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## Article

# Firm-specific determinants of debt maturity structure of listed non-financial firms in Nigeria

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## **FIRM-SPECIFIC DETERMINANTS OF DEBT MATURITY STRUCTURE OF LISTED NON-FINANCIAL FIRMS IN NIGERIA**

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### **Abstract**

*The importance of debt financing to firms as a basis for decision-making cannot be over-emphasised. This implies that the maturity structure of debts becomes important for understanding the outcomes of firms' decisions. There is a dearth of evidence from the Nigerian context in the current body of literature on factors that determine debt maturity structure of listed firms. We observed a persistent and steady decline in the average ratio of length of maturity period among non-financial firms among listed non-financial firms in Nigeria. This study examined the extent to which non-debt tax-shield, liquidity, assets intensity, diversification, investors' confidence, growth opportunity, firm size, profitability and dividend policy determines the debt maturity structure of non-financial firms in Nigeria. The secondary data collected from the annual reports of a sample of 92 listed non-financial firms were analysed using the Two-stage Generalised Method of Moments (GMM) regression model for the period between 2010 and 2015. The results indicate that the non-debt tax-shield, liquidity, assets intensity, diversification, growth opportunity, firm size and the dividend policy significantly determine the debt maturity structure among the listed non-financial firms in Nigeria. However, the evidence is not enough to conclude that profitability and investors' confidence determine the debt maturity structure among the non-financial firms in Nigeria. Firm diversification and liquidity appeared to have the most profound negative effect on the debt maturity structure in line with*

*predictions of special use of debt hypothesis and the pecking order theory. Overall, it is concluded that the firm-specific factors determine the choice of debt maturity structure among Nigerian listed non-financial firms. Although the findings of the study are robust, future studies in the areas can extend the literature by identifying and investigating institutional and macroeconomic factors that drive debt maturity structure in Nigeria.*

**Keywords:** *Debt maturity, leverage, determinants, GMM, non-financial firms.*

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## Introduction

The importance of corporate finance has instigated and sustained a robust field of research into capital structure that is, the combination of equity and debt employable by business entities for operations. Following the global financial crisis of 2008, a number of Nigerian firms suffered significant financing constraints due to the decline in the general economic growth. The country suffered a decline in the economic performance which was related to weak remittance, foreign direct investment and a severe decline in oil prices. These problems have resulted in severe market collapse, several bankruptcies and liquidity challenges among firms. The trend has once again resulted in an increased interest in researches into financing structure among Nigerian firms. Despite the increased number of studies on capital structure in Nigeria, there is a dearth of literature which focuses on the factors that determine the debt maturity structure of firms in Nigeria.

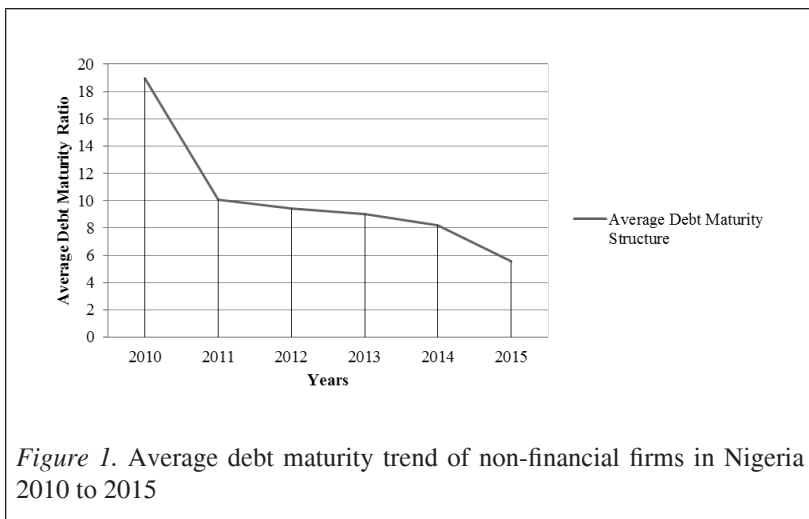
Specifically, the use of debt has been accorded significant attention; being noted for its wide-range effect on cost of capital, risk, financial performance as well as control of agency problems. While the literature is saturated with the studies on factors of whether firm, industry or country determines the presence of debt in the capital structure of firms, the same cannot be said of the choice between short-term and long-term debt which underlies the concept of the debt maturity structure of firms evident in the context of Nigerian on corporate finance.

Why does debt maturity structure matter? Lemma and Negash (2012) noted a host of reasons among which include: signalling of quality as regards firm earnings, the avoidance of liquidity risk by the matching of asset structure with debt maturity, the reduction in cost of finance, the mitigation of agency problems (and costs) and the enhancement of flexibility in financing.

Theories (signalling and agency costs) and hypotheses (tax, liquidity risk and maturity matching) have equally been expounded in explaining the dynamics of debt maturity and fostering empirical tests which contribute to broader understanding of the firm's capital structure.

The signalling function of debt is such that where short-term debts are utilised by a firm, it is most likely indicative of high quality (Flanner, 1986). Its use is likewise evident in firms with a potential for agency problems (small-sized and growing) due to its mitigating effects (Barnea, Haugen & Senbet, 1980; Myers, 1977; Smith & Warner, 1979). The tax hypothesis proposes that tax savings accruing to firms by the use debt, determines the maturity structure with profitable firms preferring long term debt to sustain exploitation of tax advantages (Lemma & Negash, 2012).

As for maturity matching hypothesis, the matching of asset maturity with debt becomes necessary in order to forestall risk of default in payment obligations (Morris, 1975; Stohs & Mauer, 1996). This equally informs the liquidity risk hypothesis which emphasises the relationship between liquidity and credit ratings which affects the debt maturity structure a firm can adopt (Diamond, 1991). From the year 2010, listed non-financial firms in Nigeria displayed a trend of increasing short-term debt in financing (Figure 1). This compels a need for investigation into possible explanations based on the firm idiosyncrasies given the limited literature on the subject matter in the context of Nigerian. From the agency theory point of view, this trend is suggestive of a likely increase in the potential for agency problem among non-financial firms in Nigeria.



The empirical works reviewed on debt maturity structure are largely concentrated on foreign economies such as France, Germany, Spain, Italy, United Kingdom (Casino-Martinez, Lopez-Garcia, Mestre-Barber & Peiro-Gimenez, 2018), United States (Custodio, Ferreira & Laureano, 2013; Olibe, Rezaee, Flagg & Ott, 2019), India (Kalsie & Nagpal, 2018), China (Cai, Fairchild & Guney, 2008), Asia-Pacific region (Deesomsak, Paudyal & Pescetto, 2009), Turkey (Orman & Koskal, 2016), Ukraine (Stephan, Talavera & Tsapin, 2011), Indonesia (Soekirman, 2015), Europe (Correia, Brito & Brandao, 2014), Jordan (Taleb & Al-Shubiri, 2011), Pakistan (Shah & Khan, 2009) and Latin America (Terra, 2010) amongst others. This paper builds on these studies by proposing and investigating the influence of diversification as well as investor confidence on the debt maturity structure. The paper further contributes to the literature by providing in-depth analysis with regards to the firm-specific determinants of debt maturity structure with a focus on listed non-financial firms in Nigeria during the years, 2010-2015 characterised by an increasing use of short-term over long-term debt by these entities. Given the theoretical propositions and post-2008 global financial crises context, this trend instigates a need for a study that brings to fore albeit in firm-specific terms, determinants of debt maturity structure of listed non-financial firms in Nigeria. The paper addresses the question of the extent to which non-debt tax shields, liquidity, asset intensity, diversification, growth opportunities, size, profitability, dividend policy and the investor confidence affect debt maturity structure in these firms. The financial industry has been excluded due to the fact that firms here, are subject to regulations on capital structure requirements (Rajan & Zingales, 1995). The non-financial firms constitute the demand for finance and are therefore, adjudged to serve a population that enables optimal assessment of firm-specific determinants in relation to choices of debt maturity structure. Insight provided by the study is expected to guide responsive adjustment of the financial system in order to meet the peculiarities of firms as displayed by their maturity structure choices.

## **Literature Review**

### ***Debt Maturity Structure***

As a concept, debt maturity structure can be defined as a means of categorising the various forms of debt employed by firms in terms of the period before repayment of principal and outstanding interest is due. Debt can refer to either financial or financial and non-financial types. Debt maturity structure can, therefore, be seen as the composition of debt maturing within a year (short-term) and that maturing beyond (long-term). This is the common distinction used in studies following the accounting convention of reporting current and

non-current debt in the financial statements (Korner, 2007; Shah & Khan, 2009). In the case where debt is defined as financial, debt maturity structure is then measured as the relation of short-term or long-term debt to total debt.

There are empirical works however, that distinguished these categories of debt (by period) using a three-year (Barclay & Smith, 1995; Custodio, Ferreira & Laureano, 2013; Soekirman, 2015) or five-year bench mark (Schiantarelli & Sembenelli, 1997; Custodio, Ferreira & Laureano, 2013). Some studies also considered the term (number of years) to maturity (Guedes & Opler, 1996; Rozali & Omar, 2011) while others in defining maturity structure, further included alongside financial debt, the non-financial types and consequently (whether short or long-term), their proportion to total liabilities (Terra, 2010; Lemma & Negash, 2012). Terra (2010) highlighted the significance of trade credit as well as other liabilities that arise due to the operations of a firm (not its financing decision) thus, justifying their inclusion in the analysis of debt maturity structure.

The theoretical framework for the subject matter is largely rooted in the extant expositions on the capital structure of firms. Modigliani and Miller (1958) posited the irrelevance of capital structure, that is, the debt-equity mix in the determination of firm value given the assumption of perfect capital markets with none of taxes, information asymmetry, transaction costs, bankruptcy costs and agency costs. Stiglitz (1974) shared this line of thought and contended that under similar conditions of perfection, the irrelevance of debt maturity structure would hold. However, the relaxation of such assumptions considering the presence of imperfections, underscored the importance of capital structure and in particular, debt maturity thus, giving rise to other hypotheses and theories. Empirical studies have further provided explanations for the composition of debt maturity in the context of tax, liquidity risk and maturity-matching hypotheses as well as signalling and agency cost theories (Lemma & Negash, 2012).

### ***Hypotheses Development***

#### **Non-debt tax shields and debt maturity structure**

According to the tax hypothesis, the consideration of tax savings accruing to firms by the use of short-term and long-term debt influences the maturity structure. The firms registering profits are expected to prefer long-term debts to extend the exploitation of tax advantages. Rozali and Omar (2011) identified three related aspects to debt and taxes that are usually studied in determining the effect of tax-shields on debt maturity structure, the effective tax rate (Kane, Marcus & McDonald, 1985), the term structure of interest rates (Brick & Ravid, 1985) and the volatility of interest rates (Kim, Mauer

& Stohs, 1995). The firms tended to prefer long-term debts in the event of a decrease in tax-shields to facilitate the amortisation of issue costs. Where the term structure of interest rates as well as its volatility are on the increase, there will be greater tax benefits in the employment of long-term debt.

Besides these however, there is a proposition that the non-debt tax-shields equally account for the overall tax benefits from the use of debt and should be considered in the studies on debt maturity structure (De Angelo & Masulis, 1980 as cited in Lemma & Negash, 2012). It is expected that the increase in non-debt tax-shields of a firm will lead to the lesser tax that will be chargeable (from the income) and likewise, will lead to tax benefits from the use of long-term debts. This implies that with increasing non-debt tax-shields, the firms are inclined to use more of short-term debts. The empirical works reviewed mostly study the influence of effective tax rate (Korner, 2007; Terra, 2010; An, 2014; Soekirman, 2015, Kalsie & Nagpal 2018) and interest rate volatility (Rozali & Omar, 2011; Correia, Brito & Brandao, 2014). Lemma and Negash (2012) examined WHAT? as a predictor variable, non-debt tax-shields and found contrary to expectation, a positive significant relationship with debt maturity. This paper is in line with proposed effect of non-debt tax-shields on debt maturity structure hypothesis as follows;

H<sub>1</sub>: Non-debt tax-shield has no significant effect on the debt maturity structure of listed non-financial firms in Nigeria.

### **Liquidity and debt maturity structure**

The capacity of a firm to meet its debt obligations determines its choice of either short-term or long-term debt. Firms may prefer short-term debt for the low interest charges but could be faced with liquidity risk where they are unable to make payments when due (Diamond, 1991). The liquidity risk hypothesis provides inference for the relationship between liquidity and debt maturity structure. Liquidity risk is a function of the level of liquidity in a firm and in turn, credit ratings or quality of firms are determined from perceived liquidity risk. Diamond (1991) opined that in the context of credit ratings from which also, investor confidence can be implied, highly rated firms are expected to opt for short-term debt (perhaps for its signalling content) and low-rated firms, long-term debt subject to its accessibility. This implies that two types of firms prone to use short-term debt are those highly and lowly rated. Employing credit quality and ratings as proxies, Correia, Brito and Brandao (2014) affirmed the hypothesis with a negative significant association registered implying that low quality or low-rated firms have longer maturity structures. In relation to liquidity and debt maturity structure, findings of studies differ; Stephan, Talavera and Tsapin, 2011, Khan, Khan

and Khan (2015) found a negative significant relationship as expected. Cai, Fairchild and Guney (2008), Terra (2010), Deesomsak, Paudyal and Pescetto (2009), Kalsie and Nagpal (2018) in contrast, found positive correlations, whereas, Taleb and Al-Shubiri (2011) concluded on the insignificance of liquidity on debt maturity structure. Based on the postulations of the hypothesis, this paper formulates the following hypothesis:

H<sub>2</sub>: Liquidity has no significant effect on the debt maturity structure of listed non-financial firms in Nigeria.

### **Asset intensity, diversification and debt maturity structure**

Correspondingly, liquidity risk may instigate the matching of asset maturity with that of debt. The longer it takes for realisation of cash from assets controlled by the firm, the more likely it will lengthen its debt maturity (Morris, 1975; Stohs & Mauer, 1996). This can be implied for firms with significant levels of investments in non-current assets as well as diversified firms under the maturity matching hypothesis. Also, the asset intensity in the firms particularly those which can serve as collateral, determines ability to contract long-term debt (Whited, 1992). Meanwhile, Terra (2010), Custodio, Ferreira and Laureano (2013) found positive significant effect of asset intensity on debt maturity, whilst Soekirman (2015), found it negative and Korner (2007) proved the insignificance of effect.

Diversification as a possible determinant has not been documented in the literature except the work of Olibe, Rezaee, Flagg and Ott's (2019). The special use of debt hypothesis in Jensen and Meckling's study (1976) revealed that diversified firms are more likely to eschew external debts especially in the short-term because such funds can be sourced internally (Llewellyn, 1971). Therefore, firm diversification is likely to lead to maturity structure dominated by long-term debt if at all, while the firms' internal capital market structure is exploited for short-term finances. Olibe, Rezaee, Flagg and Ott (2019) found that multinational corporations in the United States finance foreign assets with long-term debt and domestic assets with short-term debt. Generally, we expect that diversified firms in Nigeria depend more on the internal sources across divisions or subsidiaries and will finance externally with long-term debt. The following hypotheses are constructed for testing;

H<sub>3</sub>: Asset Intensity has no significant effect on the debt maturity structure of listed non-financial firms in Nigeria.

H<sub>4</sub>: Diversification has no significant effect on the debt maturity structure of listed non-financial firms in Nigeria.



### **Growth opportunities and debt maturity structure**

On the liquidity risk hypothesis, Diamond (1991) provided grounds for the relationship between growth opportunities and debt maturity structure. Firms experiencing growth have an array of investment opportunities that could expose them to default risk on debts where suboptimal projects are financed. To cushion against this, a reference will be made for long-term debts over short-term. Hart and Moore (1995) referred to such choice as a mitigation of the 'overinvestment' problem. In confirmation, some studies (Correia, Brito & Brandao, 2014; Orman & Koskal, 2016; Rozali & Omar, 2011; Taleb & Al-Shubiri, 2011), found significant positive relationships between growth and debt maturity with the exception of Soekirman's (2015) study which concluded on the insignificance of such relationship.

In contrast, the agency cost theory, while equally considering growth opportunities as having the potential to create agency costs of debt (asset substitution and underinvestment), posits the shortening of maturity as an optimal choice. Myers (1977) explained that underinvestment may arise where pursuing worthwhile investments is discouraged due to significant appropriation of gains by debt financiers via high interest rates as compensation for risk. With the procurement of short-term debt, maturity occurs before the investment decision allowing for refinancing and avoidance of the underinvestment problem. Firms could likewise explore the option of asset maturity matching with debt. Empirical works such as by Casino-Martinez, Lopez-Garcia, Mestre-Barber and Peiro-Gimenez, (2018), Kalsie and Nagpal (2018), Terra (2010) and Stephan, Talavera and Tsapin (2011), Custodio, Ferreira and Laureano (2013) found a significant negative relationship between growth and debt maturity whereas Heyman, Deloof and Ooghe (2003), Korner (2007), Cai, Fairchild and Guney (2008), Shah and Khan (2009), Deesomsak, Paudyal and Pescetto, (2009), Khan, Khan and Khan (2015) found insignificant relationships. We predict that the firms with growth opportunities opt for long-term debt. Based on the theories and findings of the studies, the following hypothesis is made;

H<sub>5</sub>: Growth opportunities has no significant effect on the debt maturity structure of listed non-financial firms in Nigeria.

### **Firm size and debt maturity structure**

Firm size can portend agency problems such that the smaller a firm, the likelihood that the conflict would arise between shareholders and debt-holders increases due to asset substitution (Smith & Warner, 1979). This can be averted by the use of short-term debt (Barnea, Haugen & Senbet, 1980).

Small firms also tend to have information asymmetry due to the inability to exploit economies of scale in the production and dissemination of information (Deesomsak, Paudyal & Pescetto, 2009). This should instigate the use of debt for its signalling properties as to firm quality. However, small firms may further be constrained by significant transaction costs with the issue or procurement of long-term debt (Titman & Wessels, 1988) leading to the finance on short-term basis. Many researchers (Korner, 2007; Shah & Khan, 2009; Rozali & Omar, 2011; Cai, Fairchild & Guney, 2008; Terra, 2010; Deesomsak, Paudyal & Pescetto, 2009; Taleb & Al-Shubiri, 2011; Stephan, Talavera & Tsapin, 2011; Custodio, Ferreira & Laureano, 2013; Correia, Brito & Brandao, 2014; Khan, Khan & Khan, 2015; Orman & Koksall, 2016) found positive significant relationships between size and debt maturity while a few others (Heyman, Deloof & Ooghe, 2003; Soekirman, 2015; Kalsie & Nagpal, 2018) concluded on negative significant relationships. The hypothesis for our investigation is presented as such;

H<sub>6</sub>: Firm Size has no significant effect on the debt maturity structure of listed non-financial firms in Nigeria.

### **Profitability, dividend policy and debt maturity structure**

As earlier mentioned, Flannery (1986) noted the signalling function of debt to be such that firms of high quality (profitable) tend to employ short-term debt than firms of low quality. Jun and Jen (2003) attributed this to high quality firms being capable of dealing with refinancing and interest risks associated with short-term debt than low quality firms which face uncertainty of cash flows as well as liquidity risk in the use of short-term debt (Goswami, Noe & Rebello, 1995). The expected consequence of alternatively employing long-term debt is, however, limited by cash-flow unpredictability, thus, restricting these firms to the use of short-term debt (Diamond, 1991).

If quality of firms can be indicated by levels of profitability, the same can be argued for the proportion of earnings paid out as dividends. Low or non-dividend paying firms are less likely to be financed by short-term debts due to the possible presence of financial constraints and inherent liquidity risk. It is also not unusual if these firms are unable to access long-term debts validating the liquidity risk hypothesis of Diamond's (1991) with dividend policy viewed in the context of its signalling function of credit quality. Lemma and Negash (2012) found a negative significant association with debt maturity whereas Terra (2010), Custodio, Ferreira and Laureano (2013) registered positive significant relationships. Profitability as a variable has been found in works to have varying effects, such as, positive significant (Custodio, Ferreira & Laureano, 2013; Deesomsak, Paudyal & Pescetto,

2009; Terra, 2010), negative significant (Lemma & Negash, 2012) and insignificant (Kalsie & Nagpal, 2018; Shah & Khan, 2009; Soekirman, 2015; Taleb & Al-Shubiri, 2011,). The hypotheses formulated from the discourse are presented below:

- H<sub>7</sub>: Profitability has no significant effect on the debt maturity structure of listed non-financial firms in Nigeria.
- H<sub>8</sub>: Dividend Policy (Pay-out) has no significant effect on the debt maturity structure of listed non-financial firms in Nigeria.

### **Investor confidence and debt maturity structure**

The managers' choice of whether to use short-term or long-term debt could be informed by assessment of investor confidence in a firm (often built on signal by a firm about its future performance). Investors and bondholders in line with signals, adjust their pricing of firm securities. Managers can take advantage of low financing costs resulting from high investor confidence to access cheap long-term debt. Additionally, according to Diamond (1991) investor confidence can be based on good credit ratings with the effect of highly rated firms being able to access either of short-term or low-cost long-term debt. Although, it can be posited that highly rated firms will utilise short-term debt for its signalling effect. Evidence of investor confidence effect is yet to be documented in empirical research and its examination serves as a contribution to extant literature on debt maturity structure. The paper hypothesis for investigation is as follows;

- H<sub>9</sub>: Investor Confidence has no significant effect on the debt maturity structure of listed non-financial firms in Nigeria.

## **Methodology**

### ***Data and Sample***

The study adopted a quasi-experimental research design with the aim of empirically testing the relationship between selected firm variables and debt maturity structure of non-financial firms listed on the NSE. This design is sufficient for our study because we only identify the independent variables and also select the number of lags of the dependent variable to include in our equation. An unbalanced pool data consisting of 516 firm-year observations was collected for the period 2010–2015 from the annual reports of 92 listed non-financial Nigerian firms. After the elimination of firm-years data points

for which information on debt maturity was not obtained, a total of 516 firm-year observation was used for the analysis with 36 missing data points. The 36 missing observations were due to one of the firms having data covering only three years and a few missing data points among other firms.

The population of the study include 144 firms that were listed and were actively traded on the NSE during the period 2010 to 2015. Due to the strict regulatory definition related to measuring debt in financial sector firms especially banks and due the problem with measuring leverage in banks (Lemma & Negash, 2012), a total of 52 banking and non-banking financial firms were excluded from the population. The final sample used in the study included only 92 non-financial firms that were listed and actively trading on the NSE as of 31 December 2015.

### ***Estimation Procedure and Model Specification***

The OLS remains the most efficient estimation technique for predicting the relationship between one or more variables provided its fundamental assumptions are not violated (Wooldridge, 2016). However, in the presence of endogenous variables, the OLS technique leads to inconsistent estimations while the GMM Dynamic panel estimation technique will always yield consistent estimates (Gujarati & Porter, 2009). Given the unbalanced pool data collected for the study and to address endogeneity concerns which are often raised in debt maturity studies as expressed by the likes of Lemma and Negash (2012) and Antoniou, Guney and Paudyal (2006), we employed the Dynamic Panel GMM estimation technique of Arellano and Bover (1995) to estimate the relationship and test the developed hypotheses. The technique makes use of moment conditions where three lags of the dependent variable and first differences of the independent variables (instruments for the first-differenced equation) and the best way to correct for endogeneity in this study.

According to Baltagi (2001), instruments for the endogenous transformed lagged dependent and independent variable are needed for use in dynamic panel estimation. Furthermore, the likely endogeneity of the independent variables was controlled for by using three lagged values of the independent variables as instruments in the equation. The Hansen Test was then used to confirm the validity of the instruments by verifying the presence of the first order serial correlation (AR (1)) but no second order serial correlation in the (AR (2)) in the first difference residuals. The Sargan test for over identifying restrictions was also used to confirm that the model was over-identified. Therefore, to achieve the objective of the study, the equation (2) below was estimated using a Two-step Arellano and Bond (1991) dynamic GMM model:

$$DMSTR = f(NDtax, LiQ, Asset, Divers, Growth, Size, Prof, DivPol, Invest) \quad (1)$$

$$DMSTR_{it} = \alpha_0 + \alpha_1 NDtax_{it} + \alpha_2 LiQ_{it} + \alpha_3 Asset_{it} + \alpha_4 Divers_{it} + \alpha_5 Growth + \alpha_6 Size_{it} + \alpha_7 Prof_{it} + \alpha_8 DivPol_{it} + \alpha_9 Invest_{it} + \varepsilon_{it}^1 \quad (2)$$

Table 1

*Variable, Definition, Hypothesis Tested, Prediction and Sources*

Variable	Measurement	Sources
Debt maturity structure	Short-term debt/Long-term debt	Modified Construct of Taleb and Al-Shubiri (2011)
Non-debt tax-shield	Depreciation and amortisation/total asset	Lemma and Negash (2012)
Liquidity	Current asset/current liabilities	Cai, Fairchild and Guney (2008), Deesomsak, Paudyal and Pescetto (2009), Stephan, Talavera and Tsapin (2011), Kalsie and Nagpal (2018)
Assets intensity	Measured as Fixed asset/total asset	Taleb and Al-Shubiri (2011), Lemma and Negash (2012)
Diversification	Diversification, 1= Group and 0=otherwise	Lemma and Negash (2012)
Investors' confidence	Measured market value divided by book value of equity	
Growth opportunity	Annual Percentage growth of sales	Casino-Martinez, Lopez-Garcia, Mestre-Barber and Peiro-Gimenez, (2018), Modified construct of Kalsie and Nagpal (2018)
Firm size	Log of total sales	Terra (2010), Lemma and Negash (2012), Kalsie and Nagpal (2018)
Profitability	Profit after tax/total asset	Modified constructs of Terra (2010) Kalsie and Nagpal (2018) Soekirman (2015)
Dividend policy	Cash dividend/Profit after tax	Lemma and Negash (2012)

To ensure that the estimates of the model are outcomes based on parameters that are consistent with the assumptions of the classical linear regression

model, the robustness checks which includes test for the presence of harmful multicollinearity, heteroskedasticity and normality of residual were conducted. Statistical inferences on the effect of each of the independent variables on the dependent variables were made on P-values lower than the acceptable levels of significance of 10 percent.

## Discussion

The study used an unbalanced pool data which comprised a total of 516 firm-year observations taken from a sample of 92 non-financial firms actively listed on the NSE between 2010 and 2015. Most firms have data of up-to six years while only one firm has data for only three years. Both descriptive and inferential analyses were conducted on the data and the result of the analysis is presented as below.

### *Descriptive Statistics*

Table 2 presents the results of the descriptive analysis of the data used in the study. From the table, it can be seen that 516 firm-year observations were analysed across a total of eleven parameters. The data covered all the selected firms during the period (2010 to 2015) of the study with some missing observations (i.e., 36).

Table 2

### *Descriptive Statistics*

Variable	Obs.	Mean	Std. Dev.	Min	Max
Debts maturity	516	10.293	33.059	.075	445.999
Diversification	516	0.432	0.496	0.000	1.000
Profitability	516	2.367	15.902	-127.298	89.545
Dividend policy	516	32.674	83.585	-191.653	1566.600
Growth opportunities	516	8.568	42.071	-85.779	558.584
Liquidity	516	1.255	0.773	0.006	6.021
Asset intensity	516	46.743	27.259	1.885	317.164
Firm size	516	3.54e+0	7.39e+0	0.000	6.70e+0
Investors' confidence	515	2.078	9.602	-163.932	51.961
Non-debt tax-shield	515	4.765	4.826	.0700	37.806

The average firm debt maturity structure of non-financial firms in Nigeria is where short-term debts are about 10.30 times the value of long-term debts or it could be explained as, for every N1.00 borrowed over the long-term<sup>2</sup>, N10.30K is borrowed with repayment within 1 year. This indicates that Nigerian manufacturing firms on the average tend to have short-term debts maturity periods (within 1 year). The minimum maturity structure is where for every N1 borrowed over the long term, about 0.07K is borrowed over the short run while some among Nigerian manufacturing firms have borrowed as much as N446 on short-term basis for every N1.00 borrowed on long-term basis. Despite the wide difference between the maximum and minimum maturity period, a standard deviation of 33.06 indicates that Nigerian manufacturing firms are more likely to have more in short term debts than long term debts in their capital structure.

Furthermore, the summary of descriptive statistics shows that some of the firms belong to the business group structures, while others do not, given that the mean of diversification is 0.432 with a maximum of 1 and a minimum of 0.00. The average return on equity is about 2.4 percent with a standard deviation of about 15.9 percent. The highest profitability recorded during the period of the study is 89.54 percent while the lowest is loss of up-to 127.29 percent. The data shows a relatively low level of profitability among moderate variation in earning among manufacturing firms during the period of the study. The Table presents the average dividend paid during the period is 32.6 percent profit after tax indicating that a good percentage of profit is paid-out.

The non-financial firms in Nigeria during the period of the study grew their sales by an average of about 8.56 percent with a standard deviation of 42.07 percent. While some firms lost as much as 85 percent of their revenue at some point during the period, some have grown their sales by as much as 558.58 percent. This is an indication that while some firms were fast growing other were not growing but contracting in size. We can also see that while some firms are highly liquid with their ability to raise cash six times greater than their current liabilities, some has a very poor liquidity position with ability to cover only 0.58 of their current liabilities. However, on the average non-financial firms in Nigeria can cover their liabilities by up-to 1.25 times with a standard deviation of 0.77 times. Given that the firms are all non-financial firms, they all appear to be moderately assets intensive with an average asset intensity of 46.74 percent and a standard deviation of 27.2 percent. Some of the firms are scarcely asset intensive indicated by a minimum of less two

percent asset intensity while a maximum of 317 percent was recorded during the period.

During the study period, the average firm size measured as firm's total revenue is N3.45bn with a standard deviation of N7.34bn. The maximum revenue earned during the period was over N67bn while the minimum N0.00 meaning that some firms did not record any sales during the period. The selected firms had a moderate market to book ratio of 2.08 with a standard deviation of 9.6. This indicates a rather low level of investors' confidence in the stocks of the sampled firms during the period. Notwithstanding the moderate level of confidence, some of the firms recorded up-to 51.96 level of investors' confidence in the firms during the period. An average non-debt tax shield of 4.76 as recorded during the period, while some firms enjoyed a tax shield of up-to 37.80 percent during the same study period. This indicates that some firms protect as much as 37 percent of their earnings from taxation through other means other than the interest payment.

### *Correlation Analysis*

Table 3 presents the result of the correlation analysis which measures the level of association between the debt maturity structure and all the factors hypothesised to determine debt maturity structure (predictor variables) and also between individual predictor variables. The result of the correlation analysis may be indicative of the presence of collinearity among variables but is not a conclusive test for the presence of harmful multicollinearity.

From the results, many predictor variables appear to be significantly collinear with each other although all of the associations are weak correlation. Among the significantly collinear predictor variables only the association between profitability and asset tangibility (0.3110), dividend policy and size (0.3514) and liquidity and asset tangibility (0.3162) are above 0.30 but not up-to 0.40 level of collinearity. They are also the highest statistically significant collinearity on the correlation matrix and such results were expected. Although the collinearity result showed a weak result, it is not a conclusive evidence for the absence of harmful multicollinearity.

Table 4 displays regression results for both two-step dynamic GMM panel estimation and pool OLS with robust standard errors. The model was first estimated using the OLS model, although no evidence of harmful multicollinearity was found with the mean VIF of 1.15. However, the Breusch-Pagan Cook-Weisberg test for heteroskedasticity returned evidence of presence of heteroskedasticity in the residual at 10 percent level of significance with a  $X^2 = 3.53$  ( $p$ -value=0.060).



Table 3

*Correlation Matrix*

	DMSTR	DIVERS	PROF	DIVPOL	GROWTH	LIQ	ASSET	SIZE	INVEST	NTAXS
DMSTR	1									
DIVERS	-0.042	1								
PROF	-0.101*	0.010	1							
DIVPOL	0.053	0.054	0.135*	1						
GROWTH	0.025	-0.058	0.091*	0.022	1					
LIQ	-0.043	-0.088*	0.311*	0.069	-0.016	1				
ASSET	-0.356*	-0.022	-0.105*	-0.116*	-0.034	-0.316*	1			
SIZE	-0.011	0.202*	0.095*	0.351*	0.045	-0.163*	-0.073*	1		
INVEST	0.006	-0.026	0.135*	0.063	-0.151	0.020	-0.047	0.106*	1	
NTAXS	0.032	-0.070	-0.070	-0.093*	-0.024	-0.121*	0.177*	-0.053	-0.064	1

A Shapiro-Wilks test of the normality of the model residual indicated that the residuals are approximately not normal indicating that the OLS may not be the best estimator of the sampled data. Consequently, the pooled OLS with robust standard errors option was used to once again estimate the model (results are provided for comparison with the GMM results). Meanwhile, the two-step dynamic GMM estimation based on 150 observations, 78 groups and a total of 16 instruments returned a Wald  $X^2 = 27.16$  ( $p$ -value = 0.000) which was statistically significant at one percent level of significance indicating that the model is fit to explain the relationship between the independent variables and debt maturity structure of non-financial firms in the study. A total of three lags values of the dependent variables were used to achieve a good model fit. The Hansen Test confirmed the validity of instruments used with a z-score of -1.6613(0.0966) which is significant at 10 percent level of significance indicating the absence of first-order serial correlation in the first difference residuals. The Sargan test for over-identifying restrictions returned a result indicating that the restriction used are valid. The test returned a  $X^2_3 2.061$  ( $p$ -value=0.560) which provides sufficient evidence, that is, it fails to reject the null hypothesis that our identifying restrictions are valid.

Table 4

### Dynamic Panel GMM and Pooled OLS Regression Results

	Two-Step Dynamic GMM Result				Pooled OLS (Robust) Result			
	Coef.	Std. Err.	z	p>z	Coef.	Robust Std. Err.	t	p>t
L1.	0.747	0.402	1.86	0.063				
L2.	0.038	0.085	0.45	0.655				
L3.	0.107	0.093	1.16	0.246				
Diversification	-0.551	0.305	-1.81	0.071	-0.125	0.114	-1.1	0.271
Profitability	0.010	0.007	1.36	0.173	-0.008	0.005	-1.7	0.083
Dividend policy	0.001	0.001	1.73	0.084	0.001	0.001	1.28	0.20
Growth opportunity	-0.002	0.001	-2.1	0.036	0.001	0.001	0.55	0.584
Liquidity	-0.774	0.402	-1.92	0.054	-0.280	0.102	-2.8	0.006
Asset intensity	-0.020	0.012	-1.8	0.072	-0.021	0.005	-4.5	0.00

(continued)

	Two-Step Dynamic GMM Result				Pooled OLS (Robust) Result			
	Coef.	Std. Err.	z	p>z	Coef.	Robust Std. Err.	t	p>t
Firm size	4.01E-1	1.80E-0	2.23	0.026	-1.28E-0	6.00E-1	-2.1	0.034
Investors' confidence	0.005	0.0195	0.28	0.781	0.002	0.003	0.59	0.554
Non-debt tax-shield	0.151	0.063	2.4	0.016	0.023	0.014	1.66	0.097
Constant	1.394	0.627	2.22	0.026	2.444	0.329	7.43	0.00
Wald Chi2(12) / Prob.	27.16			0.0007				
F (9, 504) / Prob.					2.97			0.002
R-squared					0.177			
No. obs.	150				514			
No. of group	78							
No. of instruments	16							
Sargan test	2.061			0.560				
Hansen test AR(1)	-1.661			0.097				
Hansen test AR(2)	-			-				

Sources: Authors' computation using STATA 13

### *Inferential Analysis and Hypotheses Testing*

Based on the Dynamic panel GMM result on Table 4, the non-debt tax-shield has a positive and significant effect on the debt maturity structure of the selected Nigerian non-financial firms. The result implies that a one unit increase in tax-shield (N1.00) will cause a 0.151 increase in the ratio of short-term debt to long-term debt. This provides sufficient evidence at 5 percent level of significance to reject the null hypothesis H01 and infer that non-debt tax-shield is a significant predictor of debt maturity structure in Nigerian non-financial firms. This result supports the view that as non-debt tax-shield increases, firms are inclined to use more of short-term debts. This finding is also in line with the findings of Lemma and Negash's (2012) where a positive significant relationship was documented between debt maturity and non-debt tax-shields.

With respect to liquidity, that is, the firms' ability to meet their short-term financial obligation, it was expected that more liquid firms will have less short-term debts in proportion to long-term debt in line with the *a-priori* in Correia, Brito and Brandao (2014). Our result affirmed this expectation indicating a significant negative relationship between the two variables. The result indicated that one unit increase in firms' liquidity will result in a 0.774 decrease the proportion of short-term debt to long term debt. This provides sufficient evidence at 10 percent level of significance to reject the null hypothesis H02 and infer that non-liquidity is a significant negative predictor of debt maturity structure in Nigerian non-financial firms. This finding is in line with those by Correia, Brito and Brandao (2014), Khan, Khan and Khan (2015) but contradicts the findings found by Panida (2004), Terra, (2011) and Hugo (2011) who found positive significant relationships.

Regarding asset intensity, our results showed that it has a statistically negative relationship with the ratio of short-term to long term debt ratio. The coefficient indicate that one unit increase in assets intensity is likely to lead to a 0.020 reduction in the ratio of short to long term debts in listed Nigerian non-financial firms. The result provides sufficient evidence at 10 percent level of significance to reject the null hypothesis H03 and infer that asset intensity affects the debt maturity structure of Nigerian non-financial firms. Although contrary to the findings by Terra (2011) and Zohreh and Hassan (2013), this finding affirms the postulations of the maturity matching hypothesis (Morris, 1975; Stohs & Mauer, 1996), the potential use of non-current assets as collateral for securing long-term debts (Whited, 1992) and Soekirman's (2015) finding.

Firm diversification, as expected, has a negative and significant effect on debt maturity structure of the Nigerian non-financial firms. The result implies that as a firm diversifies it is likely to have a 0.551 decrease in its short-term debt to long-term debt ratio. The result provides sufficient evidence at 10 percent level of significance to reject the null hypothesis H04 and infer that diversification is a significant predictor of debt maturity structure in Nigerian non-financial firms. This result supports the view that as firms diversify, they are inclined to use less of short-term debt. This finding supports the special use of debts hypothesis by Jensen and Meckling (1976).

The growth opportunity has negative and significant effects on the debt maturity structure of the sampled Nigerian non-financial firms. The result implies that a one unit increase in growth opportunity will cause a 0.002 decrease in the ratio of short-term debt to long-term debt. The result provides sufficient evidence at 5 percent level of significance to reject the null

hypothesis  $H_5$  and infer that growth opportunity is a significant predictor of debt maturity structure in Nigerian non-financial firms. This result supports the view that as growth opportunities increases, firms are inclined to use more of short-term debts. Although this finding contradicts the findings by Rozali and Omar (2011), Taleb and Shubiri (2011), Zohreh and Hassan (2013) who found significant positive relationships between growth and debt maturity, it is in line with the findings by Terra (2011) and Custodio, Ferreira and Laureano (2012) who found significant negative relationship. The findings of this study can be explained more in the light of the liquidity risk hypothesis than the maturity matching hypothesis or the postulations by Myers (1984).

On the contrary, firm size has a positive and significant effect on debt maturity structure of the sampled Nigerian non-financial firms. The result showed that a one unit increase in firm size will cause a very small decrease of  $4.01E-9$  in the ratio of short-term debt to long term debt. Although the effect is weak, it however provides sufficient evidence at 5 percent level of significance to reject the null hypothesis  $H_{06}$  and infer that firm size significantly predicts of debt maturity structure in Nigerian non-financial firms. This result supports the view that as firms grow in size, they are inclined to use more of short-term debt and shorten maturity. Based on the agency theory arguments, it is expected that small firms are likely to have shorter maturity structure than the large firms. The findings of this works supports the agency theory and is in line with the works by Panida (2004), Korner (2007), Shah and Khan (2009), Rozali and Omar (2011), Terra (2011), Taleb and Shubiri (2011), Zohreh and Hassan (2013), Correia, Brito and Brandao (2014), Khan, Khan and Khan (2015) who found positive significant relationships between size and debt maturity and contrary to the findings revealed by Heyman, Deloof and Ooghe (2003), Gul, Sajid, Mumtaz and Murtaza (2012), and Soekirman (2015) who found significant negative relationship.

Contrary to expectation, profitability has a positive but insignificant effect on the debt maturity structure of the sampled Nigerian non-financial firms. The result showed that a one unit increase in profitability will result in a 0.010 decrease in the ratio of short-term debt to long term debt. The result is not significant at 10 percent, 5 percent or one percent level of significance. Due to insufficient evidence, we fail to reject the null hypothesis  $H_{07}$  and infer that profitability is not a significant predictor of debt maturity structure among Nigerian non-financial firms. This study fails to find evidence supporting the liquidity risk of short-term debts hypothesis which predicts a positive relationship between performance and short-term debts. The evidence documented here also contradicts the previous findings by Terra

(2011) and Custodio, Ferreira and Laureano; the findings by Zohreh and Hassan (2013) which documented positive significant relationship, those by Lemma and Negash (2012) who revealed negative significant but in line with Shah and Khan's (2009) study and the study by Taleb and Shubiri (2011) and Soekirman (2015) who documented insignificant relationship between debt maturity and profitability.

Dividend policy has a positive and significant effect on debt maturity structure of the sampled Nigerian non-financial firms. The result showed that a one unit increase in profitability will result in a 0.0012 increase in the ratio of short-term debt to long-term debt. The result is significant at 10 percent level of significance. This result provides sufficient evidence to reject the null hypothesis H08 and infer that the dividend policy is a significant predictor of debt maturity structure among Nigerian non-financial firms. This study fails to find evidence supporting the liquidity risk of short-term debt hypothesis which predicts a positive relationship between the performance and short-term debt. The evidence documented here also contradicts previous findings which documented positive significant relationship by Terra (2011), Custodio, Ferreira and Laureano (2012), and Zohreh and Hassan (2013). Meanwhile, Lemma and Negash's (2012) findings revealed negative significant. However, our study's findings were in line with that by Shah and Khan (2009), Taleb and Shubiri (2011) and Soekirman (2015) who documented insignificant relationship between debt maturity and profitability.

Finally, the investors' confidence has a positive but statistically insignificant effect on debt maturity structure of the sampled Nigerian non-financial firms. Although insignificant, the result documented evidence that a one unit increase in investors' confidence would result in 0.005 units increase in short-term debt to long-term debt structure of the firms in the study. Due to insufficient evidence, we fail to reject the null hypothesis H09 and infer that the level of investors' confidence in a firm is not a significant predictor of its debt maturity structure among Nigerian non-financial firms.

## **Conclusion**

The average trend of debt maturity structure among non-financial firms in Nigeria has been on a steady downward trend in recent years. This means that managers tend to prefer the use of short-term debt over long-term debts in meeting their financing needs. This study is focused on investigating

the extent to which a number of firm-specific characteristics affects the managements' decision in the selection of their firms' debt maturity structure in the non-financial firms as listed in Nigeria. The result of the analysis of the data collected for the study indicated that seven out of nine firms' characteristics that were investigated are statistically significant determinants of how firms choose between short-term and long-term debts. Meanwhile, the evidence documented in favour of the two other firm characteristics was not significant enough for us to conclude that they are determinants of debt maturity structure.

The study documented evidence that diversification, growth opportunity, liquidity and asset intensity are significant negative predictors of the firms' choices between short-term and long-term debts. Furthermore, diversification and liquidity are likely to cause a higher level of change in firms' debt maturity structure. Evidently, these two main determinants of debt maturity choices among firms can be explained as the function of the firms' effort in taking advantage of their internal capital market to reduce their financing cost and their strategy for mitigating the risks associated with liquidity respectively to reduce their agency cost. On the contrary, dividend policy, firm size and non-debt tax-shield were found to be significant positive determinants of debt maturity structure among the listed firms in Nigeria. In this case, the non-debt tax-shield which represents the tax advantages that firms stand to gain from selecting their maturity structure is likely to exert more influence on their choice of maturity structure. The tax-bankruptcy hypothesis provides a plausible explanation for the reason firms are likely to adjust the maturity structure of their debts to protect profits from taxes. However, this study did not document significant evidence in favour of profitability and investors' confidence as determinants of debt maturity structure despite the fact that they have been found to be among the determinants of debt maturity choices in some other studies with strong theoretical backing.

Finally, our study is based on the fairly robust methodology and data analysis technique which attempted to address fundamental issues in estimating the relationship between the debt choices and the factors that drive such choices. However, the study did not account for some macroeconomic events and key policy interventions that happened during the period of the study especially in the banking industry which is the main source of debt for Nigerian firms. For instance, events such as the Central Bank of Nigeria special audit and the creation of the Asset Management Corporation of Nigeria (AMCON) are likely to have created significant structural break which can affect or limit firms' choices in the selection of maturity structure. Not accounting for these

events does not invalidate the findings of this study. Rather accounting for them is likely to improve the result for the purpose of having more accurate inferences and generalisation.

### Endnotes

- <sup>1</sup>  $DMSTR_{it}$  = Debt Maturity Structure;  $NDtax_{it}$  = Debt Tax-Shield;  $LiQ_{it}$  = Liquidity;  $Divers_{it}$  = Diversification;  $Growth_{it}$  = Growth opportunity;  $Asset_{it}$  = Assets Intensity;  $Size_{it}$  = Firm Size;  $Prof_{it}$  = Profitability;  $DivPol_{it}$  = Dividend Policy;  $Invest$  = Investors' Confidence;  $\alpha_0$  = Constant;  $\alpha_1 - \alpha_8$  = coefficients of the independent variables;  $\varepsilon$  = stochastic error term;  $i$  and  $t$  represents each individual firm and financial year, respectively.
- <sup>2</sup> 1 unit of currency in Nigeria is One Naira (N1.00) while the decimal is One Kobo (0.01K).

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