International Journal of Financial, Accounting, and Management (IJFAM)
ISSN: 2656-3355, Vol 4, No 2, 2022, 199-218 https://doi.org/10.35912/ijfam.v4i2.1064

Debt Financing and Firm Valuation of Quoted Non-Financial Firms in Nigeria Stock Exchange

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Article History
Received on 21 March 2022
1st Revision on 2 April 2022
2nd Revision on 9 May 2022
3rd Revision on 2 June 2022
Accepted on 24 June 2022

Abstract
Purpose: This study examined the effect of debt financing on the firm valuation of quoted non-financial firms on the Nigerian Stock Exchange (NSE). The study specifically evaluated the effect of short-term debt to equity, long-term debt to equity, and total debt to assets on Tobin's Q for the period 2011 to 2019.
Methodology: The study adopts the ex post facto research design. The sampling technique utilized in the study was non-probability sampling. The final sample comprised seventy-five firms quoted non-financial firms on the Nigerian Stock Exchange (NSE). The secondary data obtained from MachameRATIOS®were analyzed using panel regression techniques. Unlike prior studies, the study also employs the Arellano Bond Dynamic Panel-data Estimation Model for robustness analysis.
Results: There is a negative effect of short-term debt to equity on Tobin's Q. The effect of long-term debt to equity and total debt to assets was positive and significant.
Limitations: The main limitation is the unbalanced nature of some sectors due to data unavailability.
Contribution: The study contributes to the literature in the context of developing countries, on the effect of long-term debt on firm valuation; consistent with the trade-off theory of the cost of long-term debt financing as an alternative to internal funding.
Keywords: *Debt financing, Short-term debt, Long-term debt, Tobin's Q*
How to Cite: Oranefo, P., & Egbunike, C. (2022). Debt Financing And Firm Valuation Of Quoted Non-Financial Firms In Nigeria Stock Exchange. *International Journal of Financial, Accounting, and Management*, 4(2), 199-218.

1. Introduction

Debt financing has remained an atopical issue in corporate boardrooms and among financial managers in today's globalized and competitive world (David &Olorunfemi, 2010; Ogungbenle, Ihedioha, &Zayed, 2021; Vătavu, 2015). Debt financing provides a firm with access to financial resources and therefore ultimately influences a firm's performance (Booth, Aivazian, Demiguc-Kunt, &Maksimovic, 2001). The debt-equity combination is therefore vital to the achievement of shareholders' wealth maximization objective (David &Olorunfemi, 2010). In corporate financing decisions, managers often explore in order to determine the optimal debt-equity combination which is a prime face reflection of the capital structure of a firm (Damodaran, 2001; Uremadu&Onuegbu, 2019). Often to choose from are three competing debt-equity mix alternatives: total equity financing (i.e., no debt), total debt financing (i.e., no equity), and a particular mix of debt and equity (X/Y, i.e., X is debt and Y is equity) (Dare & Sola, 2010; Semiu& Collins, 2011). In the first scenario, the firm is regarded as unlevered, that is, it is solely financed by equity. The second option is a fully geared firm, that is, a firm with the absence of equity capital. The third scenario specifies a particular combination of debt and equity mix in the firm's capital structure. This option avails a firm with any benefit of leverage (if any) to be exploited (Akeem, Terer, Kiyanjui, &Kayode, 2014; Semiu& Collins, 2011).

Debt financing is vital to maximizee share price, boost firm value and enhance performance (Uremadu&Onuegbu, 2019;Vătavu, 2015). Debt financing has remained a dominant topic for scholars and has remained a subject matter of several business roundtable discussions for several decades (Uremadu&Onuegbu, 2019). The two main sources of financing which are available to a firm are either internal or external sources of funds. The internal sources include ordinary and preference shares, reserves, and retained earnings (Orwel, 2010). The external sources include both short and long-term borrowings in the form of debt financing. Managers choose from either of these alternatives, an option that is consistent with the firm's policy. As far back as the '50s, following the seminal work by Modigliani and Miller (1958), a vast amount of studies has emanated in the finance literature on factors that affect the debt-equity mix. According to the traditionalists' view, an optimal capital structure mix lowers the Weighted Average Cost of Capital (WACC) (Vătavu, 2015). The proponents suggest that debt is cheaper than equity, such that a firm can increase its firm value by employing debt financing up to a reasonable limit. Debt is preferred over equity for two circumstantial reasons: the cost of debt financing is far lower than that of equity and the tax-shield benefit of debt.

Prior studies have explored the firm's debt-equity mix and performance nexus from several perspectives in different countries (Akeem, Terer, Kiyanjui, &Kayode, 2014; David &Olorunfemi, 2010;Nima, Mohammad, Saeed, &Zeinab, 2012;Salim&Yadav, 2012; Uremadu&Onuegbu, 2019;Vătavu, 2015). Empirically, Das, Chowdhury, and Islam (2021) in Bangladesh, Chakraborty (2010) in India, and the study by Huang and Song (2006) in China found a negative relationship between leverage and firm performance, proxied using ROA, ROE, and EBIT. Others, such as Khan (2012) in Pakistan; Sadeghian, Latifi, Soroush, and Aghabagher (2012) in Iran also find a negative relationship. Yet, the study by Jaisinghani and Kanjilal (2017) in India found evidence of a positive relationship between leverage and ROA for large firms. And in Nigeria, Akinyomi (2013) found a positive correlation between debt to equity ratio with ROA and ROE. David and Olorunfemi (2010) in Nigeria; Nimalathasan and Brabete (2010) in Sri Lanka, also reported a positive relationship.

According to Insee (2020), non-financial companies are an "agglomeration of institutional units that mainly produce non-financial goods and services". Their activities are also organized around a similar architecture to the modern corporation with the separation of ownership and control. Non-financial firms occupy a pivotal role in an economy contributing immensely to a country's growth and development. This is particularly true, in the Nigerian context with key players such as Dangote Cement, PZ Cussons, Cadbury, Guinness, and Nigerian Breweries Plc., among others, with huge revenues and a large market share in Western Africa. The financing mix of non-financial companies differs considerably across countries (Borio, 1990; Ortas & Gallego-Álvarez, 2020). While prior studies investigate factors that determine the capital structure of firms across varying industries. The literature remains scanty on the totality of non-financial firms quoted on the Nigerian Stock Exchange. In addition, studies have failed to account for the issue of endogeneity in debt financing and firm value nexus. In the seminal study by Modigliani and Miller (1958), the authors find that in a perfect capital market, the value of a firm is not dependent on its capital structure. Several years later, finance scholars show that a firm's capital structure plays a role in determining the firm's value. This is because of the tax-deductible nature of interest payments(Modigliani & Miller, 1963), costs of monitoring agents (Jensen &Meckling, 1976), and information asymmetry (Myers, 1984;Myers &Majluf, 1984;Graham, Harvey, &Puri, 2013). This is consistent with the study by Ortas and Gallego-Álvarez (2020) that highly geared firms are more likely to employ 'tax-deductible interest payments'. The non-financial sector has witnessed declining productivity in recent times (Obamuyi, Edun, &Kayode, 2012). They were hard hit during the economic recessions of 2016 and 2020; a situation further worsened by the recent COVID-19 pandemic with disastrous ripple effects across several sectors. The traumatic experiences exposed a lot of non-financial firms to circumstances that may lead to failure. For instance, during periods of economic recession, financial institutions often experience a credit crunch with its concomitant effect on firms especially those that are increasingly reliant on debt financing, thereby exposing the firm to capital shortage and weakness. Vieira (2017) opines that debt financing and firm performance nexus are weakened in situations with adverse

economic conditions. The enumerated circumstances, therefore, offer managerial implications on the need to shed further insight on the issue of debt financing and firm performance nexus, thus offering implications for the broad macroeconomic environment(Vygodchikova, Gorskiy, Khalikov, &Zayed, 2021). Against this backdrop, the study examines the effect of debt financing on the firm valuation of quoted non-financial firms.

Objective of the Study

The main objective of the current study is to examine the effect of debt financing on the firm valuation of quoted non-financial firms on the Nigeria Stock Exchange (NSE). The researcher, therefore, formulates the specific objectives listed below to address the main objective:

1. To determine the effect of short-term debt to equity on Tobin's Q of quoted non-financial firms.
2. To examine the effect of long-term debt to equity on Tobin's Q of quoted non-financial firms.
3. To determine the effect of total debt to assets on Tobin's Q of quoted non-financial firms.

2. Literature review

Conceptual Review

Capital Structure

Financing may be subdivided into two categories: long-term debt and short-term debt.

1. Capital structure refers to the debt-equity mix or the combination of long and short-term debt and equity financing (share premium, reserves/retained earnings, ordinary and preference shares, etc.). Debt Long-term debts are incurred for a period usually exceeding three accounting cycles or fiscal year and are often used for capital-intensive projects such as property, plant, and equipment acquisition.
2. Short-term debts are normally incurred for a shorter period usually less than three years and are mainly used to finance working capital needs or daily operational expenses, such as the purchase of raw materials, staff salaries, wages, inventory, etc. They are usually repaid within an accounting cycle or fiscal year.

The firm's debt-equity mix is affected by a plethora of factors. Al-Najjar and Taylor (2008),Morri and Cristanziani (2009),and Vătavu (2015) have shown that capital structure is affected by firm size, revenue growth, risk, profitability, market-to-book ratio, tangibility, and liquidity in developed and developing markets. Others suggest that tax, dividend income, financial flexibility, and the level of managerial conservatism or aggressiveness influence capital structure (Miller, 1977;Vygodchikova, Gorskiy, Khalikov, &Zayed, 2021). Therefore, the ability of a manager to identify the optimal capital structure determines the firm's performance (Bandyopadhyay&Barua, 2016). To ensure the maximization of shareholders' wealth, there is a need to determine the optimal capital structure at which point the weighted average cost of capital is minimized (Jaisinghani&Kanjilal, 2017; Ross, Westerfield, & Jaffe, 2005). According to Jaisinghani and Kanjilal (2017), the optimal capital structure is determined by evaluating the 'trade-off' of the merits and demerits of utilizing debt funds in the business. One of the benefits of debt financing is its 'tax shield advantage' (Kraus &Litzenberger, 1973). This is because the interest accrued from debt funds is deductible from profits in many countries before determining a firm's tax liability (Jaisinghani&Kanjilal, 2017). However, the use of debt financing also exposes the firm to risks such as 'bankruptcy and liquidation' costs. However, the operating conditions from the external environment may cause a disparity between the optimal and actual capital structure. An optimal capital structure can only be determined from a risk-return trade-off analysis (Uremadu&Onuegbu, 2019).

Performance

Corporate Firm performance is measured using various financial indices over a given period (Haniffa&Hudaib, 2006). The literature is filled with accounting and market-based measures of firm performance. The accounting-based measures include such as profitability, liquidity, solvency, etc. examples of profitability ratios include such as ROA, NPM, GPM, ROCE, etc., while, the market-based performance measures may include EPS and DPS. This is consistent with Jeroh (2018), which stated that an analysis of firm performance requires scrutiny of various indices/measures like sales

growth, turnover, dividend growth, profitability, asset base, size, capital employed, returns, earnings, Tobin's Q, market share among others. The focus of the study is on Tobin's Q a measure of firm valuation which has been widely utilized in several studies.

Capital Structure and Tobin's Q

A firm's capital structure is the proportion of available funds which are either financed externally, i.e., debt, or internally, i.e., equity. The former can either be from short-term or long-term sources (Ross, Westerfield, & Jaffe, 2002). The literature has documented mixed findings on the nexus of capital structure and a firm's value. Tobin's Q is a proxy for firm valuation used in several prior studies. The use of debt financing presents a significant configuration to a firm's capital structure thereby altering the level of exposure to risk and return (Shahriar, Hasan, Hossain, Beg, Islam, &Zayed, 2021); and, thus significantly affecting firm value (Gitman, 2003). On the positive side, debt provides a significant tax advantage because the interest is tax-deductible (Ross, Westerfield, & Jaffe, 2002). Prior studies have yielded mixed results. Manu, Alhabsji, Rahayu, and Nuzula (2019) found that capital structure has a positive and significant effect on a firm's value. Using data from Jordan, Al-Nsour and Al-Muhtadi (2019) found a non-significant positive association between capital structure and Tobin's Q. this positive relationship was also confirmed by Al-Najjar and Al-Najjar (2017) and the study of Kontesa (2015). However, in contrast,the studies by Soumadi and Hayajneh (2015) found a negative association between capital structure and firm valuation; while, Agrawal and Knoeber (1996) also confirmed this negative association. The study, therefore, makes the following proposition,

- Ho_1: There is no significant effect of short-term debt to equity on Tobin's Q of quoted non-financial firms.
- Ho_2: There is no significant effect of long-term debt to equity on Tobin's Q of quoted non-financial firms.
- Ho_3: There is no significant effect of total debt to assets on Tobin's Q of quoted non-financial firms.

Theoretical Framework

The study is anchored on the trade-off and pecking order theory which is deemed relevant to the discussion on capital structure and firm performance, in the context of developing countries (Adeyemi& Oboe, 2011; Olokoyo, 2013;Lee, Dobiyanski, & Minton, 2015).

Pecking Order Theory

The theory was originally formulated by Donaldson in 1961 and later developed and modified by Myers in 1984 (Myers, 1984). The theory suggests that generally, firms prefer internal financing to debt financing and equity as a last resort. According to Jaisinghani and Kanjilal (2017), firms follow a 'hierarchical process', and therefore rank the various alternative sources before selecting an option. Based on the above line of argument, Myers opines that an optimal financing structure may be difficult to determine as equity appears to be at the top and the bottom of the 'pecking order' based on the choice. Pecking order is about managerial preference; i.e., a pecking order of different sources of financing available to a firm (Myers, 1984;Wramsby&Österlund, 2004).

Trade-off Theory

Trade-off theory posits that an optimal debt-equity combo can be achieved from a trade-off of the associated tax shield associated with interest payment and the long-term cost of financial distress. According to Vieira (2017), trade-off theory explores the "merits and demerits of debt financing", therefore the firm considers the costs or benefits associated with either debt or equity financing option. In addition, agency costs may also be included in such consideration. The agency cost is a summation of the 'monitoring costs by the principal, bonding costs by the agent, and a residual loss' effect (Jensen &Meckling, 1976). As stated by Myers (1977), debt provides the benefits of tax shields however excessive use of debts also exposes the firm to the risk of bankruptcy.

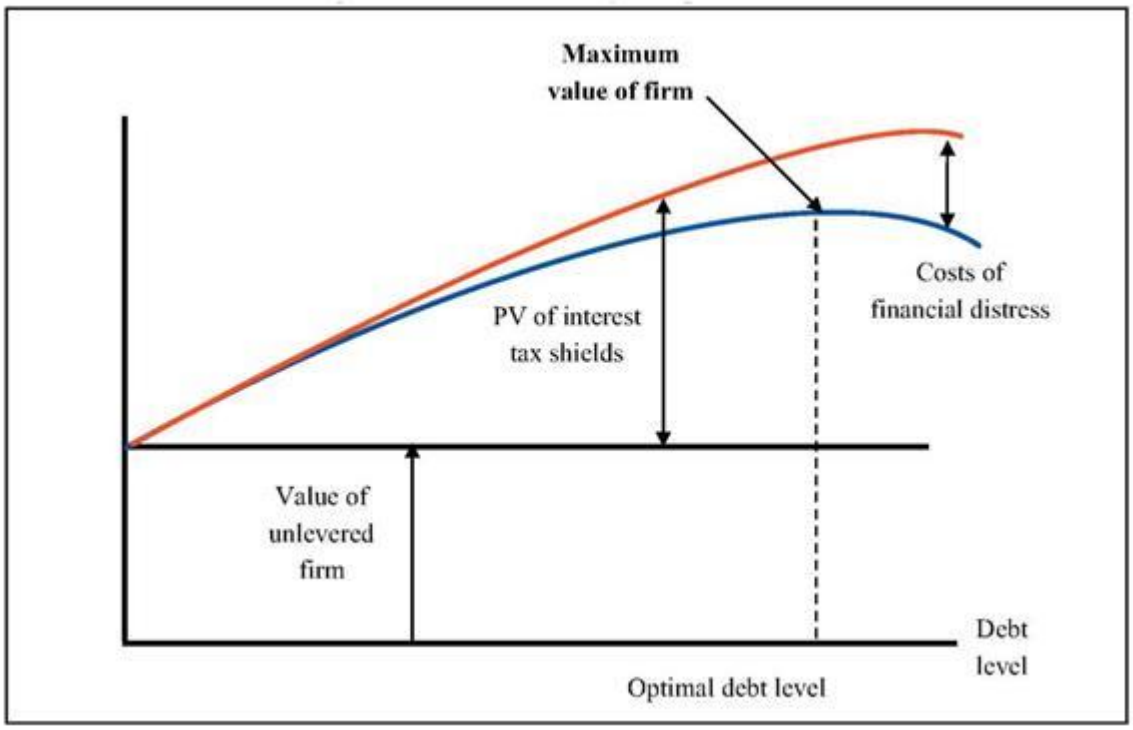

Figure 1: Diagrammatic illustration of the trade-off theory
Source: Lahri, V. (2017)

Empirical Review

Using a sample of 165 firms, Das, Chowdhury, and Islam (2021) analyzed the effect of leverage on firm performance in Bangladesh. They employed secondary data which spanned from 2007 to 2016 and analyzed using system (and differenced) GMM techniques. The GMM results showed a negative effect of financial leverage on ROE and ROA.Using data from Pakistan which spanned from 2006 to 2016, Samo and Murad (2019) analyzed a sample of 40 firms analyzed with the pooled regression technique and showed a negative relationship between leverage and profitability (ROA and ROE). And in Nigeria, Uremadu and Onuegbu (2019) though using a sample of only 4 firms, and secondary data which spanned from 2002 to 2016 analyzed using the OLS showed that long-term debt to total assets ratio and total debt to equity ratio had a negative non-significant effect on ROA.

Empirically, Vieira (2017) analyzed the relationship between debt financing and firm performance in Portugal using a sample of 35 family-controlled firms and 30 non-family-controlled firms. The firms were studied over the period 1999 to 2014. The regression results showed that debt negatively affects firms' performance, but does not differ among the two firm categories. Using a unique procedure, Jaisinghani and Kanjilal (2017)employed panel threshold regression to analyze a sample of 1,194 firms from 2005 to 2014. The results confirmed the presence of a non-linear relationship between capital structure and ROA. The results found a negative effect for the small firm sample, while, for larger firms capital structure was positive. Analyzing a sample of 493 firms in Thailand and data from 2001 to 2014, Detthamrong, Chancharat, and Vithessonthi (2017), explored the interaction of corporate governance, capital structure, and firm performance. The SEM result however showed that leverage had a positive effect on firm performance. Likewise, Bandyopadhyay and Barua (2016)in India studied a sample of 1,594 firms using data from 1998 to 2011 and analyzed using a two-step dynamic panel GMM system method showing that capital structure had a significant effect on performance.

Using data from Romania, Vătavu (2015) analyzed a sample of 196 firms to evaluate the nexus of capital structure and financial performance. The data spanned from 2003 to 2010 was analyzed using cross-sectional regressions. The study established that the total equity to total assets had a significant

negative effect on ROA and ROE. Short-term liabilities to total assets had a negative significant effect on ROA and ROE; while, long-term liabilities to total assets had a positive non-significant effect. Empirically, Yazdanfar and Öhman (2015) analyzed a sample of 15,897 from the SME sector in Sweden from 2009 to 2012 but employed the fixed effects and 3-stage least squares model. They found a negative relationship between short-term and long-term debt and with firm's profitability. Trade credit also had a negative influence on firm performance. The results were also confirmed in a study conducted in Nigeria by Gabriel and Nneji (2015) using a sample of 20 firms and data from 2012 to 2013 confirmed that leverage had a negative effect on corporate performance.

From an agency perspective, Cheche and Olayiwola (2014) used a sample of 70 firms and data from 2000 to 2009 to examine the association between capital structure and firm performance in Nigeria. The empirical results showed a negative relationship between debt ratio and profitability. Likewise, Lawal, Edwin, Monica, and Adisa (2014) used a sample of 10 firms, and data from 2003 to 2012 showed that total debt to asset and debt to equity ratio had a negative relationship with firm performance (ROA and ROE). Studying another different sector, the study by Enekwe, Agu, and Eziedo (2014) using a sample of 3 pharmaceutical firms and data which spanned 2001 to 2012 found that debt ratio and debt to equity ratio negatively affect ROA; while, the interest coverage ratio had a positive effect on ROA.

Empirically, Sheikh and Wang (2013) examined the nexus of capital structure and firm performance of Pakistan's non-financial firms. The data spanned the period from 2004 to 2009 and analyzed using the panel regression technique. The results showed that total debt, long and short-term debt ratios had a negative relationship with ROA. The short-term debt ratio had a positive non-significant relationship with the market-to-book ratio; while, total debt and long-term debt ratios were negatively related to the market-to-book ratio in the pooled OLS model.

Empirically, Ogebe, Ogebe, and Alewi (2013)analyzed the effect of capital structure on firms' performance. The data spanned from 2000 to 2010 of Nigerian firms. The data were analyzed using the fixed effect regression model. The results showed a relationship between firm performance (proxied by return on investment) and leverage. Likewise, Akinyomi (2013) using a sample of 3 firms and financial statement data spanned from 2007 to 2011 showed a positive correlation between debt to equity with ROA and ROE but long-term debt to capital was negative and significantly related to ROA and ROE. Another study in Nigeria used data from 2003 to 2007, Olokoyo (2013)on a sample of 101 firms showed a significant negative effect of leverage on the ROA; however, leverage had a positive significant relationship with Tobin's Q.

Using a sample of 45 Jordanian firms, Khalaf (2013) investigated the relationship between capital structure and firm performance. The data spanned the period 2005 to 2009. The data were analyzed using the multiple regression techniques. The results showed that total equity debt was positively related to ROA and negatively to profit margin. Short-term debt to total assets was significant using ROA; while, long-term debt to total assets was significant using profit margin. Likewise, Al-Taani (2013) using the same sample size and same period data showed a negative non-significant relationship between short-term debt to total assets and long-term debt to total assets with ROA and operating profit margin. The ratio of total debt to equity was positively related to ROA but negatively related to profit margin.

Using a sample of large firms in Sri Lanka, Puwanenthiren (2011) analyzed data that spanned from 2005 to 2009 to examine the relationship between capital structure and financial performance. The results showed a negative relationship between capital structure and financial performance.

Simon-Oke and Afolabi (2011) examined capital structure and performance using a sample of 5 firms in Nigeria. The secondary data that spanned from 1999 to 2007 were analyzed using the panel regression technique. The results showed a negative relationship between debt financing and firms' performance.

Ong and Teh (2011) examined the association between capital structure and firm performance using data from firms in the Malaysian construction sector which spanned 2005 to 2008. The data were analyzed using the multiple regression techniques. They found a positive relationship between capital structure and firm performance.

Conceptual Framework

The conceptual framework is shown in the Figure below, and it depicts the logical relationship between the set of variables as utilized in the study and connected to prior theories. The framework is developed by a researcher to enable an in-depth understanding of possible interrelationships and further empirical analysis.

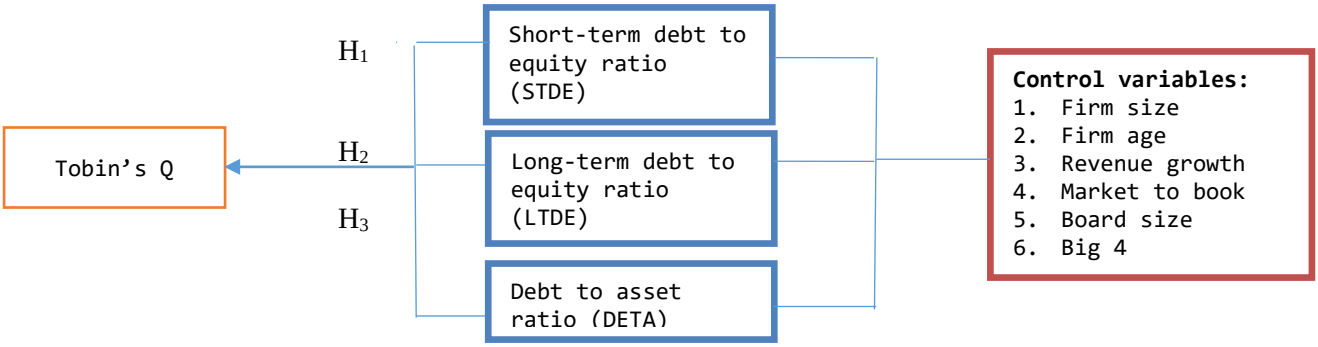

Figure 2: Conceptual Framework
Source: Author's Conceptualisation (2021)

The conceptual framework shown above identifies the different components of debt financing utilized in the study. The study considers as independent variables four debt ratios. This is consistent with studies of a similar nature. The STDE, calculated as the ratio of debt payable in one year to total assets (Abor, 2007; Sheikh & Wang, 2011), LTDE is defined as the debt payable beyond one year, as a percentage of total assets (Sadeghian, Latifi, Soroush, &Aghabagher, 2012; Ramadan, 2013); while, the DETA is the ratio of total debt scaled by total assets (Abor, 2007; Setia-Atmaja, 2010;Salim&Yadav, 2012). The three components of debt financing point to the firm performance measure of Tobin's Q, which is the singular dependent variable utilized in the study. Prior studies have utilized these variables; likewise, consistent with the control variables. The model also shows selected firm-specific variables identified from prior literature which affect the relationship between capital structure and firm performance (Jaisinghani&Kanjilal, 2017;Vătavu, 2015). The study employs firm size (Huang & Song, 2006; Jaisinghani&Kanjilal, 2017), age, sales growth, liquidity (Jaisinghani&Kanjilal, 2017;Vătavu, 2015), and inflation rate (Ogebe, Ogebe, &Alewi, 2013;Vătavu, 2015) to control for firm-specific factors which affect the association between capital structure and firm performance. Empirically, Vieira (2017)analyzed a sample of non-financial firms in Portugal finds a positive influence of firm age and firm size, however, board independence negatively influences firms' performance. Öhman and Yazdanfar (2017) employed firm size, age, growth, and profitability and found a link between them and short and long-term debt.

Firm size has been widely utilized in corporate governance studies as a determinant of firm's performance (Legowo, Florentina, &Firmansyah, 2021;Delgado, Fernández-Rodríguez, &Martínez-Arias, 2018). Secondly from a political cost perspective, they are subject to greater media scrutiny and public pressure. They are therefore less likely to utilize aggressive tax management (Watts & Zimmerman, 1986) and more likely to use debt financing. The study by Um (2001) suggests that monitoring costs are lower for larger firms when compared with their smaller counterparts. Thus, large firms are more prone to debt financing than their smaller counterparts. The variable sales growth is a measure of the annual (%) change in revenue, which is simply computed as the current sales

minus prior year sales scaled by prior year sales an indicator of the Y-o-Y change of the firm's sales performance. Firm age has also remained crucial to the nexus of capital structure and firm performance. It has been utilized in prior studies, such as Akinyomi (2013), that found a positive effect of age on ROA and ROE in the Nigerian context. The study by Al Hussaini (2018) using a large sample from Bahrain, Kuwait and Oman found a positive effect of age on leverage. However, for individual sub-samples the RLS showed that age was negative in Bahrain and Oman; but, positive in Kuwait. The corporate governance variable of board size has also been demonstrated as a significant factor to explain firm performance.

According to Jeroh and Okoro (2014), board size refers to the numerical value of directors sitting on a firm's board. Jeroh (2018) using canonical correlation found a significant association between the number of directors sitting on the board and firm performance. The market to book (PTBV) was computed as the ratio of market value to the book value of a firm(Jermias, 2008). This is a growth measure that incorporates all possible future expectations of a firm's performance (O'Brien, 2003).

3. Research Methodology

The study from a quantitative viewpoint adopts the ex post facto research design. The study follows a positivist approach and relies on data retrieved from the annual financial statements of manufacturing firms quoted. The study employed only firms quoted on the Nigerian Stock Exchange. The focus of quantitative research designs is the numerical measurement of the studied variables (Gay, Mills, &Airasian, 2009). This approach has been utilized in prior studies by Jaffar, Derashid, and Taha (2021) in Malaysia; and, Legowo, Florentina, and Firmansyah (2021) in Indonesia. The population comprised seventy-five (75) non-financial firms consistent with our prior definition. The number was premised on the categorization of such firms on the NSE and consistent with that used in prior studies by Jaffar, Derashid, and Taha (2021) in Malaysia; and, Legowo, Florentina, and Firmansyah (2021). The study focused on non-financial firms with data available during the study period as provided by MachameRATIOS®. The final sample as shown in the table below was restricted to seventy-five firms selected using the purposive sampling technique.

Table 1: Firms (Non-financial firms) included in the final sample

S/No	Sector	No. of firms
1	Agriculture	5
2	Conglomerates	5
3	Consumer Goods	20
4	Construction/Real Estate	9
5	Health Care	10
6	ICT	9
7	Industrial Goods	13
8	Natural Resources	4
	Total	**75**

Source: Official Website of the Nigerian Exchange Group (2021)

Sources of Data

The study utilizes secondary data obtained from the annual financial statements of the sampled firms. The nature of the data gave rise to panel data; with both time-series and cross-sectional. The final dataset was made available by MachameRatios a registered company in Nigeria and Canada that collates annual report data from African countries and is suitable for carrying out regression analysis.

Model Specification

The firm valuation proxy, utilized in the study: Tobin's Q is to be regressed on short-term debt-to-equity, long-term debt to equity, total debt to assets (independent variables), and firm-specific control variables that affect firm performance identified from the literature shown below as follows (implicit): Tobin's Q = *f* (short-term debt to equity, long-term debt to equity, debt to assets, firm size, firm age, revenue growth, market to book, the board size, big 4)

The 'static linear' explicit model of the above expression is presented in the equation specified below as follows:

$$TobQ = \alpha_0 + \beta_1 STDE\ it + \beta_2 LTDE\ it + \beta_3 TDA\ it + \beta_4 FSIZ\ it + \beta_5 FIRA + \beta_6 REVG + \beta_7 PTBV + \beta_8 BODS + \beta_9 BIG4 + \mu_i$$

Model Validation:

The overall statistical significance of the models is checked with the F-statistics and the associated p-values of the estimated coefficients are used to support or refute each hypothesis.

Description of Variables:

Table 2: Variables included in the models

Acronym	Measurement	Source
Tobin Q	in numbers is computed as Market Capitalization + Total Liabilities -Cash flow divided by Total asset	MachameRATIOS®
STDE	Current Liabilities divided by Total Equity	MachameRATIOS®
LTDE	Non-current Liabilities divided by Total Equity	MachameRATIOS®
TDA	Debt to Total Asset in percentage is computed as total liabilities divided by Total asset	MachameRATIOS®
FSIZ	Log of the total asset in thousands is computed as the natural logarithm of Total asset.	MachameRATIOS®
FIRA	Firm listing age in numbers is the difference between current years minus year of listing in the stock exchange + 1	MachameRATIOS®
REVG	Revenue growth in percentage is computed as current year revenue minus previous year revenue divided by previous revenue	MachameRATIOS®
PTBV	Book to Market value in numbers is computed as total equity divided by market capitalization.	MachameRATIOS®
BODS	Board Size in numbers is computed as the total numbers of all directors of a company	MachameRATIOS®
BIG4	Big 4 Auditors in Dummy (1,0) is computed as "1" for Companies that use PWC, Deloitte, E&Y, and KPMG as external auditors and "0" otherwise	MachameRATIOS®

Source: Author's Compilation (2021)

4. Results and discussions

Descriptive Statistics

Table 3a: Descriptive statistics of dependent and independent variables

	TOBQ	STDE	LTDE	DETA
Mean	1.526818	45.48343	-140.2804	64.18537
Median	1.039950	38.64970	26.65750	59.92315
Maximum	11.29860	376.4143	9968.736	395.4504
Minimum	0.124100	0.000000	-148398.9	4.284900
Std. Dev.	1.358303	37.49685	5470.435	36.25507
Skewness	2.966352	4.747595	-26.67182	3.772888
Kurtosis	14.00285	35.25996	723.2341	27.26397
Jarque-Bera	4870.095	35245.24	16255995	20123.66
Probability	0.000000	0.000000	0.000000	0.000000

Sum	1142.060	34021.61	-104929.7	48010.66
Sum Sq. Dev.	1378.205	1050292.	2.24E+10	981879.4
Observations	748	748	748	748

Source: STATA Ver. 15

Table 3b: Descriptive statistics of control variables

	FSIZ	FIRA	REVG	PTBV	BODS	BIG4
Mean	7.090313	26.06301	11.61380	-0.302838	8.990411	0.584932
Median	7.012000	28.00000	5.350550	1.176400	9.000000	1.000000
Maximum	9.240900	55.00000	1354.255	103.9037	19.00000	1.000000
Minimum	5.092700	2.000000	-90.70160	-1176.194	4.000000	0.000000
Std. Dev.	0.820312	13.38360	70.57525	53.91442	2.673072	0.493072
Skewness	0.170256	-0.234880	12.00509	-19.01914	0.752811	-0.344736
Kurtosis	2.527938	1.728341	201.7413	382.9607	3.663533	1.118843
Jarque-Bera	10.30490	55.89949	1218935.	4435268.	82.34319	122.0963
Probability	0.005785	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	5175.929	19026.00	8478.074	-221.0715	6563.000	427.0000
Sum Sq. Dev.	490.5523	130579.1	3631051.	2119031.	5208.933	177.2342
Observations	730	730	730	730	730	730

Source: STATA Ver. 15

On average, the mean value of STDE was 45.48 while the average value of LTDE was -140.3 which confirms that short-term debt and long-term debt were significant components of the capital structure of non-financial firms with long-term debt having a wider implication. The value of debt to total assets shows that close to 64% of the total assets of non-financial firms are comprised of debt. The average value of long-term debt to equity was -140.28average of the natural logarithmic transformation of firm size is 7.09; while the average firm age was 26 years since the date of listing on the Nigerian Stock Exchange (NSE) the maximum value of age was 55 years with a minimum value of 2 years. The average natural logarithmic transformation of the revenue growth variable was 11.61 given the nature of transformation, it's deduced that firms experienced over 100% revenue growth during the study period. The market to book firm value data had a negative -0.30 value; with a maximum value of 103.9 and a minimum value of -1176.2. The average value of board size was 8; thus, the sampled non-financial firms had an average of eight sitting directors during the study period. The mean of the big 4 proxy of 0.58; indicated that on average 50% of the sampled firms employed the services of the big 4 auditors against the use of non-big 4 auditors by the remaining firms.

Correlation Analysis

Table 4: Correlation matrix of study variables

	TOBQ	STDE	LTDE	DETA	FSIZ	FIRA	REVG	PTBV	BODS	BIG4
TOBQ	1									
STDE	0.157752	1								
LTDE	-0.00588	-0.01706	1							
DETA	0.149304	0.610427	-0.04268	1						
FSIZ	0.046909	-0.03253	0.083487	-0.01284	1					
FIRA	0.093458	0.151579	0.025386	0.038515	0.109235	1				
REVG	0.009964	-0.06154	0.01935	-0.02593	0.052349	-0.03759	1			
PTBV	-0.03004	-0.01232	0.624668	-0.06687	0.116356	0.050499	-0.01271	1		
BODS	0.016234	-0.06678	-0.00134	-0.12381	0.488893	0.091274	0.068142	-0.00269	1	
BIG4	0.165771	0.084544	-0.03307	-0.03877	0.368959	0.176084	0.048016	-0.02056	0.137479	1

Source: STATA Ver. 15

The correlation matrix shows the degree of relationship between two variables, i.e., measures the strength of the linear or nonlinear relationship between two variables. The Tobin's Q positively correlated with STDE (0.16) and DETA (0.15), but negatively correlated with LTDE (-0.01). Tobin's Q positively correlated with firm size (0.05), firm age (0.09), revenue growth (0.01), board size (0.02) and big 4 (0.17). However, Tobin's Q negatively correlated with the market to book (PTBV) with a value of -0.03. The STDE negatively correlated with LTDE but positively correlated with DETA. With regard to the control variables, STDE negatively correlated with FSIZ, REVG, PTBV, and BODS. STDE positively correlated with FIRA and big 4. The LTDE negatively correlated with DETA. With regard to the control variables, LTDE positively correlated with FSIZ, FIRA, REVG, and PTBV. LTDE negatively correlated with BODS and big 4. The relationship between DETA and the control variables shows that DETA negatively correlated with FSIZ, REVG, PTBV, BODS, and big 4; however, it positively correlated with FIRA. The relationship between FSIZ and the control variables shows that FSIZ positively correlated with FIRA, REVG, PTBV, BODS, and big 4. FIRA negatively correlated with REVG but positively correlated with PTBV, BODS and big 4. The control variable REVG negatively correlated with PTBV; but, positively related to BODS and big 4. The PTBV negatively correlated with BODS and big 4. The variable BODS positively correlated with big 4.

Interestingly, this is consistent with the fact that the number of directors sitting on the board increases the greater the tendency to employ a big 4 auditor. Prior to the analysis of the hypothesis formulated in the study, the researcher performed certain diagnostics to determine the presence of multicollinearity among the variables. The Variance Inflation Factor (VIF) test checks the degree of multicollinearity among the variables:

Table 5: VIF of model variables

Variable	VIF	1/VIF
STDE	1.68	0.593853
PTBV	1.67	0.598251
DETA	1.67	.599309
LTDE	1.64	0.608125
FSIZ	1.56	0.640991
BODS	1.36	0.733475
BIG4	1.23	0.814019
FIRA	1.07	0.937381
REVG	1.01	0.986354
Mean VIF	1.43	

Source: STATA Ver. 15

As a rule of thumb, none of the variables had a VIF greater than 10; while the tolerance defined as 1/VIF was all less than 1. The researcher concludes that the variables demonstrated an absence of multicollinearity among the variables included in the model. Thereafter, the Hausman specification test to determine the preference for a fixed or random-effects model was performed. The details are shown in the table below.

Table 6: Hausman specification test of the model
The test checks the null hypothesis:
Ho: The difference in coefficients is not systematic

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  chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
          =       85.07
Prob>chi2 =      0.0000
```

Source: STATA ver. 15

Null: Random Effect Model (REM) is appropriate
Alternate: Fixed Effect Model (FEM) is appropriate

Decision: Since the p<.05; the null hypothesis is rejected and the alternate accepted. The FEM specification is therefore the appropriate technique to be used to analyze the hypothesis. The results of the FEM are shown below and used to test the first hypothesis.

Table 7: FEM output for test of the hypotheses

TOBQ	Coef.	Robust Std. Err.	t	P>t	[95% Conf.	Interval]
STDE	-.0011587	.0011543	-1.00	0.319	-.0034586	.0011412
LTDE	.0000244	3.20e-06	7.62	0.000	.000018	.0000308
DETA	.0098736	.0020012	4.93	0.000	.0058861	.0138612
BODS	-.0413256	.0251315	-1.64	0.104	-.0914013	.00875
BIG4	-.2236818	.1478677	-1.51	0.135	-.5183146	.070951
PTBV	-.0010311	.0007881	-1.31	0.195	-.0026015	.0005392
REVG	-.0003139	.0001663	-1.89	0.063	-.0006452	.0000174
FSIZ	-.7461041	.3413104	-2.19	0.032	-1.42618	-.0660282
FIRA	-.061066	.0143802	-4.25	0.000	-.0897193	-.0324128
_cons	8.341851	2.295648	3.63	0.001	3.767672	12.91603

F(9,74) = 515.83
Prob> F = 0.0000
(Std. Err. adjusted for 75 clusters in Panel_ID)
R-sq (within) = 0.2097

Source: STATA ver. 15

The robust Fixed Effects Model (FEM), is utilized to address the issue of heteroscedasticity. This is consistent with the output of the modified Modified Wald test for GroupWise heteroskedasticity in FEM (p<.05). The output is shown above the R-squared value of 0.21; i.e., the explanatory variables explain approximately 21% of the systematic variation in the dependent variable. The F-statistic value was highly significant at p<.05 (F=515.83, *p*-value = 0.000). The *coefficients* of STDE were -.0011587 (p>.05), LTDE was .0000244 (p<.05) and DETA was .0098736 (p<.05). The FEM showed that the control variables of board size and big 4 were negative but non-significant. However, the variables of firm size and firm age were significant and negatively affected Tobin's Q. the revenue growth variable was negative and significant at 10%; while, the market to book was negative and non-significant. In contrast, the studies by Garcia-Teruel and Martinez-Solano (2007);Ramadan (2013) found that performance positively related to firm size; while, Bhaird and Lucey (2009); Nunes, Viveiros, and Serrasqueiro (2012) showed a positive association between firm age and performance.

Test of Hypotheses

Ho_1: There is no significant effect of short-term debt to equity on Tobin's Q of quoted non-financial firms.

The *t*-statistic of the variable of interest is -1.00 with a p-value greater than .05; therefore, the study accepts the null for hypothesis one (p>.05), and rejects the alternate for hypothesis one. Interestingly, the Arellano-Bond dynamic panel-data estimation technique also showed a negative non-significant coefficient of the STDE. This procedure is robust to issues of endogeneity present in most corporate governance and firm performance studies using the STATA *xtabond*command. This leads to the conclusion that; *there is no significant effect of short-term debt to equity on Tobin's Q of quoted non-financial firms.*

Ho_2: There is no significant effect of long-term debt to equity on Tobin's Q of quoted non-financial firms.

The *t*-statistic of the variable of interest is 7.62 with a p-value less than .05; therefore, the study rejects the null for hypothesis two (p<.05), and accepts the alternate for hypothesis two. Interestingly, the Arellano-Bond dynamic panel-data estimation technique also showed a positive significant coefficient of the LTDE. This procedure is robust to issues of endogeneity present in most corporate governance and firm performance studies using the STATA *xtabond*command. This leads to the conclusion that; *there is a significant effect of long-term debt to equity on Tobin's Q of quoted non-financial firms.*

Ho_3: There is no significant effect of total debt to assets on Tobin's Q of quoted non-financial firms. The *t*-statistic of the variable of interest is 4.93 with a p-value less than .05; therefore, the study rejects the null for hypothesis three ($p<.05$), and accepts the alternate for hypothesis three. Interestingly, the Arellano-Bond dynamic panel-data estimation technique also showed a positive significant coefficient of the DETA. This procedure is robust to issues of endogeneity present in most corporate governance and firm performance studies using the STATA *xtabond*command. This leads to the conclusion that; *there is a significant effect of total debt to assets on Tobin's Q of quoted non-financial firms*.

Discussion of Findings

The *first* hypothesis showed a non-significant negative effect of short-term debt to equity on Tobin's Q of quoted non-financial firms. This is supported by Al-Taani (2013) in Jordan that showed a negative non-significant relationship between short-term debt to total assets with ROA. However, in Pakistan, Sheikh and Wang (2013) found a positive non-significant relationship between short-term debt ratio and market-to-book ratio. Rahman, Meero, Zayed, Islam, Rabbani, and Bunagan (2021) utilizing a sample of 3 industrial firms find no significant impact on ROA, ROE, and net profit margin of the firms.

The *second* hypothesis showed a significant positive effect of long-term debt to equity on Tobin's Q of quoted non-financial firms. This is in contrast to Al-Taani (2013) in Jordan who showed a negative non-significant relationship between long-term debt to total assets with ROA. The *third* hypothesis showed a significant positive effect of total debt to assets on Tobin's Q of quoted non-financial firms. The results are supported by the study of Detthamrong, Chancharat, and Vithessonthi (2017), in Thailand found a positive effect of leverage on firm performance. Bandyopadhyay and Barua (2016) in India showed that capital structure had a significant effect on performance. Al-Taani (2013) used empirical data from Jordan and showed that the ratio of total debt to equity was positively related to ROA.

This was supported in the study of Khalaf (2013), of the same country showed that total debt to equity positively related to ROA. Akinyomi (2013) in Nigeria showed a positive correlation between debt to equity with ROA and ROE. Ong and Teh (2011), from a sample of firms in the Malaysian construction sector, showed a positive relationship between capital structure and firm performance.

The results are in contrast to the study by Das, Chowdhury, and Islam (2021) in Bangladesh which found a negative relationship between financial leverage and firm performance proxied as ROE and ROA. Also, Samo and Murad (2019) in Pakistan found a negative relationship between leverage and profitability (ROA and ROE). Yazdanfar and Öhman (2015) using empirical data from Sweden also found a negative relationship between long and short-term debt on firm performance. Uremadu and Onuegbu (2019),Gabriel and Nneji (2015) in Nigeria found a negative non-significant effect of long-term debt to total assets ratio and total debt to equity ratio on ROA. The negative relationship was also documented in the study of Vieira (2017) in Portugal; while, Abdul (2010)in Pakistan total debt to total assets had a significant negative relationship with performance measured by ROA, GPM, and Tobin's Q. Using empirical data from Nigeria, Lawal, Edwin, Monica, and Adisa (2014) also showed that total debt to asset and debt to equity ratio. Studies byEnekwe, Agu, and Eziedo (2014), Cheche and Olayiwola (2014) also confirm a negative effect of debt ratio and debt to equity ratio on ROA.

5. Conclusion

The study concludes that debt financing is associated with the firm value of quoted non-financial firms on the Nigerian Stock Exchange. The evidence supports the tradeoff theory perspective in play for non-financial firms quoted on the Nigerian Stock Exchange. The empirical results found a non-significant effect of short-term debt to equity; however, the long-term debt to equity and total debt to assets had a positive significant effect on Tobin's Q of quoted non-financial firms. This implies that the debt financing mix is a significant determinant of the firm value of quoted non-financial firms. Based on this, the study recommends the following for policymakers, managers, and investors.

1. The managers should be wary of using short-term debt for its negative influence on Tobin's Q; this is in line with the suggestion of a trade-off that managers weigh the benefits and costs of different debt financing options with other funding sources.
2. The managers should employ the use of long-term debt financing to boost firm value from a trade-off perspective in developing countries. However, the excessive use of debt financing may signal managerial inefficiency. Thus, market regulators and policymakers should monitor such by developing appropriate measures to avoid bankruptcy and loss of investor funds.

The debt to asset ratio also supports the positive beneficial effect of long-term debt financing to improve firm value in developing economies; this may be attributed to the volatile nature of the majority of such economies which may cause a liquidity imbalance from a short-term interest payment. However, the shareholders should monitor the debt element of the capital structure to avoid eroding the value of their shareholding. They should employ analyst forecasts for proper monitoring and guidance before an investment decision.

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Appendix

Table 8:Dynamic Panel-data Estimation Model

TOBQ	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
TOBQ L1	.3217637	.0482048	6.67	0.000	.227284	.4162434
STDE	-.0013159	.0013607	-0.97	0.334	-.0039829	.0013512
LTDE	.0000199	5.80e-06	3.42	0.001	8.49e-06	.0000312
DETA	.0095277	.0016615	5.73	0.000	.0062711	.0127842
BODS	-.0562707	.0211839	-2.66	0.008	-.0977905	-.0147509
BIG4	-.2125215	.1524285	-1.39	0.163	-.5112759	.0862329
PTBV	-.0030211	.0005327	-5.67	0.000	-.0040651	-.0019771
REVG	-.0005439	.0003609	-1.51	0.132	-.0012512	.0001635
FSIZ	-1.760597	.2851897	-6.17	0.000	-2.319559	-1.201636
FIRA	-.0158908	.0137002	-1.16	0.246	-.0427426	.010961
_cons	14.01888	1.84121	7.61	0.000	10.41018	17.62759

Wald chi2(10) = 325.89
Prob> chi2 = 0.0000