

## **DOES FIRM-AGE MODERATE DEBT AND RETURN RELATIONSHIP IN EMERGING MARKETS?**

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### **Abstract**

Firm-age is mostly added as an explanatory variable when investigating debt-return relationship but the theoretical motivation for adding firm-age as determinant of return is unclear. Besides, Malaysian firms are moving closer to maturity stage in their firm-life cycle. As firms grow and mature with age, the costs and benefits of debt change and firms can take advantage of interest tax-shield benefits to raise debt in their capital structure. The paper draws insights from firm-life cycle theory and integrates it with Modigliani and Miller's theory. Specifically, the paper investigates the moderating effect of firm-age on debt-return relationship. The results indicate that firm-age has a positive moderating effect on debt-stock return relationship. Our results suggest that as firms grow older they use their experience to make effective capital structure decisions such as optimal debt-equity mix which maximize stockholders return. Our results also suggest that firms should consider their present stage in the firm life cycle before taking advantage of the benefits of debt interest tax-shield.

**Keywords:** Stock return, debt, firm-age, life-cycle theory, M-M theory, Malaysia

## INTRODUCTION

Firm-age is frequently used as a determinant of returns and when investigating the relationship between debt and returns (e.g. Custodio and Metzger, 2014; Lin and Chang, 2011) but it is hard to find studies that investigate moderating effects of firm-age on debt-return relationship in the finance literature. This paper makes three contributions to risk-return research. Firstly, the paper uses large samples of Malaysian listed firm and hand collect data on firm-age. Information on firm-age is not easily available, especially for firms in emerging markets. Secondly, the paper investigates the moderating effects of firm-age on debt-stock return relationship within the M-M (1958; 1963) theoretical framework. Third, the paper integrates the firm life-cycle theory with the Modigliani and Miller's and trade-off theories to explain the moderating effects of firm-age on debt-stock return relationship, in Malaysia.

Malaysian firms use more debt in their capital structure (IMF, 2013) to take advantage of the benefits of an interest tax shield to maximize shareholders return; however, firms with more experience are those that make effective capital structure decisions which maximize shareholders return. Furthermore, most Malaysian firms are closer to maturity stage in their firm-life cycle. As firms grow and mature, the costs and benefits of debt change and firms can take advantage of interest tax-shield benefits to raise debt in their capital structure. Moreover, Malaysia is an emerging market in South East Asia, and the results of this paper have policy relevance to other emerging markets because most emerging markets share similar characteristics.

Like most emerging markets, there are cases of some Malaysian firms exposing their firms to financial distress problems which adversely affect their value. Financial distress problems faced by Malaysian firms are explainable within the framework of the M-M and trade-off theories of capital structure. The trade-off theory is implied in the M-M (1963) theory and it argues that an optimal debt level exists that maximize firm value, at a point where the marginal costs and the benefits of debt are equal. This paper draws insights from firm life-cycle theory and integrates with M-M and trade-off theories to investigate the moderating effect of firm-age on debt-return relationship, an area that has received inadequate attention in the finance literature. One possible reason is that it is difficult to obtain representative data on firm-age, and the theoretical relationship between firm-age and return is unclear (Coad et al., 2013).

The rest of the paper is organized as follows: section 2 review the literature while section 3 describes the methodology and data. Section 4 discusses the results while section 5 concludes the paper and provides policy implications.

## LITERATURE REVIEW

The life-cycle theory identifies four stages in the firm life-cycle. The first is the birth stage, followed by the growth stage, maturity stage, and then declining stage (Puri and Zarutskie, 2011; Levitt, 1965). Stepanyan (2012) provide detailed characteristics of firms at the four different stages of their life-cycle. This life-cycle theory can explain the relationship between firm-age and stock returns. Firm, at growth phase or firm closer to maturity has substantial experience and makes effective capital structure decision via maximizing benefits of debt interest tax-shield or negotiating lower costs of debt capital. They can increase shareholders return. As firms move from the birth stage to growth stage or closer to maturity, the costs and benefits of debt change and firms can take advantage of interest tax-shield benefits to raise debt in their capital structure. Therefore, firm-age should moderate the relationship between debt and stock returns. In line with this reasoning, Custodio and Metzger (2014) link firm-age to the firm life-cycle theory. More specifically, they use firm-age as a proxy for firm life-cycle and their results confirm a direct and positive relationship between firm-age and return measures.

Life-cycle theory has been applied to explain firms' dividend policy decisions. Mueller (1972) applies the life-cycle theory to explain dividend policy decisions. He notes that under the life-cycle theory, a typical firm shows an S-shape growth pattern. A firm experience slow growth at birth stage, then period of rapid growth, and finally maturity and decline stage (Mueller, 1972). Conversely, this present study applies the life-cycle theory to explain the moderating effect of firm-age on debt-stock return relationship. Firm closer to maturity has substantial experience and make effective capital structure decisions via maximizing benefits of debt interest tax-shield; they can increase shareholders return. As firms move from birth stage to maturity, the costs and benefits of debt change and firms can take advantage

of the benefits of debt interest tax-shield to raise debt capital up-to the point where the shareholders return is maximized.

In a classic paper, Stinchcombe (1965) provide a logical link between firm-age and returns. He argues that older firms have more experience and greater network of relationships and can therefore obtain superior returns. Conversely, Papadogonas (2007) argues that older firms have a more bureaucratic organization structure; consequently, they are unable to respond faster to unfavorable market conditions which may negatively affect returns. Partly motivated by dearth of information on firm-age, and theory to explain the relationship between firm-age and returns, Headd and Kirchoff (2009) use the life-cycle theory to explain the link between firm-age and returns. They argue that life cycle theory provide better explanation of the link between firm-age and returns.

In a recent study, Stepanyan (2012) notes that in the field of finance, the arguments in support and against shareholder value maximization; arise due to the exclusion of time dimension from the theory of finance. New research trend now focus on the evolution of financial decisions overtime. This new research trends highlight the benefits of knowing the history of the firm overtime and subsequent stage of the firm (Stepanyan, 2012). The history of the firm is inherent in the life-cycle theory, and this paper integrate the life-cycle theory with the Modigliani and Miller's and trade-off theories to explain the moderating effect of firm-age on debt- stock return relationship.

According to the trade-off theory, an optimal debt exists at a point where marginal benefits of debt equate the marginal costs of debt. This life-cycle theory complements the Modigliani and Miller's and trade-odd theories because firms in growth phase (or firm closer to their maturity stage) use their experience to make effective capital structure decisions such as optimal debt-equity mix which maximizes the benefits of debt interest tax-shield, they can increase the shareholders return. Therefore, firm-age should moderate the debt-stock return relationship. In line with the argument presented in this paper, Faccio et al (2011) notes that firm-age captures the differences in life-cycle of the firm because riskiness would decline with firm-age. They also note that firm-age may serve as good proxy for relational network of the company (Faccio et al., 2011). It is possible that older firms may use their relational network experience to negotiate favorable debt capital.

Turning to empirical studies on firm-age and risk-return relationship in developed countries, Faccio et al (2011) investigates the impact of large shareholder diversification on corporate risk taking, Faccio et al (2011) adds firm age as determinant of corporate risk taking. They report negative relationship between firm-age and corporate risk taking in fifteen European countries. Conversely, Huang et al (2014) results show that the SEO long-run underperformance occurs mainly in young issuers, but there is no evidence of post-issue stock underperformance in idiosyncratic risk for mature (older) firms. Using panel regression analysis, Huang et al (2014) report significant positive relationship between firm-age and idiosyncratic volatility. Firm-age is also used as a determinant of equity mispricing in Pantzalis and Park (2014) study. They investigate the link between agency costs and equity mispricing and their results reveal that firm-age is negatively related to equity mispricing, in the United States. Likewise, Custodio and Metzger (2014) in a study that examines the valuation effects, use firm-age as determinant of return. They report evidence that firm-age is positive related to return measures.

Turning to empirical studies in developing country, firm-age is commonly used as determinants of returns but it is hard to find studies that investigate moderating effects of firm-age on debt-stock return relationship. Lin and Chang (2011) within the framework of Modigliani and Miller theory, analyze whether debt affect firm value but firm-age is included as a control variable. The authors report significant positive relationship between firm-age and firm-value in Taiwan. Similarly, Agiomirgianakis et al (2013), investigate the determinants of returns in tourism sector, in Greece. Using panel regression analysis, they confirm significant positive relationship between firm-age and returns. Agiomirgianakis et al (2013) argue that it appears older firms are more profitable than younger firms and it reflects the impact of accumulated learning by doing.

Conversely, within the framework of Modigliani and Miller's theory, Sinthupundaja and Navee (2015) investigate the impact of growth, size, age and debt on financial performance of manufacturing firms, in Thailand. Using ordinary least squares regression, they find negative but insignificant relationship between firm-age and both return on assets and return on equity. However, they report significant and positive relationship between firm-age and debt. In India, Dawar (2014) within the framework of agency theory investigates the impact of debt choice on return on equity and return on

assets, after controlling for age, size, growth, among other variables. He argues that it is important to control for firm-age in order to account for firm-related factors, and to avoid specification bias in the model. Using panel regression analysis, Dawar (2014) report negative relationship between firm-age and return on equity, and negative relationship between firm-age and return on assets.

In Malaysia, Rosli (2011) notes that there are many factors that determine returns and there is no general acceptable determinants of returns. He included firm-age as determinants of performance in a study that examines factors that determines the performance of small and medium enterprises (SMEs) in the auto-parts industry. Using a multiple regression analysis, he reports a positive relationship between firm-age and return on assets. Rosli (2011) also confirm positive relationship between firm-age and market price as well as positive relationship between firm-age and turnover. But the moderating effects of firm-age on debt-stock returns relationship are not investigated and there is no theoretical justification for including firm-age as control variable in return model.

## METHODOLOGY AND DATA

The study follows the framework of Modigliani and Miller (1958; 1963) with modification. Modigliani and Miller (1958) specify a static model to investigate the relationship between debt and return on common stock. Conversely, this study specifies a dynamic model to capture the dynamic relationship between debt and stock returns. The relationship between debt and stock returns is endogenous (Johnson et al., 2011). Therefore, the paper specifies dynamic panel model below:

$$\text{Return}_{it} = \alpha \text{Return}_{it-1} + \beta_1 + \beta_2 D_{it} + \beta_3 \text{Age}_{it} + \beta_4 (D * \text{Age})_{it} + \beta_5 \text{Size}_{it} + \beta_6 \text{BM}_{it} + \beta_7 \text{Tax}_{it} + \theta_i + \eta_i + \lambda_t + \mu_{it} \quad (1)$$

Where  $\text{Return}_{it-1}$  is the return in previous period, Age is the firm-age, BM is book-to-market equity,  $\alpha$  is adjustment parameter,  $\eta_i$  is the unobserved firm-specific effects,  $\lambda_t$  is the year fixed effect,  $\theta_i$  captures industry effects,  $\mu_{it}$  is the error term, subscripts 'i' and 't' represent firm and time period respectively. The model is estimated with system generalized method of moment (GMM). System GMM is proven as one of the best estimators to estimate dynamic model in corporate finance (Flannery and Hankins, 2013). Blundell and Bond (1998) system GMM combines level-equation and difference-equation, and it address endogeneity with efficient instrumental variable technique. The system GMM combines the difference GMM moment conditions in equation (2) and additional moment condition in equation (3) to produce unbiased estimators.

$$E [\Delta \mu_{it} \text{Return}_{t-k}] = E [\Delta \mu_{it} X_{t-k}] = 0, k > 1. \quad (2)$$

Where:  $\text{Return}_{t-k}$  is the higher order lags of returns (dependent variable) and  $X_{t-k}$  is the higher order lags of independent variables used as instrument. In words, the correlation between the differenced error-term and lagged returns variable used as instrument as well as lagged independent variables used as instruments equals zero. The lagged levels of the variables use as instruments in the difference GMM become weak instruments if the explanatory variables are persistent (Arellano and Bover, 1995). Thus, the system GMM adds additional moment conditions:

$$E [\Delta Y_{it} \eta_i] = 0 \quad (3)$$

In words, the correlation between the differenced instruments ( $\Delta Y_{it}$ ), and unobservable firm-specific effects ( $\eta_i$ ) in the level equation equals zero. In all the estimations, the paper uses two-step estimates because it uses the first-step errors to construct heteroskedasticity-consistent standard errors or optimal weighting matrices (Blundell and Bond, 1998).

## DATA

The data set consists of firms listed on Bursa Malaysia from 2008 to 2012. Firms-age is calculated as years since the date the firm is incorporated. Only firms with information on date of incorporation available in their websites are included in the final sample. The other variables were extracted from the Data-Stream databases. Firms operating in the financial industry are excluded from the sample because their capital structure is different from non-financial listed firms. The sample firms comprise top 621 listed firms on Bursa Malaysia. Listed firms are chosen because valuation is attached to listed firms stocks. Similar to Gomes and Schmid (2010), return is the ratio of stock return at time t+1 to stock return at time t. This is a straight forward definition compare to M-M (1958) who measure return on common stocks as ratio of stockholders net income to average value of common stock. Total debt (TD) is the ratio of total debt to

total assets. Total debt is a broader measure that encompasses the total of all liabilities and ownership claims on a firm (Matemilola and Ahmad, 2015). Debt is either measured in book-value debt or market-value debt (Tchuigoua, 2014). In accordance with Gomes and Schmid (2010) and Graham and Harvey (2001), our paper focuses on book-value of debt because it is not affected by price changes and book value of debt is closer to the value of a distress firm. Size is log of total assets. Book-to-Equity (BE) is the ratio of book value of equity to market value of equity. Tax (effective tax rate) is the ratio of tax liability to taxable income. All the control variables are those established in the literature and they are good predictor of stock returns.

## EMPIRICAL RESULTS

Table 1 shows the descriptive and correlation between the variables. Correlations between the variables affect the efficiency of the estimated coefficients. The correlation coefficients between the independent variables are generally less than 0.4, suggesting that multi-collinearity is not a problem. Table 2 present the system GMM results. The second order serial correlation test and difference Sargan test confirm that the instruments are valid. Thus, the system generalized method of moment (GMM) estimation is appropriate. Moreover, there is absence of second order serial correlation in both models. The two post estimation tests indicate that the model are correctly specified. The coefficient of the interaction-term is the main focus and it indicates how much the effect of debt changes as managerial ability changes one unit. The co-efficient of the interaction terms (debt\* firm-age), and firm-age alone are statistically significant (see Model 1 and Model 2 results). This suggests that firm-age positively moderate the debt-stock return relationship. Intuitively, the results suggest that firm closer to maturity has substantial experience and make effective capital structure decisions via maximizing benefits of debt interest tax-shield; they can increase shareholders return. As firms move from birth stage to maturity, the costs and benefits of debt change and firms can take advantage of the benefits of debt interest tax-shield to raise debt capital up-to the point where the shareholders return is maximized. In other words, firms use their business experience to choose optimal debt level where marginal tax benefits of debt outweigh the costs of financial distress. Thus, older firms' ability to minimize financial costs would increase stockholders return.

Moreover, in accordance with Ahmad et al. (2012), Matemilola et al. (2012) and Bhandari (1988) empirical findings, debt is positively related to returns. Conversely, the results are inconsistent with the empirical findings of George and Hwang (2010) and Penman et al. (2010) that debt is negatively related to stock returns. As control variables, book-to-market equity is statistically significant and positively related to stock returns. This result is consistent with Gomes and Schmid (2010) and Chang & Chen (1991) who document evidence that book-to-market equity is positively related to stock returns. They argue that book-to-market equity relates to earning prospects of the firm and it captures risk factor (financial risk) in returns. Consistent with Mironov (2013) and Dhaliwal et al (2006), tax is negatively related to stock returns because taxes are expenses to firms which should lower returns.

**Table 1 Descriptive Statistics**

Panel A. Mean, Median and standard deviation

	RETURN	TDTA	LDTA	AGE	SIZE	BM	TAX
Mean	1.076	0.465	0.367	25.062	12.566	0.019	0.069
Median	0.964	0.304	0.237	20.000	12.487	0.015	0.172
Std. Dev.	0.598	0.302	0.300	19.353	1.969	0.051	0.774

Panel B. Correlation results

	RETURN	TDTA	LDTA	AGE	SIZE	BM	TAX
RETURN	1						
TDTA	0.110 <sup>a</sup>	1					
LDTA	0.201 <sup>a</sup>	0.074 <sup>a</sup>	1				
AGE	0.102 <sup>a</sup>	0.048 <sup>b</sup>	0.049 <sup>a</sup>	1			

SIZE	0.022	0.155 <sup>a</sup>	0.093 <sup>a</sup>	-0.016	1		
BM	0.045 <sup>b</sup>	0.113 <sup>a</sup>	0.050 <sup>b</sup>	0.067 <sup>a</sup>	0.044 <sup>b</sup>	1	
TAX	-0.106 <sup>a</sup>	0.108 <sup>a</sup>	-0.109 <sup>a</sup>	0.045 <sup>b</sup>	-0.021	-0.057 <sup>b</sup>	1

**Notes:** <sup>a</sup>Stock-Return is the ratio of stock-return in year t+k to stock-return in year t. TDBV is the ratio of total debt to book value of total assets. LDBV is the ratio of long-term debt to book value of total assets. Age is firms-age calculated as years since the date the firm is incorporated. Size is log of total assets. Book-Market Equity (BM) is the ratio of book value of equity to market value of equity. Tax is the ratio of tax liability to taxable income. <sup>a</sup> and <sup>b</sup> indicate correlation coefficient is significant at 1% and 5% levels, respectively.

**Table 2: System Generalized Method of Moment (Two-step)**

Independent variable	Model 1	Model 2
Stock-Return <sub>it-1</sub>	0.189*** (13.68)	0.195*** (28.01)
TDBV	0.002*** (2.73)	- -
LDBV	- -	0.029*** (3.51)
Age (Firm-age)	0.006** (2.11)	0.041** (2.19)
TDBV*Age	0.007*** (2.87)	- -
LDBV*Age	- -	0.039*** (3.19)
Size	-0.026 (-0.96)	-0.063** (-2.33)
Book-Market Equity (BM)	0.114*** (2.83)	0.153** (3.57)
Tax	-0.002***(-3.25)	-0.001*** (-3.11)
Industry dummy	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
2 <sup>nd</sup> order serial correlation (p-value)	0.273	0.150
Difference Sargan Test (p-values)	0.144	0.500

**Notes:** <sup>a</sup>Stock-Return is the ratio of stock-return in year t+k to stock-return in year t. TDBV is the ratio of total debt to book value of total assets. LDBV is the ratio of long-term debt to book value of total assets. Age is firms-age calculated as years since the date the firm is incorporated. Size is log of total assets. Book-Market Equity (BM) is the ratio of book value of equity to market value of equity. Tax is the ratio of tax liability to taxable income. Industry effect is a dummy variable equal to 1 if a firm belongs to a particular industry and zero otherwise. <sup>b</sup>The numbers in parentheses are test statistics. <sup>c</sup>\*\*\*and\*\*indicate coefficients are significant at 1 and 5 percent levels, respectively. <sup>d</sup>Standard errors are robust system GMM results. <sup>e</sup>2<sup>nd</sup> order serial correlation that has N (0, 1) distribution, but null uncorrelated with errors. Difference Sargan (1958) over identification test and nulls that

instruments are valid. Difference Sargan (1958) tests runs if the errors are GMM type (Stata xtdpdsys command). N=621, T=5. Number of instruments are 68. Stock-Return<sub>it-2</sub>, TDBV<sub>it-2</sub>, LDBV<sub>it-2</sub>, Age<sub>it-2</sub>, Size<sub>it-2</sub>, BM<sub>it-2</sub>, and Tax<sub>it-2</sub> are used as instruments.

## CONCLUSION

Although, prior studies include firm-age as determinants of returns but the theoretical motivation for doing so is unclear. The paper draws insights from the firm-life cycle theory and integrates it with Modigliani and Miller's theory to investigate the moderating effect of firm-age on debt-stock return relationship. The results indicate that firm-age has a positive moderating effect on debt-stock return relationship. This results support the insights drawn from the firm life-cycle theory that firms closer to their maturity stage use their experience to make effective capital structure decisions in order to maximize shareholders returns.

Our results have important policy implication. Firstly, the results suggest that as firms grow older they use their experience to make effective capital structure decisions such as optimal debt-equity mix which maximize shareholders return. Secondly, the results also suggest that firms should consider their present stage in the firm life cycle before taking advantage of the benefits of debt interest tax-shield. The reason is that firms closer to maturity stage have more experience and reputation to negotiate favorable debt capital at lower costs than firms at birth stage. Third, financiers or provider of capital like banks may find it profitable to provide debt capital to firms closer to maturity in their firm life-cycle. The reason is that firms closer to maturity generate stable cash flow than firm in the birth phase which means that firms closer to maturity can easily repay debt capital plus interest. Fourth, Policy makers should take the firm-age into consideration when formulating policies that directly or indirectly influence firms' performance. Policy makers that understanding the characteristics of firms at different phase of their life cycles make better strategic decisions that address firms' financing needs. Additionally, policy makers may encourage investment in firms in their birth phase facing financial constraints problems but has high growth potentials. Future research may draw more insights from life-cycle theory to explain how firm-age affects other corporate decisions such as real investment decisions.

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