# Debt and Financial Performance of REITs in Malaysia: An Optimal Debt Threshold Analysis

*(Pembiayaan Hutang dan Prestasi Kewangan REITs di Malaysia: Analisa Nilai Ufuk Pembiayaan Hutang Optimum)*

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## *ABSTRACT*

*The aim of this study is to estimate the optimal debt threshold of Real Estate Investment Trusts in Malaysia (MREITs). This study uses continuous sequential threshold regression approach adopted from Bai and Perron (1998; 2003) and Perron (2006) methodologies and collaborates the threshold regression by Hansen (2001; 2015) to estimate the MREITs optimal debt threshold. In this regard, although by regulation, MREITs are allowed to use debt up to 50% of their total assets, the result of this study indicates that MREITs need to maintain a debt level of between 14.33% and 21.40%, to balance the external funding needs and the optimal level of financial performance. Given the high dividend payout requirement, and the marginal tax rate of zero, if debt is chosen as the dominant approach of obtaining external financing needs, MREITs need to carefully monitor the optimal level of debt in order to maximize the shareholders return and to avoid debt overhang problem. The finding offers a useful guide to MREITs managers in strategizing their financing decision to support their external growth needs by investing in real property.*

*Keywords: Real Estate Investment Trusts; Malaysia; threshold; optimal debt; financial performance*

## *ABSTRAK*

*Tujuan kajian ini adalah untuk menentukan nilai ufuk pembiayaan hutang yang optimum bagi Pelaburan Dana Amanah Hartanah di Malaysia (MREITs). Kajian ini menggunakan pendekatan regresi nilai ufuk jujukan berterusan oleh Bai dan Perron (1998; 2003) serta Perron (2006), juga koloborasi regresi nilai ufuk oleh Hansen (2001; 2015) untuk menganggarkan nilai ufuk hutang yang optimum bagi M-REIT. Meskipun peraturan membenarkan M-REIT menggunakan hutang sehingga 50% daripada jumlah aset mereka, dapatan kajian ini menunjukkan bahawa M-REIT perlu mengekalkan paras hutangnya pada kadar 14.33% dan 21.40%, bagi mengimbangi keperluan kepada pembiayaan luar dan prestasi kewangan yang optimum. Memandangkan terdapat keperluan untuk membayar dividen yang tinggi serta kadar cukai sut sifar, sekiranya hutang dipilih sebagai pendekatan yang dominan bagi mendapatkan pembiayaan luar, M-REIT perlu mengawasi kadar optimum hutang tersebut bagi memaksimumkan pulangan pemegang saham serta mengelakkan masalah juntaian hutang. Dapatan kajian ini memberi panduan berguna kepada pengurus-pengurus M-REIT dalam mengatur strategi dan membuat keputusan pembiayaan yang menyokong keperluan pertumbuhan luar bagi organisasi mereka dalam pelaburan harta tanah.*

*Kata Kunci: Pelaburan Dana Amanah Hartanah; Malaysia; nilai ufuk; hutang optimum; prestasi kewangan*

# INTRODUCTION

The global financial crisis in September 2007 has drawn attention to the severe risks of overloaded credit expansion on the financial performance of the firms and economics. Numerous empirical studies have attempted to investigate the asymmetric non-linear relationship between debt and financial performance either at the national or firm level. Using data from 87 developed and developing countries, Law and Singh (2014) revealed that the use of debt by the public sectors above 88% of GDP slows down the economic growth. Similarly, Abd Halim and Nur Adiana Hiau (2013) examined the optimal debt level of 467 Malaysian listed firms for the study period from 2005 to 2009, found the use of debt above the optimal debt level of 64% adversely affects Malaysian firms' financial performance. Other studies with a similar objective include Cheng et al. (2010), Cuong and Canh (2012), Dang et al. (2012) and Alaabed and Masih (2016). Unlike previous studies that focus on public listed firms, this study aims to determine the optimal debt threshold of Real Estate Investment Trusts in Malaysia (MREITs). In this light, REIT's business structure differs from other typical listed firms, particularly in Malaysia.

MREITs, under the current regulation, must distribute 90% or more of their income in the form of dividends to maintain a tax-exempt status. This unique business structure indicates that MREITs have limited internal funding to support their investment growth needs and do not enjoy any tax shield benefit for interest payment from the use of debt if they choose debt as a source of fund. Furthermore, leverage ratio for MREITs is restricted to 50% of its total assets. As put forth by Hardin and Wu (2010), Ghosh et al. (2010) and Ghosh and Sun (2014), REITs are known as business entities with constraints in cash flow retention and liquidity and requires high external capital in order to grow. The evidence shows that REITs in the western countries use debt to support their growth and optional for liquidity (Chan et al. 2003; Campbell et al. 2008; Riddiough & Wu 2009; Hardin & Wu 2010; Giambona 2014). A study by Feng et al. (2007) examined the puzzling borrowing pattern of REITs in the United States, where the use of debt by REITs is more than 50% at the IPO and increases gradually to 65% during the 10-year period. In the context of MREITs, the use of debt during 2005 to 2014 ranged from 12.5% to 50% (see Exhibit I). This shows that some of the MREITs utilize almost the maximum statutory asset gearing limits at 50% of their total asset value which will limit their new debt capacity for new acquisition opportunity. It would be essential for MREITs to ensure that their debt level does not exceed the certain limit that may harm their financial performance as this element is important to ensure the future success of MREITs sustainability. This is due to the fact that REITs' underlying assets heavily rely on real property and their performance is directly influenced by the strong cyclical behavior of the property market (Chan et al. 2003; Ong et al. 2012). REITs are also known to have high levels of fixed operating costs. Thus, having higher financial leverage together with the higher levels of fixed operating leverage can substantially increase the influence of declining markets on net earnings and cash flows available to the shareholders will be more volatile (Chan et al. 2003). Moreover, the use of debt for REITs, which are tax-exampt entity, are more expensive than taxed firms (Howe & Shilling 1988; Maris & Elayan 1990).

This study uses a recent empirical approach to estimate the debt threshold value of MREITs. The estimation approach of optimal debt uses the continuous sequential approach of threshold regression method and adopts the methodologies presented in Bai and Perron (2003), Perron (2006), and Hansen (2001; 2015). This approach estimates the unknown threshold value directly and does not require the bootstrapping testing procedure to identify the number of thresholds and takes care the issue of heterogeneity. Furthermore, most of the REITs literatures analyse the puzzle of why REITs use debt despite no tax shield benefit and the adverse effect of using debt, but no attempt to determine the optimal debt threshold above which destroy REITs' financial performance. As such, this study contributes to the REITs literature by estimating the optimal debt threshold value for REITs in Malaysia, while simultaneously controlling other factors that affect the MREIT's financial performance, such as *liquidity, financial flexibility, size, dividend payout, cash flow volatility and growth in investment.* Equally important, The finding of this study can be used as a benchmark for REITs particularly REITs in Malaysia to identify the level of debt that provides an optimal financial performance. Therefore, this study deserves special attention.

The data were analysed through employing panel threshold regression model for all MREITs samples from 2005 to 2014 to confirm the existence of a non-linear relationship between debt and financial performance and identify the threshold of optimal debt that optimizes the financial performance of MREITs. A striking conclusion that emerges from the finding is that debt is positively related to financial performance when it is within the identified optimal debt threshold values. In this study, the optimal debt threshold value for MREITs is between 14.33% and 21.40%, hence, further increase in the debt away from its identified threshold (optimal regime) will impair the financial performance of MREITs. Important to realize that the optimal debt threshold for MREITs are lower than those of the taxable firms. This compares to the optimal debt threshold value of 64.33% for Malaysian listed firms (taxable firms) referenced study by Abd Halim and Nur Adiana Hiau (2013). Thus, MREITs need to balance the risk of having a high debt level to finance the investment growth needs and the high return on the investment by having an optimal or right composition of debt level. Consequently, MREITs need to focus on the optimal level of leverage and only accept risk when the odds of success are high.

The other sections in this study are organized as follows, Section 2 consecutively discusses the theoretical background and presents a literature review on REITs debt financing, Section 3 discusses the methodology and data description of this study, Section 4 highlights the estimation results and finally, Section 5 provides recommendation and conclusion.

## LITERATURE REVIEW

Being an entity with a marginal tax rate of zero, many are concerned on what considerations should guide MREITs in deciding its debt level. The query of what is the optimal debt level for MREITs could be responded in different ways through theories of capital structure such as trade-off theory (Kraus & Litzenberger 1973) and debt overhang theory (Myers 1977). The trade-off theory provides the notion that the optimal debt level derives at the point where the benefit of using debt on tax saving is equal to the direct and indirect bankruptcy cost. The concern is that for the REITs industry, the tax shield benefit is less relevant for tax-exempt industry (Harrison et al. 2011). As there is no tax saving on the debt usage for MREITs, the obvious implication is that the use of debt financing may reduce their financial performance (such as earnings) more than tax-paying firms. This will increase the risk of potential reduction in the future earnings available to the shareholders. Too much debt can be a cause of the underinvestment problem associated with free cash flows. Specifically, when a firm has what as Myer (1977) calls a “debt overhang”, where a firm has high debt burden in its capital structure and this limits them to undertake future profitable investment growth. In the meantime, according to Myer (1977), “debt overhang” can be reduced if firms use a short-term debt maturity. The rationale is that the new investment decision can be made immediately when the debt matures and firm’s value is less sensitive to the short-term debt. However, Diamond and He (2014) suggested that short-term debts can create debt overhang where debt may expose firm to default earlier. Short-term borrowing needs to be paid during the short-term intervals, and if the credit market freezes especially during the downturn period, this may lead to a severe problem of default payment.

An increase in debt ratio may have an adverse effect on the financial performance of REITs, and this effect will continue to worsen during the economic downturn. Oppenheimer (2000) analyzed the debt levels of REITs in the United States (U.S.), and the ability to pay the debt financing cost, as well as dividend payment in the period from 1994 to1998, and suggests that an extensive increase in the debt has led to a substantial reduction in the dividend payout ratio and interest coverage ratios. In addition, a recent study by Titman et al. (2014) concluded that excessive leverage and shorter maturity debt in REITs’ capital structure contribute to higher exposure to financial distress and subsequently enlarging the decline of REITs’ share price, especially during the financial crisis period from 2007 to 2009. This situation has forced REITs to forgo their existing real property asset at unattractive term in order to survive. Titman et al. further concluded that REITs with higher debt ratios during the crisis are still struggling to rebound and the share value is still trading below the pre-crisis highs. Similarly, the recent study by Zalina et al.(2017) also show that debt financing is negatively associated with MREITs’ financial performance. The use of debt by MREITs has increased a burden of interest cost, which pulled down its net return. Relatedly, Dimitrov and Jain (2008), Cai and Zhang 2011), and Diamond and He (2014) perform studies within a non-REITs industry also conclude that an increase in leverage ratio is likely to harm firm’s future cash flow and investment. Dimitrov and Jain (2008) and Chung et al. (2013) demonstrated that an increase in debt level gives an indication of poor performance as the firms tend to increase their borrowing level when they experience deterioration in their operating performance.

Meanwhile, a study on non-REITs in emerging country, for example Malaysia, found a negative relationship between debt ratios and firm financial performance. The study by Salim and Yadav (2012) used a sample of 237 Malaysian listed companies from 1995 to 2011. Other studies on emerging countries which focused on the similar issue are Ebaid (2009) and, Zeitun and Tian (2007), both concluded that debt financing has a negative impact on firm performance. However, empirical evidence presented in Abor (2005) on listed firms in Ghana showed that firms with a high number of short-term debts have higher profitability. Previous studies have also shown that there are other factors that affect firm’s financial performance, such as *liquidity, financial flexibility, size, dividend payment, cash flow volatility and growth in investment.* With regard to liquidity, previous studies indicates that liquidity provides positive effect to firm’s financial performance. For instance, Moyer et al. (2001) indicated that having higher liquid asset may enhance firm performance and business survival. Firms that have sufficient liquid funds are views to have more opportunity that will give direct effect to the firm performance. The reason is that firms with ample cash reserves permit them to fund their potential valuable investment and operation needs at less expensive than both debt and common equity financing (Opler et al. 1999; Faulkender & Wang (2006). Comparably, Mikkelson and Partch (2003) concludes that holding large cash do facilitate firm to undertake profitable investment without threatening firm performance.

Similarly, Marchica and Mura (2010) provided an evidence states that companies which are managed conservative debt policy will allow them to maintain financial flexibility and directed to have more ability to take any opportunity in investment if it arises in the future. Arslan-Ayaydin et al. (2014) showed that firms with substantial cash and adopt leverage policy conservatively will have better performance as they are able to take investment opportunity when the time of needs. A recent study by Zalina et al. (2017) found that financial flexibility acts as an important factor that able to adjust the relationship between debt financing and financial performance from negative to positive relationship of MREITs. Overall, financial flexibility play as an important element for firm performance and sustainability (Arslan-Ayaydin et al. 2014; Byoun 2011; Childs et al. 2005; DeAngelo & DeAngelo 2007; Gamba & Triantis 2008; Lins et al. 2010; Mikkelson & Partch 2003; Moyer et al. 2001).

Previous finance literature has also claimed that the size of a firm has an impact on firm’s performance, specifically, its profitability. Larger firms are seen to be cost efficient because they are able to apportion their fixed expenditures for more ventures or projects. This is known as the benefit of economies of scales. Large firms may also have greater revenue as they have the greater market power which enables them to possibly control the market in term of raising market price of services and goods. Studies on REITs by Ambrose and Linneman (2001) and Ambrose et al. (2005) suggested larger REITs incline to have greater profit. It was revealed larger REITs gain greater profit margin and greater rental revenue and have lesser indirect capitalization rates than smaller REITs. Recent evidence that supports the findings of these two studies was presented in Ertugrul & Giambona (2010) which also reported that larger REITs gain more profit. Moreover, Ross et al. (2016) and Kanwal and Hameed (2017) posited that dividend payout determines firm's performance as high dividend payment translates into high firm's performance. It also reflects the firm's capacity to generate profits from the business and to distribute available funds to its shareholders.

Another important factor that affect firm's financial performance is cash flow volatility. Trueman and Titman (1988) denoted that cash flow and earnings stability reduces a firm's default. Froot, David and Stein (1993) provide empirical evidence that volatility in firm's cash flows could reduce a firm's value it has to forgo positive-NPV projects due to limitation in obtaining financing. In contrast, Chi and Su (2017) showed the positive relationship between cash flow volatility and firm performance have particularly for small (young) with higher growth opportunities thus, cash flow volatility affects the firm's financial performance. Growth in investment is reported to have an effect to firm's performance. Lipson, Mortal and Schill (2011) and Fama and French (2006) observed that firms experiencing high asset growth have higher stock return and tend to experience high accounting performance prior to the occurrences of growth. Thus, this suggests that growth affects the firm's financial performance.

In the meantime, it should be noted that most empirical evidences revolve around a central question on debt-financial performance relationship and the determinant factors of firm financial performance, however, past literature including past REITs studies have rarely described the debt threshold systematically, particularly, on which level of debt provides optimal firm financial performance. Meanwhile, other studies that considered the optimal level of debt and firm performance for non REITs entity are Abd. Halim and Nur Adiana (2013); Cheng et al. (2010), Coricelli et al. (2012). Cheng et al. (2010) examined the optimal debt at which point maximize the firm value using data from 650 Chinese listed during the period from 2001 to 2006. Cheng et al. conclude that the firm value starts to diminish when the debt ratio is 53.97% and its deteriorate when the debt ratio reach to 75.26%. The relationship between debt and firm value is found to be an inverted U-shape. Using a larger set of sample from sixteen transition countries over the period 1999 to 2008, Coricelli et al. (2012), found the lower threshold value is 33.6% and the upper threshold value is 38.6%. The study was carried out among the manufacturing firms from the countries, namely Ukraine, Romania, Bosnia and Herzegovina, Bulgaria, Russia, Croatia, Estonia, Republic of Moldova, the Slovak Republic, Hungary, the Czech Republic, Poland, Serbia, Latvia, Slovenia and Lithuania. While Abd. Halim and Nur Adiana (2013), with the similar objective to examine the optimal threshold level of debt at which point maximize firm value among 467 Malaysian listed firms (excluding REITs, financial institution, and insurance industry) for the study period from 2005 to 2009 and found the threshold limit above which destroy the Malaysian firm value is 64.33%. It may be noticed that different empirical studies carried out in the different country provide a different optimal level of debt at which point can maximize the firm value. This might be due to the differences in institutional structure, legal system and tax policies (Wald 1999).

Therefore, this research attempts to identify the optimal threshold of MREITs' debt, being an entity with a marginal tax rate of zero. This will enable MREITs' managers to improve their financing decision and financial performance, and also allows them to monitor their debt financing level so as not to destroy their financial performances while maintaining a sufficient amount of liquid capital.

## DATA AND METHODOLOGY

This study examines the data set which consists of financial information and accounting data of all sixteen (16) MREITs publicly traded in Bursa Malaysia for the 10-year period from the inception in January 2005 to December 2014. The study makes an effort to cover the whole MREITs. The study time frame lies between 2005 to 2014 is because MREITs was only introduced in 2005. The data in this study are based on secondary data which are extracted from the annual report of each MREITs published in the Bursa Malaysia and Datastream International.

This study uses the threshold regression model developed by Bai and Perron (1998; 2003) and Perron (2006) as a baseline to assess the issue of balancing the cost and benefit of using debt. The threshold regression model applied in this study provides an approach to assess the heterogeneous relationship between the debt and financial performance in identifying the optimal debt threshold of MREITs, relative to the conventional threshold regression model. The model allows this study to obtain the threshold estimation value for the unknown threshold. It is important to remark that this study collaborates Perron (2006) and Bai and Perron (2003) threshold regression specification models. The framework for the threshold estimation is based on the fundamental of breakpoint model introduced by Bai and Perron (2003) and Perron (2006) to estimate the unknown threshold. Hansen (2015) newest edition of his threshold regression model acknowledges a similar assumption. This threshold regression model is referred to as the "regression kink model" with an unknown threshold. According to Hansen (2015), most of the previous literature use the *discontinuous* threshold regression method with the assumption that the threshold is known, and further commented that the implementation of multiplier bootstrapping method, as recommended by Hansen (1999) to resolve the "Davies" problem (see Davies 1987) does not explain the observation of time-series nature which is expected to express certain finite sample distortion. Thus, to overcome this shortfall, the Bai-

Perron Sup-F test statistics was used in this study to estimate the optimal debt threshold value by adapting the methodologies of Bai and Perron (1998; 2003) and Perron (2006). The approach does not require the bootstrapping testing procedure to identify the number of thresholds, indeed, it applies continuous sequentially estimation. The construction of the optimal debt threshold model is explained in the following section of this study. The construction of the threshold model is explained below.

## VARIABLES

This study uses return on invested asset (ROIA) to represent MREITs financial performance. The measurement for ROIA is net fund from operation (FFO) to total net assets, where net FFO is defined as net realised earnings plus depreciation and amortization minus gains on sales of property or any extraordinary items. In this light, most REIT studies used FFO rather than earnings before interest and tax (EBIT) or earning after tax (EAT) as the key indicator of REITs' operating profit as FFO provides a more useful information on the operating performance measure than net earnings for the REITs industry (Harrison et al. 2011). The data comprise of the unbalanced panel data and the debt ratio (total debt to total net assets) is the threshold variable. Debt refers to bank loan or interest bearing debt. On the other hand, this study excludes accruals, trade credit (accounts payable) which includes fixed term loans, revolving credits and commercial papers and non-interest bearing liabilities, such as accruals and trade credit (accounts payable) and intercompany loan or parent companies. The threshold variable is considered as the main variable in examining whether there is a threshold of optimal debt above which threatens the financial performance of MREITs.

This research used six control variables that commonly influence the firm's financial performance. The control variables are the ratio of cash and cash equivalent to total net assets (liquidity) to measure the liquidity of MREITs, cash flow volatility (risk), *the* cash flow volatility is measured by standard deviation of funds from operations (FFO) scaled by the total net asset over the year to measure the potential risk of the MREITs' cash flow, growth (based on the percentage at which MREITs is growing and measured as the annual percentage changes in the total market value of property investment), the log of total tangible assets as a measure for MREITs' size. Meanwhile, dividend payout (Dividend) was measured as total annual dividend payment scaled by the total net asset. To measure financial flexibility (FF), this research constructed an index multiplying the ranks of liquidity (the ratio of cash and cash equivalent to total net assets) and debt ratio of all MREITs samples over the study period from 2005 to 2014. This is inspired by Arslan-Ayaydin et al. (2014) in which the financial flexibility can be attained through the combination of higher cash holding and lower debt ratio. To obtain the financial flexibility score, first, this research ranked the cash holding ratio of all MREITs over the study period in a descending order. The highest cash holding ratio was assigned as the highest score in the ranking. Second, the debt ratio was ranked for all MREITs over the study period in an ascending order which indicates the lowest debt ratio is assigned as the highest score in the ranking. The product of the two scores is the quantified financial flexibility, where higher value indicates higher financial flexibility. This value was used as a proxy to measure the financial flexibility in the regression analysis.

As the data in this research comprised of the panel data series, it is necessary to perform a panel unit root test to confirm that the variables are stationary. This test was performed to examine the null hypotheses of a unit root. Therefore, to test for panel unit root of all the defined variables in the model for all MREITs samples, this research employs the panel unit root test of Levin et al. (2002), Im et al. (2003) and Augmented Dickey-Fuller (ADF) (Dickey and Fuller 1979). Once this condition was met, the single debt threshold for two-regime model equation was estimated using Bai and Perron (1998; 2003) and Perron (2006) threshold regression specification. This is expressed as follows:

The observation for regime j= 0, 1….m, the standard linear regression specification is presented as:

$$V_{it} = \mu_i + \theta' h_{it} + \alpha_1 d_{it} + \varepsilon_{i,t} \quad (1)$$

While the specification for single threshold, two-regime model is presented as:

$$V_{it} = \begin{cases} \mu_i + \theta' h_{it} + \alpha_1 d_{it} + \varepsilon_{i,t} & \text{if } \infty < d_{it} < \gamma_1 \\ \mu_i + \theta' h_{it} + \alpha_2 d_{it} + \varepsilon_{i,t} & \text{if } \gamma_1 \leq d_{it} < \infty \end{cases} \quad (2)$$

$$\theta = (\theta_1, \theta_2)'$$

$$h_{it} = (L_{it}, FF_{it})'$$

$V_{it}$ represents the MREITs' financial performance measured by ROIA. The debt ratio is the explanatory variable and the threshold variable denoted as $d_{it}$. It is important to note that $d$, which is debt ratio, has the coefficients that specify the regime in which the regressors are split into two or more regime. $\gamma_1$, represents the identifiable estimated threshold value. $h_{it}$ represents control variables that may influence the MREITs' financial performance. The assumption is that the control variables are the variables that have similar parameters across the regimes. The six control variables are *Liquidity*$_{it}$*; Cash flow volatility*$_{it}$*; Growth in investment (Growth)*$_{it}$*; Size*$_{it}$*; Dividend*$_{it}$*;* and *Financial Flexibility*$_{it}$. Meanwhile, $\theta_1$, and $\theta_2$ represent the coefficients estimate of control variables. $\mu_i$ is a given fixed effect that is treated to control heterogeneity of MREITs. *i* represents a cross section of MREITs and *t* represents periods in this stud, while $\alpha_1$ is the coefficient for $d_{it}$ (debt ratio) if the value of the observable threshold variable is lesser than $\gamma_1$; $\alpha_2$ is the coefficient for $d_{it}$ (debt ratio) if the value of the observable threshold is greater than $\gamma_1$. It is assumed that there is an observable threshold variable $d_{it}$ and the threshold value is strictly increasing ($\gamma_1 < \gamma_2 < \ldots\ldots\gamma_m$), thus it is present in regime *j* if $\gamma_j \leq d_{it}\ \gamma_{j+1}$, where it is set as $\gamma_0 = \infty$ and $\gamma_{m+1} = \infty$. Lastly, the error $\varepsilon_{i,t}$ is assumed to be normally distributed $\varepsilon_{it} \sim i.i.d(0, \sigma^2)$.

Based on equation 2, the optimal debt threshold regression analysis is divided into two regimes. The first regime is when the debt ratio ($d_{it}$) is less than the estimated identified threshold value ($\gamma_1$). Thus, the threshold value falls in the lower debt regime ($\infty < d_{it} < \gamma_1$). The second regime ($\gamma_1 \leq d_{it} < \infty$) is when the debt ($d_{it}$) is greater than the estimated identified threshold value ($\gamma_1$) and it is considered to be in the upper debt regime. The regimes are set apart based on the diversity of regression slope, which are $\alpha_1$ and $\alpha_2$. Here, the known variables of $V_{it}, d_{it}$, $h_{it}$ were used to estimate the unknown parameters- $\gamma$, $\alpha$, $\theta$ and $\sigma^2$.

Once the threshold value of $\gamma_1$ has been determined, for example, $\alpha_1 \neq \alpha_2$, a confidence interval can be formed for the estimated identified threshold value of $\gamma_1$. This study hypothesizes that there is a non-linear relationship between debt ratio and MREITs financial performance. As such, it is vital to test the following null hypothesis in order to investigate whether the estimated threshold value is statistically significant. The null hypothesis and alternative hypothesis are represented as follows:

$H_0$ : $\alpha_1 = \alpha_2$
$H_1$ : $\alpha_1 \neq \alpha_2$

When the null hypothesis holds, the coefficient $\alpha_1 = \alpha_2$ indicates that the estimation of threshold does not occur in the relationship between the debt ratio and MREITs' financial performance. Whereas, when the alternative hypothesis holds, the coefficient $\alpha_1 \neq \alpha_2$ indicates that the estimation of threshold does occur in the relationship between the debt ratio and financial performance of MREITs. Hansen (1999) suggested the use of an F-test to determine the threshold value and Sup-Wald statistic to examine the null hypothesis. Furthermore, Hansen (1999) suggested a 'bootstrap' procedure to estimate the testing statistic asymptotic distribution to resolve the "Davies" problem. However, it is important to note that this study applied the estimation of the threshold value adopting the methodologies of Bai and Perron (1998; 2003) and Perron (2006), that based on continuous sequential breakpoints. Giving that in mind, this violates the assumptions for the Sup-F statistics (Hansen 1999; Hansen 2000). Hence, the fixed regressor bootstrap testing as proposed by Hansen (1999) is not applicable to identify the thresholds.

In this study, the optimal debt threshold was estimated sequentially by first, searching the initial threshold value that minimizes the sums of squares, and then simultaneously finding the values, based on the obtained initial threshold value that minimized the sums of squares until the next possible threshold value is determined. It was performed from number 1 to the maximum number until the null hypothesis cannot be rejected. The estimation of the parameter of the model is performed using the nonlinear least square approach. The nonlinear least square is an accepted approach to estimate the model parameter. The estimation of threshold regression was obtained by minimizing the $S(\alpha\theta, \gamma)$ with respect to the parameter. The sum-of-squares objective function is illustrated below:

$$S(\alpha, \theta, \gamma) = \sum_{t=1}^{i} (y_t - h_t'\theta - \sum_{j=0}^{m} 1_j(d'_t, \gamma) \,.\, d_t'\alpha_j)^2 \qquad (3)$$

In particular, when there is a double threshold, the model equation can be illustrated as:

$$V_{it} = \begin{cases} \mu i + \theta' h_{it} + \alpha_1 d_{it} + \varepsilon_{i,t} & \text{if } \infty < d_{it} < \gamma_1 \\ \mu_i + \theta' h_{it} + \alpha_2 d_{it} + \varepsilon_{i,t} & \text{if } \gamma_1 \leq d_{it} < \gamma_2 \\ \mu i + \theta' h_{it} + \alpha_3 d_{it} + \varepsilon_{i,t} & \text{if } \gamma_2 \leq d'_{it} < \infty \end{cases}$$

It is notable to mention that this study did not split the bank debt ratio into short term and long term to identify the optimal debt level in the study analysis and splitting the pre, during and post financial crisis period. This is because the number of the MREITs data is relatively small and this study was unable to perform the analysis due to insufficient data. Furthermore, this study only considered the most relevant and crucial explanatory variables in the analysis because the model is considered to have little degree of freedom if the number of estimated variables is larger than the number of observations (Baltagi 2011). This may cause over-fitting of the model.

## EMPIRICAL RESULT

This research employed the Levin et al. (2002), Im et al. (2003) and Augmented Dickey Fuller (Dickey & Fuller 1979) to test for panel unit root of all defined variables in the debt threshold model for all MREITs samples. Based on the result of panel unit root test, show that the nulls of the unit root are rejected. Thus, it can be confirmed that all variables in the debt threshold model are stationary at I(0), indicating that the full analysis of the optimal debt threshold estimation can be performed. Table 1 presents the result of the panel unit root test.

TABLE 1. Panel Unit Root Test Result.

| | LLC | | IPS | | ADF-Fisher | |
|---|---|---|---|---|---|---|
| Variables | t-statistic | P-value | t-statistic | P-Value | t-statistic | P-value |
| ROIA | -709.874 | 0.0000 | -107.642 | 0.0000 | 111.331 | 0.0000 |
| Debt ratio | -17.869 | 0.0000 | -7.2882 | 0.0000 | 80.998 | 0.0000 |
| Liquidity | -13.447 | 0.0000 | -5.907 | 0.0000 | 76.631 | 0.0000 |
| Cash flow volatility | -21.831 | 0.0000 | -10.773 | 0.0000 | 95.604 | 0.0000 |
| Growth | -89.861 | 0.0000 | -19.890 | 0.0000 | 96.192 | 0.0000 |
| Size | -8.6771 | 0.0000 | -3.6715 | 0.0001 | 63.695 | 0.0003 |
| Dividend | -28.455 | 0.0000 | -13.892 | 0.0000 | 148.425 | 0.0000 |
| Financial flexibility | -19.022 | 0.0000 | -4.6254 | 0.0000 | 55.125 | 0.0034 |

*Notes:*
LLC represent the Levin,Lin & Chu (2002), IPS represent Im, Pesaran and Shin(2003), ADF represent the Dickey and Fuller (1979) panel unit-root test approach respectively.

Table 2 presents the result of the threshold estimation of total debt ratio and ROIA with six controlling variables which are *liquidity, cash flow volatility, growth in investment, size, dividend payout, and financial flexibility.*

TABLE 2. Threshold Estimation of Total Debt Ratio and ROIA

| Variables | | Coefficient | $SE_{White}$ | $t_{White}$ | P-value |
|---|---|---|---|---|---|
| First Regime<br>Debt ratio< 14.33 ($\gamma_1$)<br>(16 observations) | | | | | |
| Debt ratio | $\alpha_1$ | 0.0168 | 0.0108 | 1.5584 | 0.1231 |
| Liquidity | | -0.8836*** | 0.1555 | -5.6829 | 0.0000 |
| Cash flow volatility | | 3.0354*** | 0.6654 | 4.5621 | 0.0000 |
| Growth in investment | | -0.0168*** | 0.0021 | -7.8907 | 0.0000 |
| Size | | -0.4609 | 0.2816 | -1.6370 | 0.1056 |
| Dividend payout | | -0.4104*** | 0.1431 | -2.8684 | 0.0053 |
| Financial flexibility | | 0.0582*** | 0.0138 | 4.2117 | 0.0001 |
| C | | 11.2981 | 3.7194 | 3.0376 | 0.0032 |
| Second Regime<br>14.33($\gamma_1$) $\leq$ Debt ratio< 21.40 ($\gamma_2$)<br>(15 observations) | | | | | |
| Debt ratio | $\alpha_2$ | 0.6019*** | 0.1678 | 3.5872 | 0.0006 |
| Liquidity | | 0.1494** | 0.0830 | 1.7993 | 0.0757 |
| Cash flow volatility | | 0.9914*** | 0.3311 | 2.9940 | 0.0037 |
| Growth in investment | | 0.0118 | 0.0227 | 0.5199 | 0.6046 |
| Size | | 0.7108** | 0.0820 | 2.5201 | 0.0137 |
| Dividend payout | | 1.1482*** | 0.2978 | 3.8548 | 0.0002 |
| Financial flexibility | | -0.0623*** | 0.0198 | -3.1511 | 0.0023 |
| C | | -21.0739 | 5.6014 | -3.7622 | 0.0003 |

| | | | | | |
|---|---|---|---|---|---|
| Third Regime<br>Debt ratio ≥21.40 ($\gamma_2$)<br>(73 observations) | | | | | |
| Debt ratio | $\alpha_3$ | -0.0256** | 0.0102 | -2.5005 | 0.0144 |
| Liquidity | | 0.0025 | 0.0049 | 0.4992 | 0.6190 |
| Cash flow volatility | | 0.2654** | 0.1058 | 2.5086 | 0.0141 |
| Growth in investment | | 0.0003 | 0.0031 | 0.0962 | 0.9236 |
| Size | | -0.1094 | 0.0736 | -1.4861 | 0.1412 |
| Dividend payout | | 0.4608*** | 0.0963 | 4.7858 | 0.0000 |
| Financial flexibility | | 0.0045 | 0.0036 | 1.2446 | 0.2169 |
| C | | 4.5847 | 1.2608 | 3.6364 | 0.0005 |
| R-squared | | 0.8584 | | | |
| F-statistic | | 21.0865*** | | | |

Notes:
$\alpha_1$ is the estimated coefficient for $d_{it} < \gamma_1$, $\alpha_2$ is the estimated coefficient for $d_{it}$ $\gamma_1 \leq d_{it} < \gamma_2$, $\alpha_3$ is the estimated coefficient for $d_{it} \geq \gamma_2$ , SE $_{White}$ is the threshold regression with White heteroscedasticity-consistent standard errors and covariances, t $_{White}$ is the t-statistic, ***, ** and * indicate significance at the 1, 5 and 10% level, respectively. Sample trimming value is 0.10, confidence interval at 95% level, use continuous sequential determined threshold method and number of threshold is 2 to fine tune the optimal threshold result.

The findings illustrated in Table 2 indicate that there are double threshold in the three (3) debt threshold regime obtained from the continuous sequential threshold regression analysis. The three regimes, along with the debt threshold value were determined based on the sequential threshold regression analysis that minimized the residual sums of squares. In this regard, in the regime where the debt ratio is less than 14.33%, the estimated coefficient $\alpha_1$ is 0.0168. However, this relationship is insignificant. This indicates that when the debt ratio is less than 14.33%, there is no relationship between debt ratio and ROIA of MREITs. This result suggests that MREITs with a ratio lower than 14.33% does not have any impact on the firm's financial performance. Meanwhile, in the regime where the debt ratio is between 14.33% and 21.40%, the estimated coefficient $\alpha_2$ is 0.6019, indicating the debt has a positive and significant impact on ROIA. Comparing the results of the two estimated coefficients, $\alpha_1$ and $\alpha_2$, it can be observed that when the debt ratio is between 14.33% and 21.40%, ROIA increased by 0.60% when the debt ratio increased by 1%.

However, the negative relationship between debt and ROIA was found when the debt ratio was more than 21.40% with a significant estimated coefficient $\alpha_3$ of -0.0256. The marginal effect of debt on ROIA of MREITs changed from positive to negative once the debt level exceeded the 21.40% threshold. Taken together, this debt threshold estimated results suggest that beyond the debt level of 21.40%, any increase in debt level results in a decrease in ROIA of MREITs. What is interesting in this result is that too little debt use in the MREITs capital structure below 14.33% does not bring any impact or relationship between debt and financial performance. In the meantime, having too little debt may indicate MREITs' lack of investment growth or indicate poor performance. This tells us that MREITs need to sustain growth in their property investment as this will provide higher income yield and increase the overall return on the firm's invested assets, bearing in mind that the threshold limit or the optimal debt threshold for MREITs is between 14.33% and 21.40%. It is also essential to note that about 14.70% of MREITs (based on 17 observation falls in the optimal debt regime) reached the optimal debt level of between 14.33% and 21.40% during the study period, while 71.56% of MREITs exceeded the financing cost against earnings that led to the reduction of financial performance, and 15.68% of MREITs showed a debt level below the estimated optimal debt threshold. The finding also suggests that the relationship between debt ratio and financial performance of MREITs is asymmetrically nonlinear.

Noticeably, the debt ratio is not the only element affecting the financial performance of MREITs. As demonstrated in Table 2, liquidity, which is used as a control variable in this threshold model, was found to be significantly negatively related to ROIA in the regimes with debt below 14.33%. While in the regime with debt ratio above 21.40% the liquidity is not related to the ROIA. More importantly, these results provide important insights that when the MREITs are in the optimal debt level, which is between 14.33% and 21.40%, liquidity also acts as an influential role in the determinant of financial performance. This is consistent with the previous empirical evidence on the important role of on firm financial performance as firms with high liquidity may have better financial performance and survival (Moyer et al. 2001). Nevertheless, the result indicates that above the optimal debt level, liquidity is less significant in determining the financial performance.

Furthermore, the study found that cash flow volatility is significantly and positively related to ROIA in all the three regimes. The results support the idea of Chi and Su (2017) that there is a small relationship between cash flow volatility and firm financial performance in small (young) firms with higher growth opportunities. This seems to match the REITs industry in Malaysia which are considered to be relatively young and small compared to the REITs in developed countries like the United States where the REITs in the US have been established since 1961. The relationship between growth in investment with the variables studied is interesting because it has a negative relationship with financial performance for the first regime but no relation with MREITs' financial performance, in both second and third regime. This indicates high growth in investment does not translate to high financial performance. Furthermore, dividend payouts have positive relationship with financial performance in both the second and third regime. This indicates that higher payout dividend translates to higher financial performance for the MREITs.

In regards to the role of financial flexibility as a control variable in this threshold model, the result revealed that financial flexibility is positively related to ROIA when the debt ratio is below 14.33%, which is consistent with the previous studies and it is negatively related when the debt ratio is above 14.33%. Thus, the obvious finding to emerge from this study is that size of MREITs has no relationship with to the firm's financial performance in the both below and above the optimal debt regime. Firm size was found to be positively related to MREITs' financial performance when the debt ratio is within the optimal regime, which is between 14.33% and 21.40%. Thus, this study posits that larger MREITs seem to gain greater financial performance if they use debt optimally. Thus, it is reasonable to conclude that being a larger MREITs does not necessary lead to higher financial performance as they are perceive to be more cost efficient, however, careful attention needs to be considered to use debt optimally in order to attain high financial performance. It is notable that regardless of their size, MREITs are exposed to bankruptcy risk if their debt level is beyond the optimal level.

## CONCLUSION

The main aim of this study is to find the answer to the lingering questions around REITs, particularly REITs in Malaysia. As REITs have no tax shield benefit, it is important to find out what is the optimal debt level for MREITs. The results confirm the nonlinear relationship between debt and financial performance and had identified the optimal debt level that optimizes the financial performance of MREITs. The finding offers an important insight that the optimal debt level of MREITs is between 14.33% and 21.40%. This finding is consistent with the trade-off theory that suggests there is an optimal debt usage in which optimal debt usage is determined at the point where any increase in debt level will cause an increase in the risk of financial distress more than the advantage received from the tax shield. In the MREITs context, there is no benefit of tax shield, thus MREITs need to balance the benefit of using debt to escalate their property investment as this will sustain the upward momentum of their income earnings, with the cost of debt financing.

The study by Abd Halim and Nur Adiana Hiau (2013) found that the optimal debt threshold value of Malaysian listed companies (non-REITs) was 64.33% while, in contrast, the optimal debt thresholds in the MREITs context were between 14.33% and 21.40%. The optimal debt level for MREITs is almost seventy percent (70%) lower than the non-REITs industry, which may indicate that for an REITs entity with a zero marginal tax rate, the cost of using debt is relatively higher than non-REITs industry. It is important to note that the comparative levels of the costs and benefits of debt vary with firms' characteristics and business framework. This suggests that different firms' characteristic and business frameworks lead to different optimal debt level and that different industries may have different abilities to carry the debt which is determined by the volatility of a firm's cash flows. Moreover, the lower optimal debt level for MREITs relative to non-REITs indicates that MREITs is discouraged to use debt because similar to tax-paying firms, MREITs have to pay the similar financing cost despite not having tax shield benefit ( Chan et al. 2003; Howe & Shilling 1988). Undoubtedly, it was found that it will be costlier for MREIT entity to fund its growth needs or other operational needs using debt financing. These results are also consistent with the debt overhang theory which posits that having too much debt will harm a firm's performance and most likely to increase the debt overhang problem in the firm. Moreover, the results support the findings by Oppenheimer (2000), Dimitrov and Jain (2008), and Titman et al. (2014) which showed the adverse effect of using debt on the firm performance.

In the context of MREITs, the result suggests that based on the high fixed dividend payout requirement and zero marginal tax, if debt financing is chosen as the dominant approach of obtaining external financing needs, the MREITs should properly monitor their debt level so that it does not exceed the optimal debt threshold. Furthermore, MREITs managers could choose to use debt financing to maintain their investment needs on the optimal path and to ensure the smoothness of business operations, however, it is imperative that their decision should not violate the constraint of debt (Lambrecht & Myers 2014). In this light, MREITs need to focus on the optimal level of leverage and only accept the risk or constraint of debt when the chances of investment success are high, rather than prioritizing the desire to expand in their property investment portfolio over the optimal debt level.

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## Exhibit 1

M-REIT Debt ratio For 2005 to 2014

| | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|
| Axis REIT (Islamic) | 34.26 | 33.38 | 35.51 | 24.11 | 34.94 | 34.64 | 31.74 | 36.10 | 21.40 | 11.94 |
| Al-AqarKPJ REIT (Islamic) | 48.09 | 48.79 | 49.34 | 50.04 | 47.26 | 45.28 | 35.25 | 27.71 | 27.71 | - |
| Al-Hadharah Boustead REIT (Islamic)* | - | - | 14.33 | 14.19 | 10.66 | 11.05 | 11.28 | - | - | - |
| AmanahHartaTanah PNB | 20.25 | 12.35 | 8.74 | 5.99 | 0.62 | - | - | - | - | - |
| Amanah Raya REIT | 37.40 | 40.29 | 38.10 | 38.31 | 39.58 | 36.78 | 36.83 | 34.60 | - | - |
| AmFirst REIT | 35.99 | 32.76 | 33.19 | 46.29 | 39.46 | 39.65 | 39.59 | 46.12 | 12.74 | - |
| Atrium REIT | 28.51 | 29.19 | 31.15 | 33.13 | 27.51 | 27.74 | 27.74 | 27.93 | - | - |
| Capita Malls Malaysia Trust | 29.64 | 29.31 | 29.35 | 29.53 | 34.64 | | | - | - | - |
| Hektar REIT | 41.44 | 41.07 | 41.93 | 42.87 | 44.08 | 45.23 | 41.98 | 32.37 | - | - |
| IGB REIT | 24.84 | 25.25 | 25.68 | - | - | - | - | - | - | - |
| Pavilion REIT | 15.92 | 17.03 | 17.53 | 19.74 | - | - | - | - | - | - |
| Quill Capita Trust | 36.17 | 36.81 | 36.83 | 37.29 | 37.42 | 38.46 | 38.53 | 16.29 | - | - |
| Sunway REIT | 31.45 | 31.33 | 33.56 | 35.54 | - | - | - | - | - | - |
| Starhill REIT | 49.71 | 55.75 | 10.73 | 35.72 | 15.97 | 11.55 | 14.08 | 14.09 | 15.63 | - |
| Tower REIT | 17.30 | 17.77 | 17.73 | 19.17 | 19.60 | 19.09 | 19.73 | 24.60 | 26.40 | - |
| UOA REIT | 35.55 | 35.44 | 35.78 | 37.33 | 28.15 | 22.50 | 23.50 | 14.99 | 18.91 | 26.04 |