.2354	0.236	0.2407	0.2338	0.2446	0.2495	0.2424	0.2476	0.2415
Minimum	-0.5041	-0.5041	-0.5041	-0.5041	-0.5041	-0.5041	-0.5041	-0.5041	-0.5041	-0.5041	-0.5041	-0.5041
Maximum	0.4011	0.4011	0.4011	0.4011	0.4011	0.4011	0.4011	0.4011	0.4011	0.4011	0.4011	0.4011
Number of observation	197	474	930	1285	210	913	553	285	373	188	742	240

In travel and leisure, both long-term book and market leverage carry adverse impacts, having coefficients of −0.0634 and −0.0523 respectively. However, short-term leverage is at least harmless where short-term market leverage shows a positive relationship of +0.0664 at a 5% significance level. It is also similarly exhibited in the sector of utilities and telecommunication. The impacts of long-term book and market leverage stand at −0.0629 and −0.0844 respectively at a 5% significance level. Short-term leverage, however, does not show any significant coefficients. The findings are not consistent with the consensus understanding that the sectors are normally associated with long-term infrastructure investment, financed mainly by long-term debt, accompanied by long-term stable returns. Such findings suggest that the sector in the emerging countries like Malaysia may perform differently from those in developed markets. In contrast, short-term leverage is more favourable perhaps due to the positive signals of firm creditworthiness supported by the nature of stable earnings with low liquidity risk.

In contrast, in the basic resources sector, short-term leverage is not favourable as compared to long-term leverage. The negative associations are found at −0.0459 for short-term book leverage and at −0.0409 for market leverage. At the same time, long-term market leverage shows a positive relationship of +0.0669. Such an observation is perhaps due to the fact that many firms are operating in the vulnerable steel and timber industries under this sector. Investments are generally capital intensive and long-term in nature. Short-term leverage is highly unwelcomed and it could also mean that the firms are less protected from the highly fluctuated raw material costs in the competitive business environment, exposing these firms to high liquidity risk.

Similarly, in the real estate sector, we should be more concerned of the high short-term obligations due to the long-term nature of business development. The sector is less impacted by long-term financing where land banks are usually purchased and held for years. No significant relationship is observed between long-term leverage and returns, while the short-term leverage coefficient is estimated at −0.1161 and −0.0781 respectively for book and market measures of leverage. Comparable observations are found in the sector of industrial goods and services, which may engage in heavy industry, industrial manufacturing and processing, port operations, postal service, and logistics. The negative relationship between short-term market leverage and returns may suggest that short-term debt financing should be reduced whenever appropriate while long-term debt financing displays no significant relationship with returns.

In the retail sector, which includes stores and distributers, long-term leverage, including both market and book leverage, generally improves returns.

Table 2
Regression results for each sector by adopting book leverage

Coefficient Estimates	Chemical	Basic resources	Construction and materials	Industrial goods and services	Automobile and parts	Food and beverage	Personal and household goods	Retail	Travel and leisure	Utilities and telecommunication	Real estate	Technology
Leverage used: Book leverage divided into long-term and short-term portion												
Long-term Leverage	-0.0520 (0.0097)***	0.0201 (0.0185)	-0.0881 (0.0201)***	0.0035 (0.0229)	-0.2755 (0.1136)**	-0.0262 (0.0226)	-0.0944 (0.0528)*	0.0229 (0.0107)**	-0.0634 (0.0290)**	-0.0629 (0.0266)**	0.0005 (0.0155)	-0.0333 (0.0354)
Short-term Leverage	0.0344 (0.0091)***	-0.0459 (0.0158)***	0.0314 (0.0169)*	0.0040 (0.0176)	0.1790 (0.0497)***	-0.0074 (0.0099)	0.0283 (0.0294)	-0.0236 (0.0210)	0.0139 (0.0111)	-0.0167 (0.0128)	-0.1161 (0.0321)***	-0.0074 (0.0369)
Book to Market	0.0633 (0.0389)	0.0178 (0.0158)	0.0625 (0.0116)***	0.0583 (0.0118)***	0.0260 (0.0066)***	0.0300 (0.0187)*	0.0295 (0.0195)	0.0119 (0.0147)	-0.0006 (0.0026)	0.0071 (0.0818)	0.0251 (0.0153)	0.0116 (0.0431)
Firm size	0.0498 (0.0087)***	-0.0041 (0.0153)	0.033 (0.0083)***	0.0087 (0.0064)	0.0346 (0.0106)***	0.0227 (0.0096)**	0.0229 (0.0096)**	-0.0284 (0.0223)	-0.0016 (0.0136)	-0.0302 (0.0187)	-0.0033 (0.0137)	0.0476 (0.0226)**
Earnings Yield	-0.2631 (0.0567)***	-0.0075 (0.0849)	0.0679 (0.0430)	0.1838 (0.0582)***	-0.0447 (0.0976)	0.1211 (0.0446)***	0.0731 (0.0533)	0.2024 (0.0589)***	0.0121 (0.0548)	-0.1803 (0.1893)	-0.0666 (0.0740)	-0.0917 (0.0864)
Market Risk Premium	0.9429 (0.0915)***	1.403 (0.0680)***	1.1844 (0.0469)***	1.0736 (0.0495)***	1.0765 (0.1222)***	1.0561 (0.0723)***	1.0393 (0.1036)***	1.2333 (0.1019)***	1.3641 (0.1398)***	1.0749 (0.1521)***	1.4182 (0.0509)***	1.4385 (0.2098)***
Constant	-0.6856 (0.1406)***	0.0316 (0.1993)	-0.4973 (0.1141)***	-0.2505 (0.0928)***	-0.4112 (0.2218)*	-0.2514 (0.1449)*	-0.2862 (0.1484)*	0.3601 (0.3148)	0.1318 (0.2039)	0.6270 (0.3664)	0.1237 (0.1927)	-0.5972 (0.3137)*
No. of observations	197	473	924	1280	210	913	550	285	373	187	740	239

(*continued on next page*)

Table 2: (*continued*)

Coefficient Estimates	Chemical	Basic resources	Construction and materials	Industrial goods and services	Automobile and parts	Food and beverage	Personal and household goods	Retail	Travel and leisure	Utilities and telecommunication	Real estate	Technology
Leverage used: Book leverage as total leverage												
Total Leverage	-0.0220 (0.0150)	-0.0147 (0.0110)	-0.0019 (0.0112)	0.0037 (0.0134)	0.0646 (0.0692)	-0.0133 (0.0038)***	-0.0076 (0.0265)	0.0048 (0.0064)	-0.0058 (0.0040)	-0.0317 (0.0147)*	-0.0266 (0.0144)*	-0.0196 (0.0064)***
Book to Market	0.0583 (0.0374)	0.0229 (0.0147)	0.0659 (0.0119)***	0.0583 (0.0118)***	0.0240 (0.0047)***	0.0349 (0.0186)*	0.0268 (0.0198)	0.0116 (0.0150)	-0.0006 (0.0027)	-0.0103 (0.0856)	0.0300 (0.0165)*	0.0110 (0.0437)
Firm size	0.0436 (0.0092)***	0.0054 (0.0121)	0.0318 (0.0083)***	0.0087 (0.0064)	0.0312 (0.0107)**	0.0226 (0.0096)**	0.0164 (0.0089)*	-0.0259 (0.0219)	-0.0021 (0.0146)	-0.0374 (0.0180)*	-0.0029 (0.0134)	0.0472 (0.0229)*
Earnings Yield	-0.2795 (0.0607)***	-0.0170 (0.0817)	0.0628 (0.0405)	0.1838 (0.0583)***	-0.0282 (0.1068)	0.1141 (0.0413)***	0.0775 (0.0516)	0.1954 (0.0620)***	0.0119 (0.0560)	-0.2290 (0.1932)	0.0051 (0.0794)	-0.0978 (0.0937)
Market Risk Premium	0.9621 (0.0911)***	1.3959 (0.0784)***	1.1832 (0.0469)***	1.0735 (0.0493)***	1.0963 (0.1161)***	1.0556 (0.0721)***	1.0353 (0.1054)***	1.2320 (0.1019)***	1.3606 (0.1380)***	1.0743 (0.1530)***	1.4305 (0.0498)***	1.4348 (0.2045)***
Constant	-0.5864 (0.1566)***	-0.1088 (0.1545)	-0.5487 (0.1057)***	-0.2466 (0.0894)***	-0.5464 (0.1975)**	-0.2705 (0.1413)*	-0.2675 (0.1379)*	0.3181 (0.3059)	0.0760 (0.2098)	0.6806 (0.3600)*	0.0136 (0.1745)	-0.127 (0.3185)*
No. of observations	194	474	924	1280	210	913	550	285	373	187	742	239

Note: The results is obtained by regressing the yearly firm-level data of stock returns on the book leverage, book-to-market ratio, firm size, earnings yield and market risk premium, with standard errors clustered by firm. A total of 483 firms are classified into 12 sectors according to the Industrial Classification Benchmark of Dow Jones and FTSE, for a sample period of 1986–2012. Book leverage is refined as short-term leverage, long-term leverage, and total leverage. The numbers in parentheses are adjusted standard errors. The asterisks ***, **, and * indicate rejection of the null hypothesis at the 1%, 5%, and 10% significance levels respectively.

Table 3
Regression results for each sector by adopting market leverage

Coefficient Estimates	Chemical	Basic resources	Construction and materials	Industrial goods and services	Automobile and parts	Food and beverage	Personal and household goods	Retail	Travel and leisure	Utilities and telecommunication	Real estate	Technology
Leverage used: Market leverage divided into long-term and short-term portion												
Long-term Leverage	0.0137	0.0669	-0.0691	0.0207	-0.1410	0.0074	-0.0261	0.0560	-0.0523	-0.0844	0.0049	-0.0490
	(0.1158)	(0.0194)***	(0.0193)***	(0.0194)	(0.0181)***	(0.0302)	(0.0346)	(0.0143)***	(0.0229)**	(0.0294)**	(0.0093)	(0.0397)
Short-term Leverage	-0.0203	-0.0409	0.0142	-0.0231	0.1023	-0.0168	0.0204	-0.0079	0.0664	0.0228	-0.0781	0.0307
	(0.0651)	(0.0205)*	(0.0077)*	(0.0100)**	(0.0432)**	(0.0241)	(0.0275)	(0.0144)	(0.0305)**	(0.1255)	(0.0293)***	(0.0660)
Book to Market	0.0596	0.0217	0.0686	0.0638	0.0220	0.0387	0.0279	-0.0242	0.0113	0.0598	0.0438	0.0180
	(0.0333)	(0.0201)	(0.0132)***	(0.0133)***	(0.0070)***	(0.0214)*	(0.0239)	(0.0198)	(0.0097)	(0.0709)	(0.0159)***	(0.0477)
Firm size	0.0411	-0.0063	0.0319	0.0064	0.0312	0.0233	0.0191	-0.0402	0.0042	-0.0297	0.0000	0.0448
	(0.0098)***	(0.0131)	(0.0086)***	(0.0066)	(0.0108)**	(0.0093)**	(0.0095)**	(0.0216)*	(0.0130)	(0.0185)	(0.0137)	(0.0245)*
Earnings Yield	-0.2710	0.0707	0.0069	0.1678	-0.0178	0.1213	0.0765	0.2730	-0.0147	-0.0934	-0.0569	-0.0507
	(0.0585)***	(0.0666)	(0.0202)	(0.0534)***	(0.1105)	(0.0494)**	(0.0599)	(0.0643)***	(0.0898)	(0.1880)	(0.0762)	(0.0889)
Market Risk Premium	0.9490	1.3917	1.1899	1.0733	1.0712	1.0576	1.0370	1.2527	1.3689	1.0735	1.4111	1.4464
	(0.0891)***	(0.0792)***	(0.0473)***	(0.0490)***	(0.1208)***	(0.0724)***	(0.1054)***	(0.1047)***	(0.1379)***	(0.1486)***	(0.0507)***	(0.2119)***
Constant	-0.5749	-0.0199	-0.4894	-0.2108	-0.4211	-0.2901	-0.3102	0.4798	-0.0449	0.553	0.0099	-0.6002
	(0.1725)***	(0.1750)	(0.1103)***	(0.0918)**	(0.1705)**	(0.1408)**	(0.1368)**	(0.2996)	(0.1754)	(0.4196)	(0.1840)	(0.3236)*
No. of observations	197	473	930	1285	210	913	553	283	369	188	740	240

(*continued on next page*)

Table 3: (*continued*)

Coefficient Estimates	Chemical	Basic resources	Construction and materials	Industrial goods and services	Automobile and parts	Food and beverage	Personal and household goods	Retail	Travel and leisure	Utilities and telecommunication	Real estate	Technology
Leverage used: Market leverage as total leverage												
Total Leverage	-0.0097	0.0058	0.0068	-0.0099	-0.0017	-0.0066	0.0071	0.0137	0.0192	-0.0663	-0.0085	-0.0141
	(0.0279)	(0.0121)	(0.0076)	(0.0102)	(0.0241)	(0.0204)	(0.0206)	(0.0071)*	(0.0231)	(0.0212)**	(0.0099)	(0.0113)
Book to Market	0.0596	0.0218	0.0603	0.0622	0.0223	0.0390	0.0202	-0.0081	-0.0111	0.0519	0.0350	0.0208
	(0.0325)*	(0.0192)	(0.0141)***	(0.0132)***	(0.0054)***	(0.0215)*	(0.0229)	(0.0165)	(0.0128)	(0.0682)	(0.0167)**	(0.0443)
Firm size	0.0414	0.0059	0.0335	0.0076	0.0273	0.0237	0.0159	-0.0309	0.0007	-0.0359	-0.0028	0.0446
	(0.0098)***	(0.0141)	(0.0088)***	(0.0064)	(0.0105)**	(0.0094)**	(0.0089)*	(0.0206)	(0.0141)	(0.0165)*	(0.0134)	(0.0237)*
Earnings Yield	-0.2681	0.0271	0.0009	0.1681	-0.0694	0.1293	0.0893	0.2524	0.0088	-0.1566	0.0153	-0.0954
	(0.0563)***	(0.0742)	(0.0261)	(0.0570)***	(0.1043)	(0.0440)***	(0.0558)	(0.0704)***	(0.0699)	(0.1372)	(0.0806)	(0.0907)
Market Risk Premium	0.9477	1.3939	1.1861	1.0782	1.0999	1.0579	1.0425	1.2359	1.3648	1.0754	1.4276	1.4347
	(0.0884)***	(0.0783)***	(0.0470)***	(0.0489)***	(0.1149)***	(0.0722)***	(0.1047)***	(0.1008)***	(0.1372)***	(0.1492)***	(0.0495)***	(0.2020)***
Constant	-0.5765	-0.1543	-0.5775	-0.2138	-0.4023	-0.2992	-0.2757	0.3835	0.0024	0.6633	-0.0196	-0.6015
	(0.1487)***	(0.1806)	(0.1100)***	(0.0876)**	(0.1502)**	(0.1381)**	(0.1311)**	(0.2847)	(0.1924)	(0.3194)*	(0.1754)	(0.3260)*
No. of observations	197	474	929	1271	210	913	553	285	349	188	742	240

Note: The results is obtained by regressing the yearly firm-level data of stock returns on the market leverage, book-to-market ratio, firm size, earnings yield and market risk premium, with standard errors clustered by firm. A total of 483 firms are classified into 12 sectors according to the Industrial Classification Benchmark of Dow Jones and FTSE, for a sample period of 1986–2012. Market leverage is refined as short-term leverage, long-term leverage, and total leverage. The numbers in parentheses are adjusted standard errors. The asterisks ***, **, and * indicate rejection of the null hypothesis at the 1%, 5%, and 10% significance levels respectively.

The relationship is estimated at +0.0229 and +0.0560 respectively at 1% and 5% significance levels. Such a relationship is consistent with the nature of capital intensive investment by firms in land, property, and buildings to generate long-run returns. The certainty of returns of such investments in retailing business is usually relatively high and therefore, the holding of long-term debt is probably widely accepted and welcomed by the market.

In the food and beverage sector, including some renowned consumer brands like Ajinomoto, Carlsberg, Dutch Lady, Fraser and Neave, Nestle, and Spritzer, as well as some plantations firms, the use of total book leverage is generally associated with negative returns. The results may also suggest that the market expects a relatively stable nature of business, where many of the firms are able to generate internal cash flows to finance growth and dividend pay-outs. It could also indicate that demand growth for their products is relatively steady in the long term and therefore firms should only raise significant external borrowings when there are substantial expansion opportunities. Moreover, this is the sector that usually preferred by investors who are more risk adverse.

A similar phenomenon is found in the technology sector, i.e. the results suggest that the use of total debt financing should be reduced. This is largely consistent with the outperformance of technology firms usually associated with low capital gearing with ample funding capacity. However, the sector of personal and household goods, where consumer good providers are usually found, (including apparel, jewellery, tobacco, furniture, electrical appliances, and similar items) is the only sector where leverage does not seem to play any direct significant role to returns at a 5% level, regardless of the use of book leverage or market leverage. A further investigation on the impact of leverage on returns could be based on other perspectives.

Robustness Tests

If the residuals in the panel data sets are correlated across firms or across time, then the ordinary least squares standard errors estimated can be biased. This could be observed in the data set used in corporate finance and asset pricing empirical work. As such, Petersen (2009) suggests that panel data analysis in empirical finance research should adjust the standard errors for possible dependence in the residuals. In the effort to provide support to the robustness of results for this firm-level study, different adjusted standard errors are compared to consider the possibility of the existence of time and the firm effects.

As shown in Table 4 and Table 5, different standard errors are estimated to tend to pose an impact on the significance of coefficients. This may be due to the fact that for some sectors, firm fixed effects are more prominent and in others, time effects may be present. Nevertheless, in most of the sectors, the different adjusted standard errors are not widely deviated among each other. This is one of the criteria indicating a large robustness of results. White corrected standard errors and panel corrected standard errors are included for comparison purposes.

Table 4
Regression results for each sector by adopting book leverage

Coefficient (t-statistic)	Long-Term Leverage			Short-Term Leverage		
	White adjusted	Clustered by time	PCSE / GLS	White adjusted	Clustered by time	PCSE / GLS
Chemical	-0.0520 (0.0224)**	-0.0520 (0.0225)**	-0.0520 (0.0203)***	0.0344 (0.0192)*	0.0344 (0.0188)*	0.0344 (0.0147)**
Basic resources	0.0201 (0.0248)	0.0201 (0.0260)	0.0201 (0.0138)	-0.0459 (0.0176)***	-0.0459 (0.0187)**	-0.0459 (0.0162)***
Construction and materials	-0.0881 (0.0222)***	-0.0881 (0.0184)***	-0.0881 (0.0250)***	0.0314 (0.0168)*	0.0314 (0.0182)*	0.0314 (0.0138)**
Industrial goods and services	0.0033 (0.0219)	0.0033 (0.0180)	0.0033 (0.0194)	0.0040 (0.0228)	0.0040 (0.0240)	0.0040 (0.0150)
Automobile and parts	-0.2755 (0.1011)***	-0.2755 (0.1220)**	-0.2755 (0.0952)***	0.1790 (0.0665)***	0.1790 (0.0664)**	0.1790 (0.0363)***
Food and beverage	-0.0262 (0.0342)	-0.0262 (0.0452)	-0.0262 (0.0288)	-0.0074 (0.0131)	-0.0074 (0.0174)	-0.0074 (0.0153)
Personal and household goods	-0.0944 (0.0493)*	-0.0944 (0.0420)**	-0.0944 (0.0728)	0.0283 (0.0324)	0.0283 (0.0349)	0.0283 (0.0241)
Retail	0.0229 (0.0172)	0.0229 (0.0182)	0.0229 (0.0127)	-0.0236 (0.0269)	-0.0236 (0.0338)	-0.0236 (0.0254)
Travel and leisure	-0.0634 (0.0297)**	-0.0634 (0.0312)*	-0.0634 (0.0265)**	0.0139 (0.0101)	0.0139 (0.0106)	0.0139 (0.0119)
Utilities and telecommunication	-0.0629 (0.0292)**	-0.0629 (0.0264)**	-0.0629 (0.0315)**	-0.0167 (0.0138)	-0.0167 (0.0140)	-0.0167 (0.0317)
Real estate	0.0005 (0.0259)	0.0005 (0.0249)	0.0005 (0.0242)	-0.1161 (0.0424)***	-0.1161 (0.0446)**	-0.1161 (0.0426)***
Technology	-0.0333 (0.0522)	-0.0333 (0.0492)	-0.0333 (0.0199)*	-0.0074 (0.0561)	-0.0074 (0.0553)	-0.0074 (0.0207)

Notes: The results is obtained by regressing the yearly firm-level data of stock returns on the long-term book leverage, short-term book leverage, book-to-market ratio, firm size, earnings yield and market risk premium, with adjustments for white standard errors, standard errors clustered by time, and with panel corrected standard errors (PCSE) / generalized least squares (GLS) estimates (see Petersen, 2009). A total of 483 firms are classified into 12 sectors according to the Industrial Classification Benchmark of Dow Jones and FTSE, for a sample period of 1986–2012. The figures in parentheses are adjusted standard errors. The asterisks ***, **, and * indicate rejection of the null hypothesis at the 1%, 5%, and 10% significance levels, respectively.

Table 5
Regression results for each sector by adopting market leverage

Coefficient (t-statistic)	Long-Term Leverage			Short-Term Leverage		
	White adjusted	Clustered by time	PCSE / GLS	White adjusted	Clustered by time	PCSE / GLS
Chemical	0.0137	0.0137	0.0137	-0.0203	-0.0203	-0.0203
	(0.0906)	(0.1145)	(0.0846)	(0.0555)	(0.0551)	(0.0636)
Basic resources	0.0669	0.0669	0.0669	-0.0409	-0.0409	-0.0409
	(0.0330)**	(0.0347)*	(0.0147)***	(0.0244)*	(0.0254)	(0.0146)***
Construction and materials	-0.0691	-0.0691	-0.0691	0.0142	0.0142	0.0142
	(0.0199)***	(0.0124)***	(0.0205)***	(0.0068)**	(0.0069)**	(0.0064)**
Industrial goods and services	0.0207	0.0207	0.0207	-0.0231	-0.0231	-0.0231
	(0.0221)	(0.0240)	(0.0210)	(0.0113)**	(0.0109)**	(0.0123)*
Automobile and parts	-0.1410	-0.1410	-0.1410	0.1023	0.1023	0.1023
	(0.0320)***	(0.0400)***	(0.0358)***	(0.0444)**	(0.0337)***	(0.0288)***
Food and beverage	0.0074	0.0074	0.0074	-0.0168	-0.0168	-0.0168
	(0.0380)	(0.0522)	(0.0317)	(0.0246)	(0.0303)	(0.0259)
Personal and household goods	-0.0261	-0.0261	-0.0261	0.0204	0.0204	0.0204
	(0.0372)	(0.0387)	(0.0380)	(0.0261)	(0.0172)	(0.0181)
Retail	0.0546	0.0546	0.0546	-0.0079	-0.0079	-0.0079
	(0.0268)**	(0.0264)**	(0.0151)***	(0.0185)	(0.0241)	(0.0218)
Travel and leisure	-0.0523	-0.0523	-0.0523	0.0664	0.0664	0.0664
	(0.0245)**	(0.0228)**	(0.0189)***	(0.0361)*	(0.0416)	(0.0186)***
Utilities and telecommunication	-0.0844	-0.0844	-0.0844	0.0228	0.0228	0.0228
	(0.0361)**	(0.0318)**	(0.0324)***	(0.1485)	-0.1452	(0.1422)
Real estate	0.0049	0.0049	0.0049	-0.0781	-0.0781	-0.0781
	(0.0147)	(0.0162)	(0.0138)	(0.0313)**	(0.0313)**	(0.0323)**
Technology	-0.0490	-0.0490	-0.0490	0.0307	0.0307	0.0307
	(0.0418)	(0.0381)	(0.0266)*	(0.0786)	(0.0616)	(0.0268)

Notes: The results is obtained by regressing the yearly firm-level data of stock returns on the long-term market leverage, short-term market leverage, book-to-market ratio, firm size, earnings yield and market risk premium, with adjustments for white standard errors, standard errors clustered by time, and with panel corrected standard errors (PCSE) / generalized least squares (GLS) estimates (see Petersen, 2009). A total of 483 firms are classified into 12 sectors according to the Industrial Classification Benchmark of Dow Jones and FTSE, for a sample period of 1986–2012. The figures in parentheses are adjusted standard errors. The asterisks ***, **, and * indicate rejection of the null hypothesis at the 1%, 5%, and 10% significance levels, respectively.

While we could not say that all findings are perfectly consistent to the results in Table 2 and Table 3 where the standard errors of the coefficients are clustered by firms, we can still confidently conclude from Table 4 and Table 5 that the overall findings, including the significance of the leverage coefficients estimated, remain robust. As can be observed from the tables, book leverage is still dominant in determining the returns in the chemical sector. Short-term leverage remains as a major threat for the sectors of basic resources, industrial goods and

services, and real estate. Long-term leverage is especially not preferred in the sectors of construction and materials, automobile and parts, travel and leisure, and utilities and telecommunication. Firms within sectors of food and beverage, personal and household goods, and technology remain less concerned with the problem of debt maturities.

CONCLUSION AND RECOMMENDATION

Using panel regressions together with the suggestion by Petersen (2009), this firm-level study emphasises the importance of debt maturity on stock returns in Malaysia based on industry classifications. In nine out of 12 sectors analysed, (i.e. chemical, basic resources, construction and materials, industrial goods and services, automobile and parts, retail, travel and leisure, utilities and telecommunication, and real estate) disaggregated leverage according to maturity measured in either book leverage or market leverage, is significant in the relationship with firm-level stock returns. The results suggest that the return-leverage relationship could be indirect in terms of maturity and the disaggregated leverage according to maturity may provide some insights to the relationship.

For some sectors (retail, utilities and telecommunication), long-term leverage is more prominent in relation to stock returns while in others (industrial goods and services, real estate), the regression results indicate that short-term leverage could be more important. For sectors including chemical, basic resources, construction and materials, automobile and parts, as well as travel and leisure, both long-term and short-term measures of leverage are important but may carry opposite impacts. Such discoveries, especially in the absence of direct impact of total leverage, suggest that the study of return-leverage would be more meaningful when debt maturities are put into consideration. The claim of which short-term debt carries a higher risk, therefore, should be compensated with higher returns needs further investigation. Robustness tests on possible correlations of residuals across firms or time confidently confirm such a conclusion.

Besides, while the overall conclusion is largely consistent with the use of both book leverage and market leverage, the results also recommend that the considerations of market leverage and book leverage are equally important despite their respective rationalities. Both measures exhibit significance in the analysis but may deliver different impacts and levels of significance. In the firm-level financing policy, researchers and practitioners should put more attention to debt maturity mix rather than the conventional debt-equity solutions. Industry-specific factors, at the same time, should not be overlooked since the results show that

completely opposite effects could take place with the same maturity decision. It further confirms the significance of sector-specific analysis.

This study provides a platform for the analysis of financial leverage on stock returns from the basic perspective of debt maturity. While maturity mismatch has been widely discussed since the last Asian financial crisis, this analysis could provide relevant empirical evidence from the standpoint of a shareholder's valuable creation based on industry classifications. Holding the importance of leverage maturities, further a detailed leverage analysis can be proposed. For instance, outcomes can be more valuable if the debt maturities can be further broken down rather than the conventional definitions of long-term (more than a year) and short-term (less than a year). Various cash flow elements, growth issues, dynamic changes in maturity mix, and other specific issues can also be included to provide a more comprehensive leverage research in the future.

NOTES

1. The inclusion of total equity in the numerator is to avoid the ratio becomes negative when net debt is considered in the analysis, of which the results are not reported in this paper. However, the application and interpretation of the leverage would be the similar like equity multiplier. Instead of total liabilities, debt is used in the numerator.
2. Market equity is used when examining the dynamic effect of leverage because market leverage will fluctuate due to market conditions and reflect the changing relative costs of equity and debt. Book equity is useful in better representing the ability of managers because it reflects firms' actual financing needs.

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