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Timing of Debt Maturity Structure: Evidence From Public and Private Debt Securities Issued By Malaysian and Singaporean Non-Financial Listed Firms

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Abstract
This study examined the causal factors concerning the timing of debt maturity structure issuance for public and private debt securities in Malaysia and Singapore. Data of 1,157 Malaysian and Singaporean listed firms were utilised between 1996 and 2019. The two-step system generalised moment (GMM) method showed that macroeconomic factors such as inflation and excess bond return are crucial in influencing Malaysia's issuance of long-term private debt securities. There was also evidence that inflation explained the issuance of long-term private debt securities in Singapore. Firms preferred to issue fewer long-term private debt securities when inflation is high. Furthermore, it was found that Malaysian firms issued public and private debt securities and Singaporean firms issued private debt securities successfully time their debt maturity structure. This study's findings offered several policy implications as they helped firms identify the proper time to issue the debt maturity structure of public and private debt securities. This identification contributed to achieving an optimal debt maturity structure, maximising the firms' value, healthy business environment and stable economic growth.
Keywords: Private Debt Securities, Public Debt Securities, Timing of Debt Maturity Structure.

Introduction

In the role of market timing in firms' financial decisions, debt market timing is still in its infancy against equity market timing, sparking significant interest amongst researchers. In our imperfect world, where information is imprecise, markets are inefficient, and transactions are not frictionless. The nature of debt maturity structure varies across countries and firms and throughout time (Graham and Harvey, 2001; Agca et al., 2015). Consequently, firms do have a target optimal debt maturity structure in the presence of market imperfections. Optimal debt maturity is crucial for firms as it maximises their value and reduces the likelihood of bankruptcy (Tekin and Polat, 2021).

Previous theories predict that the optimal debt maturity, which is prone to minimising the overall capital cost, is determined by firm-specific characteristics. Nevertheless, market timing theory has recently challenged previous predictions by claiming that corporate debt

maturity structure is affected by credit market conditions. Based on the previous empirical evidence, five domineering factors affect the timing of debt maturity structure, namely interest rates, excess bond return, inflation, term spread, and government debt maturity structure (Graham and Harvey, 2001; Baker et al., 2013; Badoer and James, 2016). Furthermore, a survey by Graham and Harvey (2001) proves that managers borrow short-term when they perceive short-term rates are low relative to long-term rates or when expecting a decrease in long-term rates. In other words, timing factors play a significant role in debt maturity structure decisions. Nevertheless, the result above is valid, particularly for big companies.

Based on the review of the related literature, researchers argued the managers' ability to utilise the abovementioned macroeconomic variables such as interest rates and excess bond return. This ability concerns short-term and long-term debt issuing in the timing of the debt maturity structure. Additionally, Song (2009) asserted that although businesses utilise market interest rates or potential credit quality to time debt markets, they do not increase the firm value. The motivation of this study dates back to earlier work on factors affecting the timing of debt maturity structure, which concentrated on developed countries. These countries include the United States, Canada and France followed by developing countries, namely Tunisia and South Africa. Furthermore, a study by Fan et al (2012) examined the issue above in Asian countries such as Malaysia and Singapore that encompasses the sample country in their study. However, by merely reporting the results, the researchers did not justify their selection of the Asian countries.

Despite institutions, legislation, taxes, and market conditions being relatively constant, debt maturity structure varies in terms of different companies' debt issues, and over time, in the problems of the same business (Julio et al., 2007). Besides, the evidence of successful timing is dependent on the time interval and type of debt examined. The corporate debt trends and determinants in emerging economies may differ from those identified in more developed capital markets. Besides, previous researchers argued on the managers' ability in timing debt maturity structure, as proposed by Modigliani and Miller. This idea suggests that managers successfully time the debt market to acquire better bond markets and future interest rates (Song, 2009). Moreover, there are mixed and unclear findings on how macroeconomic factors affect the timing of debt maturity structure (Kaya, 2012; Barry et al., 2009; Bougatef & Chichti, 2011). In other words, the results from previous researchers contradicted the market timing and gap-filling theory, which support the relationship between factors that affect the timing of debt maturity structure.

Previous research found discrepancies between firms that utilise bank debt and firms that utilise private non-bank debt, motivated by debt maturity (Carey et al., 1993). Hence, this study differs from previous empirical studies where factors causing decision on debt maturity structure is investigated. The study primarily focuses on the public and private debt securities in Malaysia and Singapore, different over time. Furthermore, this study will add to the current literature in several ways. Firstly, prior studies on the timing of debt maturity structure concentrate merely on one form of debt securities, either the public or private debt securities (Deesomsak et al., 2009; Agca et al., 2015; Fan, Titman & Twite, 2012; and Turk-Ariss, 2016). This situation is because theoretical models on debt structure presume that the public and private debt securities are identical (Johnson, 1997).

Secondly, as mentioned above, the author asserted that most theoretical models on debt maturity structure do not enable companies to use public and private securities as their funding source. Moreover, previous studies either exclude or combine private debt with public debt. Finally, less attention is given to Asian countries, specifically Malaysia and Singapore, examining the effect of government debt maturity structure on the issuance of corporate debt maturity structure. This issue received significant attention among researchers, and thus, this topic has become a novel research scope for Asian countries, especially Malaysia and Singapore.

The result from this study reported that inflation is responsible for the issuance of long-term private debt maturity structures in Malaysia and Singapore. Additionally, by utilising the generalised moment (GMM) method, the study found that excess bond return negatively impacts Malaysia's issuance of private debt securities. However, this variable does not explain the issuance of long-term private debt securities in Singapore and the public debt of both countries. Furthermore, macroeconomic factors such as interest rates fail to explain the two countries' debt maturity structure timing of public and private debt securities. The study found no evidence of government debt maturity structure's success in explaining the issuance of long-term public and private debt securities in both countries' government debt maturity structure, contradicting the gap-filling theory.

Furthermore, this study proved that Malaysian firms that issue public and private debt securities successfully time their debt maturity structure. This finding can be similarly observed in Singaporean firms issuing private debt securities. The remainder of the paper is organised as follows: theoretical and empirical literature on the determinants of corporate debt maturity structure and hypothesis growth, discussed in Section 2. Section 3 describes the estimation results and a summary of the data used in the empirical study, while the last section concludes the study.

Timing of Debt Maturity Structure: Overview of the Literature

Gap-filling Theory

Greenwood, Hanson and Stein (2010) first introduced gap filling theory when the researchers realised limitations in the traditional theory used in debt maturity structure. This theory stated that the firms' decision on debt maturity structure negatively affects the government's debt maturity decision. In other words, if the government decided to utilise long-term debt, the firms should shift their decision to debt financing by using short-term debt.

Market Timing Theory

Market timing theory is categorised into equity market timing and debt market timing theory. Based on the equity market timing theory, the firms' decisions in raising additional equity depended on their current market value (Baker, Greenwood, and Wugler, 2003). Meanwhile, debt market timing theory depends on the market interest rate or debt market behaviour, specifically deciding on debt maturity structure and the types of debts. In other words, when market interest rates (term spread or excess bond return) are low, companies are more likely to issue long-term debt.

Trade off Theory

A new tax theory is introduced by Myres (1984), known as the trade-off theory, an extension of Modigliani and Miller's (I) and (II) propositions with the addition of tax. In this context, Myres successfully demonstrated that leverage is optimal if the firms absorb the costs and issue an offset by tax benefits. This idea allowed them to enjoy the gains or benefits at the time of interest payment (Ahmadimousaabad et al., 2013). Incidentally, a value-creating firm must balance refinancing cost and interest rate risk with the benefit of paying lower interest while using shorter-term loans. A cost-cutting company will adapt its financial policies into a fluctuating business environment. Thus, firms will modify their debt maturity structure as the relative cost advantage of shorter-term debt shifts. One significant advantage of using shorter-term debt is lower costs than longer-term debt. In essence, firms that can bear the total refinancing and interest rate risk of using shorter-term debt will thus shorten their debt maturity structure.

Factors Affecting Decision for Debt Maturity Structure to be Different Across Time

Several theoretical and empirical finance research studies investigated debt versus equity decisions and other factors influencing debt issuance decisions. A study examined the factors that led to the issuance of debt maturity structure's gradual shift (Baker et al., 2003). It was found that inflation, short-term interest rate, and term spread successfully predicted excess bond return and identified the timing of short and long-term debt issuance. In other words, firms are inclined to issue long term debt given the manager's prediction of low excess bond returns. The aforementioned strength of the result increased particularly for established firms, matured firms, dividend payment-based firms, and investment-grade firms.

This outcome was further supported by the findings of various researchers (Bougatef and Chichti, 2010; Witmer, 2009; Zavertiaeva and Nechaeva, 2017; Rixtel et al., 2015; Chang et al., 2019). However, Rixtel et al (2015) asserted that interest rate is more effective in explaining the timing of debt maturity structure before an economic crisis, albeit not during the crisis. Additionally, Chang et al (2019) suggested that firms that are not financially constrained issue debt in response to debt market spreads. Baker et al (2003) investigated the impact of the market timing hypothesis on debt maturity structure, supported by Graham and Harvey's (2001) findings. Notably, interest rates, inflation, and term spread have become factors influencing short-term loan demand over time. However, there are certain limits to this economic component, such that they can only explain the variations in demand for short-term debt over time and across large enterprises.

Previous researchers have validated the importance of interest rates, inflation, and predicted bond returns in timing debt maturity structure, though others challenged these conclusions. For instance, the only interest rate successfully explained gradual variance in maturity structure for straight bonds among US corporations, albeit failed to demonstrate the anticipated return (Barry et al., 2005). On a similar note, interest rates effectively elucidated the consistent variations in short-term debt among US firms (Graham and Harvey, 2001). However, it was found that among these firms, the debt market factor, such as interest rates, only significantly affect long-term debt and not short-term debt (Badoer and James, 2016).

Several studies found that interest rate is not a significant determinant for timing debt maturity structure in the United States and Turkey (Custodio et al., 2013; Orman and Koksal,

2017). Kaya (2012) claimed that bond yield fluctuations exhibited no impact on US companies' issuance of long-term debt. Furthermore, the empirical evidence on the timing of debt maturity structure indicated that short-term interest rate and term spread (inflation) insignificantly affect the timing of debt issuance among US firms (Byun et al., 2021). Overall, managers ineffectively utilise the macroeconomics variable, namely short-term interest rate and term spread (inflation), in timing debt maturity structure.

H_1: Interest rates negatively affect the issuance of public and private debt securities.

H_2: Excess bond returns negatively affect the issuance of public and private debt securities.

H_3: Historical interest rates negatively affect the issuance of public and private debt securities.

H_4: Future excess bond returns negatively affect the issuance of public and private debt securities.

H_5: Inflation negatively affect the issuance of public and private debt securities.

In emerging economies, corporate debt trends and determinants may differ from those identified in more developed capital markets such as the US. This situation is further proved in a study by Jiang et al (2021), where market timing fails to explain the issuance of long-term debt among Chinese firms between 2003 and 2015. Similarly, for the timing of debt issuance, the manager fails to utilise the interest rate to time the debt issuance of Indonesian firms between 2009 and 2011 (Andreani and Tamara, 2013). Additionally, Ameer (2007) examined the macroeconomic factors such as changes in interest rate, stock market returns, and expected inflation rate in influencing the issuance of equity and bond in Malaysia and Korea.

The authors above asserted that the changes in interest rates are more effective in explaining the bond issuance in Korea. However, it was found that stock returns significantly affect bond issuance in Malaysia. Nevertheless, the study above differed from this study in the form of objective, time frame, unit of study, and method. The author explains the distinction of vector autoregressive models and variance decomposition techniques in accomplishing the study's objective. Recent empirical evidence suggests that government debt maturity structure had a detrimental impact on the issuance of long-term debt. For instance, Graham et al (2014) show that government debt maturity structure plays a crucial role in negatively influencing American firms' financial behaviour.

Previous research further supported this finding, which discovered a negative link between government debt maturity structure and corporate debt maturity structure in the US and Europe (Demirci et al., 2019; Badoer and James, 2016; Ayturk, 2017). In Asian countries, Huang, Pagano and Panizza (2020) revealed a shift in financial preference for short-term debt, specifically when the government issues long-term debt for firms in China. A similar study found that the government debt maturity structure significantly and negatively affects firms' debt maturity in Asian countries (Demirci et al., 2019). However, the author did not clarify the

specific Asian countries utilised in the study and reported the results for the countries as a collective group. Consequently, government debt maturity structure directly and adversely influence firms' debt maturity structure and assist managers in timing the debt maturity structure.

Despite the reported results agreeing with Greenwood, Hanson, and Stein's (2010) gap-filling theory, others disagreed with the idea. For instance, Witmer (2009) investigated the factors influencing debt market timing. The author claimed that interest rates successfully explained the issuance of long-term government debt over time. However, the relationship between maturity structure for government debt and maturity structure for corporate debt was statistically insignificant. Furthermore, Orman and Koksal (2017) reported contradicting results from Greenwood, Hanson, and Stein (2010), who found that changes in government debt's maturity structure presented little influence on long-term corporate debt.

$H_{6:}$ government debt maturity structure negatively affects the issuance of public and private debt securities

Methodology

Description of the Sample and Data

Data from this study comprise 828 listed firms in Malaysia and 329 listed firms in Singapore. Financial industries and unclassified industries are excluded from this study because they are subjected to different regulatory capital requirements and accounting considerations. These factors include banks (34), financial services sector (101), life insurance (2), nonlife insurance (16), real estate investment trust (4), the closed-end fund (4), and unclassified industries (7). Since this study focused on the debt maturity structure of Malaysia and Singapore, it has classified the industries using data from the data stream. Furthermore, data on long-term and total debt used as a dependent variable of this study are gathered from the data stream. Data on government debt, interest rates, inflation and term, spread utilised as independent variables are derived from Bank Negara Malaysia and Bank International of Settlement.

This study eliminated financial and unclassified industries data due to different regulatory capital requirements and accounting considerations. These industries comprised banks (34), financial services sector (101), life insurance (2), nonlife insurance (16), real estate investment trust (4), the closed-end fund (4), and unclassified industries (7). The period of this study covered twenty-three years, from the year 1996 to 2019. The selection of 1996 as the initial study period was due to two reasons: the bond market development in Malaysia and Singapore started after the 1997 Asian financial crisis. The second reason is the data availability for the breadth of the public debt market or bond market in Malaysia and Singapore.

Previous studies utilised two variables, namely firm size and credit ratings, to classify whether Malaysian and Singaporean enterprises are issuing public or private debt securities (Pessarossi and Weill, 2013; Lin et al., 2013; Gomes and Phillips, 2012). According to Kale and Meneghetti's (2011) survey, enterprises possessed two critical criteria in employing public or private debt as a source of financing: information asymmetry and credit ratings. Moreover, previous researchers that examine factors affecting firms' decisions in selecting public and private debt indicate the same finding as Kale and Meneghetti (2011) (Pessarossi and Weill,

2013; Lin et al., 2013; Gomes and Phillips, 2012). In classifying either Malaysian and Singaporean firms are issuing public or private debt securities, previous researchers utilise two measurements, namely firm size and credit ratings (Pessarossi and Weill, 2013; Lin et al., 2013; Gomes and Phillips, 2012).

Firms in Malaysia and Singapore were categorised based on their issuance of public or private debt securities using the Z-score. Out of 537 listed corporations, it was revealed that 436 firms in Malaysia issued public debt securities and 392 firms issued private debt securities. Meanwhile, 175 of the 208 listed companies issued public debt securities in Singapore, while 154 issued private debt securities. The study's aim was achieved by employing a dynamic panel data analysis, a suitable method as it used listed firms in Malaysia and Singapore as the unit of analysis, and the sample period was between 1996 and 2019. However, this study has an unbalanced panel data because of missing observations, specifically from financial statements such as long-term debt and total debt, utilised to estimate debt maturity structure.

The time-series and cross-sectional data assume firms to be homogeneous, resulting in bias and inconsistent results. Thus, a panel data analysis offer several benefits, where the method considers firms to be heterogeneous and allows for dynamic modification. Besides, panel data reduced the multicollinearity issues that the time series and cross-sectional data analysis typically encounter. Studies have found that each country has its accounting standards, laws, and regulations, followed by its economic environment and corporate governance traditions (Antoniou, Guney, and Paudyal, 2006; Terra, 2009). Furthermore, the objective of this study is to examine the factors that lead to the timing of public and private debt maturity structures issuance. Overall, panel data analysis is preferable to cross-sectional data analysis as this favoured method allowed changes in one period of time to explain changes in another. This study aims to examine factors affecting the timing of long-term debt issuance. In this context, the regression that comprises dependent variable and explanatory variables is as follows:

$$DM_{i,t} = \propto_0 + \sum_{k=1}^{n} \beta DM_{i,t-1} + \sum_{k=1}^{n} \gamma X_{i,t} + \sum_{k=1}^{n} \theta Z_{i,t-1} + \varepsilon_{i,t}$$

i = 1,2,…1157,; t = 1996, …,2019

$DM_{i,t}$ *represent the dependent variable, the debt maturity structure of listed firms in Malaysia and Singapore that issued public and private debt securities i at the period, t.* $DM_{i,t-1}$ *represents the lagged debt maturity structure included in the right-hand side of the equation to allow for dynamic adjustment.* $X_{i,t}$ *are the explanatory variables examined in this study, namely inflation, interest rates, excess bond return, and government debt maturity structure.* $Z_{i,t-1}$ *are the explanatory variables examined in this study, namely lagged interest rates and lagged excess bond return.* $\propto_0, \beta, \gamma, \theta$ *are the unknown parameters to be estimated while* $\varepsilon_{i,t}$ *represent the residual term in the equation*.

Proxy for Variables

Proxy for Debt Maturity

The method for measuring debt maturity structure as the dependent variable is too broad as different authors have distinct perspectives or methods for measuring it. In this case, some authors use long-term debt as a proxy to measure debt maturity structure (Costa et al., 2014;

Bali and Skinner, 2006; Custodio et al., 2013). Bali and Skinner (2006) used the total long-term debt as their dependent variable, albeit they only focused on new debt issuance rather than existing debt. Meanwhile, previous authors have measured their dependent variable by comparing long-term debt to total debt (Cai et al., 2008; Deesomsak et al., 2009; Terra, 2011; Mateus and Terra, 2013; Zheng et al., 2012). However, several authors used book value rather than market value to measure their debt maturity structure (long-term book debt over total book debt).

In his study, Myres (1977) mentions "determinants of corporate borrowing," in which book value was considered the value of debt that was already recorded. This idea was opposed to market value that measured unrecorded debt (Arslan and Karan, 2006; Terra, 2011; Chen, Ho and Yeo, 1999; Graham et al., 2014; Orman and Koksal, 2017). Furthermore, Terra (2011) claimed that using the book value of debt made the value of debt more reliable, though this type of value could not avoid the risk of window dressing done by accountants. Notably, book value is a preferable measure of debt maturity structure than market value when access to data is complex, or the secondary market is underdeveloped.

In determining the best proxy for debt maturity structure, this study investigated the measurements of debt maturity structures used and how they are defined in previous studies. Debt maturity structure differs in how it is measured and its definition (Antoniou, Guney and Paudyal, 2002). Custodio, Ferreira, and Laureano (2013) defined short-term debt as debt maturing in less than five years, while other authors define long-term debt as debt that matures in more than a year (Deesomsak, Paudyal and Pescetto, 2009; Orman and Koksal, 2017; Costa et al., 2014; Arslan and Karan, 2006; Antoniou et al., 2002; Ozkan, 2002; Antoniou et al., 2008). Debt maturity structure, term to maturity, or tenor of debt referred to the date when the agreement between issuers and investors matured, or the remaining period for the firm or government to pay the interest and principal in total amount (Reilly and Brown, 2011). This situation is due to the absence of a precise benchmark for categorising specific years of short-term, medium-term, and long-term debt. Consequently, there are distinct definitions for debt maturity structure from various authors. Therefore, this study used a similar measurement from Mateus and Terra (2013); Zheng et al (2012) to measure the debt maturity structure.

Proxy for Inflation

Inflation is defined as an increase in the general price of goods and services (McConnell and Brue, 2008). Previous researchers utilised the consumer price index as a proxy for inflation to investigate inflation as one of the factors influencing the gradual variation of debt maturity structure decisions (Barry et al., 2008; Baker et al., 2003; Witmer, 2009). However, these researchers examined the inflation issue among firms in developed countries such as the US, the United Kingdom, Europe, and Canada. Hence, Malaysian and Singaporean firms were less emphasised on the issue above. Furthermore, Antoniou et al (2006) stated that the relationship between macroeconomic factors and debt maturity structure varied by country and time. Hence, the consumer price index is used as a proxy for measuring inflation in this study.

Proxy for Interest Rates

According to McConnell and Brue (2008), interest rates are the cost borrowers must pay after receiving a loan from creditors. Barry et al (2008) investigated the optimal time to issue debt using the three-month treasury bill rate as a proxy for interest rates. Meanwhile, Witmer (2009) investigated the timing of debt issuance among Canadian firms, where interest rates are one of the variables examined in this study. The author employed a similar variable as Barry et al. in the author's study, which is the three-month Treasury bill rate.

Kaya (2012) investigates the effect of historical interest rates on debt market timing and the use of three-month treasury bills rate in measuring historical interest rates. Furthermore, Baker, Greenwood, and Wugler (2003) use a similar measurement as previous researchers to investigate the impact of excess bond return on time-series variation in debt issuance. The researchers used a three-month treasury bills rate as a proxy to measure interest rates in the study. Notably, most researchers employ three-month treasury bills as a proxy to measure interest rates, specifically when examining factors affecting decisions for fluctuating debt maturity structure. Hence, this study will utilise the same proxy for interest rates.

Proxy for Excess Bond Return

Excess bond returns refer to the returns on investments issued by firms in the form of securities or portfolios that outperform returns on government securities (Mobius, 2012). Previous researchers used the same metric, which is the difference between the yield on AAA bonds and the yield on government bonds (Baker et al., 2003; Butler et al., 2006; Barry et al., 2008; Witmer, 2009; Custodio et al., 2013). However, there is limited access to data on AAA bond yields because this study uses debt from two countries, namely Malaysia and Singapore. As a result, this study employs the same metric as Barry et al (2008), the difference between the yield on a 20-year government bond and the yield on a three-month treasury bill.

Proxy for Government Debt Maturity Structure

According to Greenwood, Hanson, and Stein (2010)'s gap-filling theory, when governments increase their reliance on long-term debt, firms shift their financing preference to short-term debt. Several studies examined whether the government debt's maturity structure influences the maturity structure of firms' debt among US and Canadian firms (Badoer and James, 2016; Custodio et al., 2013; Witmer, 2009). In this context, the studies used long-term government debt to proxy for government debt maturity structure. Significantly, there are substantial studies that examined the effect of government debt maturity structure by utilising the proxy of long-term government debt over total debt on firms' debt maturity structure among US firms. Accordingly, this study will utilise the exact measurement to proxy the government debt maturity structure.

Proxy for Historical Interest Rates and Future Excess Bond Return

A survey by Graham and Harvey (2001) proves that firms tend to issue debt when the interest rate is low. Furthermore, Baker et al (2003) asserted that firms issue long-term debt when predicting that future excess bond return is low. Another study revealed that the premium would increase as future interest rates are unknown with certainty, and the actual short-term yield of long-term securities is uncertain. Given the risk aversion, long-term security holders will require compensation for bearing the uncertainty (Modigliani and Shiller, 1973). Thus, most researchers use lagged interest rate and lagged excess bond return to represent the

historical interest rates and future excess bond return, respectively. Hence, this method can be applied to determine whether Malaysian and Singaporean firms issued long-term public and private debt securities to time their debt issuance (Butler et al., 2006; Song, 2009; Barry et al., 2009; Beetsma, 2021). Thus, this study adopts an equivalent measurement to compare the results better.

Table 1. Determinants of debt maturity structure, theories, definition of the variables and expected sign

Determinant factors	Measurement	Theoretical hypothesis	Predicted relation
Inflation ($INF_{i,t}$)	Consumer price index	Trade off theory	-
Interest rates ($INT_{i,t}$)	3 months treasury bills rate	Debt market timing theory	-
Excess bond return ($EBR_{i,t}$)	difference between the yield on a 20-year government bond and the yield on a 3-month Treasury bill	Debt market timing theory	-
Future excess bond return ($EBR_{i,t-1}$)	Lagged of excess bond return	Debt market timing theory	-
Historical interest rates ($INT_{i,t-1}$)	Lagged of inflation	Debt market timing theory	-
Government debt maturity structure ($GDS_{i,t}$)	Government long-term debt over total debt	Gap filling theory	-

Empirical Results

Descriptive Statistics

Table 2 below depicts the result for descriptive statistics on determinants for the timing of debt maturity structure. Overall, the results show that the interest rates exhibit a significant mean for public and private debt securities in Malaysia at 3.265 and 3.4006, compared to the other variables. Additionally, lagged interest rates perceivably represent a crucial variable that explains the issuance of debt maturity structure for public and private debt securities in Malaysia. Accordingly, this variable's mean value is higher than other variables at 3.2556 and 3.4446, respectively. Meanwhile, for Singaporean firms that issue public and private debt securities, both excess bond returns exhibit the value of 1.8589 and 2.054, respectively.

Moreover, lagged excess bond return reported a substantial mean value compared to other variables that affect public and private debt issuance at 1.8627 and 1.2971, respectively.

Based on these results, the issuance of long-term public and private debt securities in Malaysia can be clarified by interest rates and historic interest rates. Meanwhile, excess bond return and historical excess bond return become an indicator for Singapore's issuance of long-term public and private debt securities.

Result for Two-Step System Generalized Method of Moment (GMM)

In Table 3, a two-step system GMM portrays a notable result concerning the determinants for the timing of debt maturity structure. Overall, the coefficient value for the lagged debt maturity positively affects the debt maturity structure of public and private debt securities in Malaysia and Singapore. Consequently, this result supports the notion that previous firm decisions heavily influence Malaysia and Singapore's debt maturity structure. This idea is specific to their current maturity structure of public and private debt securities. Notably, this idea conforms with Keele and Kelly (2005)'s results on the inclusion of lagged dependent variable on the right-hand side of the equation. In this context, the study asserted that the firms' current and future performance tend to strongly link with their past performance.

Furthermore, this study demonstrated a negative inflation coefficient, statistically affecting the issuance of private debt securities in Malaysia and Singapore. This result is parallel with the trade-off theory and the findings of previous studies (Oztekin, 2015; Custodio et al., 2013), indicating that firms issue less private debt securities when both countries experience lower inflation. In other words, the firms may receive lower tax benefits and have undervalued their debt. Moreover, excess bond returns negatively affect private debt securities issuance in Malaysia. Thus, excess bond return is considered one of the vital macroeconomic factors affecting Malaysian firms' issuance strategy, specifically allocating long-term private debt securities.

This result aligns with Barry et al (2008) 's findings and a survey by (Graham and Harvey, 2001). When the relative cost of long-term debt is low, firms tend to borrow longer. However, the government debt maturity structure does not exhibit statistically significant coefficients in this regression, contradicting the gap-filling theory. Accordingly, the gap-filling theory is prominent in explaining long-term debt issuance in developed countries such as the US compared to Asian countries, namely Malaysia and Singapore. Overall, the findings of this study strongly support debt market timing among firms. These firms are specific to Malaysian firms issuing long-term public and private debt and Singaporean firms issuing long-term private debt securities.

This finding is proven further by the historical interest rate proxy in which lagged interest rates negatively affect debt maturity structure timing of Malaysian public debt securities, aligning with Kaya (2013)'s findings. This idea implies that Malaysian firms issuing long-term public debt are more interested in the historical rates than current rates. In other words, Malaysian firms tend to issue fewer long-term public debt securities when the current interest rate is higher than the previous year. Additionally, it was found that future excess bond return proxy by lagged excess bond returns negatively influence the timing of long-term private debt securities issuance in Malaysia and Singapore. This result is consistent with Park (1999) and Baker, Greenwood, and Wugler (2003)'s findings. Therefore, these factors can be considered as timers or to time debt maturity structures successfully for Malaysian firms that issue long-

term public and private debt securities. Moreover, this idea can be applied to Singaporean firms that issued long-term private debt securities.

Conclusion

Overall, the magnitude of the determinants examined in this study varies depending on the type of debt securities issued by firms and the country issuing them vis-à-vis the timing of issuance for debt maturity structure. This phenomenon is due to the nature of each country, varying in terms of country governance, debt market size, economic condition, rules and regulations, and economic environment (Antoniou et al., 2006; Terra, 2011). Inflation and excess bond return are other vital and significant factors that can be used as vital and useful mechanisms, influencing the overall critical decisions for Malaysian firms, including financing, operations, and management. For example, the cost of borrowing short-term and long-term private debt securities will escalate if the inflation rate is significant in Malaysia and Singapore.

Consequently, firms will postpone purchasing new assets, hiring new employees, and expanding their businesses. Moreover, firms will shift their financing preference to internal financings, such as retained earnings. Meanwhile, historical interest rates and excess bond returns assist the financial manager to determine the proper timing for long-term debt financing. Ultimately, this idea will enable them to achieve their optimal debt maturity structure more quickly.

The current study contributed to the literature on the determinants of debt issuance timing by focusing on public and private debt securities in Southeast Asian countries, specifically Malaysia and Singapore. However, the current study exhibited several limitations that must be addressed. For instance, the Z-score, a credit rating proxy, was used in this study to determine whether Malaysian and Singaporean firms issue public or private debt. However, a multiple discriminant analysis as the proxy is better in measuring the financial distress in a developing country such as Malaysia. Hence, future research may classify Malaysian firms that issue public and private debt securities may utilise this approach to obtain a more significant result (Abdullah et al., 2008; Karbhari and Zulkarnain, 2004).

Table 2. Summary of descriptive statistics: Factors affecting timing of issuance for debt maturity structure of public and private debt securities in Malaysia and Singapore

	Obs	Mean	Std. Dev	Min	Max
Panel A: PDS (Malaysia)					
Inflation	4210	2.400	1.1956	0.5833	5.4407
Interest rate	4168	3.265	1.1554	0	9.982
Excess bond return	4210	1.172	0.7557	0.006	3.631
Government debt maturity structure	4210	0.598	0.0921	0.398	0.7108
Lagged of interest rates	3561	3.2556	1.1551	0	9.982
Lagged of excess bond return	3564	1.1874	0.7687	0.006	3.631
Panel B: PRDS (Malaysia)					
Inflation	3383	2.4420	1.2548	0.5833	5.4408
Interest rate	3355	3.4006	1.3821	1.823	9.982
Excess bond return	3383	1.2351	0.8192	0.006	3.631
Government debt maturity structure	3383	0.6063	0.0873	0.398	0.7108
Lagged of interest rates	2791	3.4446	1.4366	1.823	9.982
Lagged of excess bond return	2794	1.2453	0.8318	0.006	3.631
Panel C: PDS (Singapore)					
Inflation	1668	1.713	1.8817	-0.5025	6.5186
Interest rate	1397	1.1929	0.887	0.2	3.45
Excess bond return	1661	1.8589	0.9415	0	5.67
Government debt maturity structure	1668	0.7437	0.067	0.6206	0.8847
Lagged of interest rates	1202	1.1901	0.8971	0.2	3.45
Lagged of excess bond return	1375	1.8627	0.9523	0	5.67
Panel D: PRDS (Singapore)					
Inflation	1178	1.2692	1.6602	-0.5025	6.5186
Interest rate	1040	1.3035	0.8373	0.2	4.15

Excess bond return	1164	2.054	0.9790	0	5.67
Government debt maturity structure	1178	0.7264	0.0704	0.6206	0.8847
Lagged of interest rates	840	1.2971	0.8109	0.2	4.15
Lagged of excess bond return	913	2.1370	0.9859	0	5.67

Notes:

1. PDS represent the public debt securities and PRDS is the private debt securities

Table 3. Summary of two-step system GMM: Factors affecting timing of issuance for debt maturity structure of public and private debt securities in Malaysia and Singapore

Dependent variable: $DM_{i,t}$						
Explanatory variables	Theories	Expected sign	Malaysia		Singapore	
			PDS	PRDS	PDS	PRDS
$DM_{i,t-1}$	DM	+	0.5174*** (0.000)	0.6584*** (0.000)	0.772*** (0.000)	0.378*** (0.000)
$GDS_{i,t}$	GFT	-	-0.01494 (0.782)	-0.0035 (0.942)	0.0022 (0.993)	-0.258 (0.321)
$INF_{i,t-1}$	MTT	-	0.00085 (0.8499)	-0.00904** (0.026)	0.00186 (0.732)	-0.156 (0.035)
$IR_{i,t}$	MTT	-	0.001187 (0.870)	-0.0033 (0.488)	0.00236 (0.155)	-0.016 (0.335)
$EBR_{i,t}$	MTT	-	0.007634 (0.341)	-0.01198** (0.011)	0.0126 (0.388)	-0.0036 (0.809)
$IR_{i,t-1}$	MTT	-	-0.0194** (0.012)	0.0007 (0.900)	-0.0204 (0.240)	-0.0135 (0.501)
$EBR_{i,t-1}$	MTT	-	-0.01009 (0.177)	-0.02049*** (0.005)	-0.0009 (0.954)	-0.039* (0.053)
AR(1)			0.000	0.000	0.000	0.000
AR(2)			0.441	0.157	0.573	0.766
Hansen test			0.696	0.297	0.957	0.998
No. of observations			2817	2738	883	720
No. of firms			366	336	133	112
No. of instruments			174	107	101	85

Notes:

1. * significant at 10 percent value
2. ** significant at 5 percent value
3. *** significant at 1 percent value
4. Number in parentheses indicate p-values

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