Determinants of Debt Financing of Listed Industrial Goods Firms in Nigeria

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Abstract

Financial decision is a core aspect of financial re-engineering and is critical to the survival of any organization. Debt financing is however paramount in view of its advantage over equity financing in some cases in Nigeria, little research work had been undertaken on this aspect most especially that of industrial goods sector of the economy. The study was undertaken to answer the research question of what are the determinants of debt financing in the quoted industrial goods companies in Nigeria with the major objective to critically examine the determinants of debt financing of listed industrial goods companies in Nigeria. Five hypotheses was postulated to aid the study while the study is significant in providing empirical evidence on the determinants of corporate debt financing in the Nigeria listed industrial goods companies and add to the existing body of literature on debt or leverage financing in developing countries. The study is restricted to all companies classified by the Nigerian Stock Exchange (NSE) under the industrial goods sector who are in operation during the period of ten years (2005 and 2014).

Keywords: Corporate debt financing quoted industrial goods sector

I. Introduction

Financing decision is one of the most critical in the realm of corporate financial management. The decision includes those related to starting a new business or to expand an existing one, and requires the means to raise money/capital to finance the firm's operations. This need stressed the prime role of the capital market in the efficient allocation of resources, which aid economic growth and development. Capital as one of the constraint to economic development in most developing countries is been considered as the main characteristic of a well-organized capital market. Corporate entities source capital from both domestic and international capital market. Hence, their capital structure consists of debt and equity, which are applied in financing operations and expansion. According to the authors in [1] corporate's financing policy requires managers to identify ways of funding operations and new investments that could maximize wealth and ensure firm sustainability. Corporate's financing policy involves the choices from among alternative sources: use of retained earnings, borrowing by issuing debt instruments, and or issuing new shares as in [2]. Further, the combination of the various funding sources that maximizes the firm's value constitutes the firm's optimal capital structure. The importance of capital markets in economic growth and development necessitated the establishment of capital markets in every nation to perform various functions. In Nigeria, the Nigeria Stock Exchange Market (NSE) was established to make and organize facilities to the general public for the purchase and sale of bonds, stocks, shares and other securities of every kind and for the investment of money.

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The NSE under its mandate controls the granting of quotations on the securities market in respect of bonds, shares and other securities of any company, corporation, government, municipality, local authority or other corporate bodies and regulates the dealings of members with their clients and with other members. Principally, NSE role as the exchange center include facilitating business expansion through providing long term financing, increasing the number of participants in the securities market and providing an alternative to savers. Long term financing can either be a debt or equity capital.

However, the traditional view of corporate finance holds that debt is generally cheaper than equity as a source of investment finance implying that a firm's average cost of capital becomes lower as it increases its debt relative to equity. Thus, as the firm's average cost of capital reduces with increases in its debt to equity ratio, the corresponding company market value schedule rises and therefore the optimal leverage is determined at the point where the firm's weighted average cost of capital is minimized and the value of the firm is maximized as in [2]. Many theories contradicting the traditional view and several researches have been carried out to determine the factors responsible for corporate debt financing in many jurisdictions. For instance, reference [3] states that debt financing is the main element of external financing for corporations raising extra funds after creation. Moreover, the authors in [4] argued that majority of corporations looking for external financing options use debt financing rather than equity financing. Reference [5] in their study of new issues in corporate finance reported estimated debt financing at 90% percent of all new external financing.

However, a number of empirical studies, such as in ([6], [7], [8], & [9]) categorize the determinants of debt financing into characteristics or specific factors of a corporation, macroeconomic factors or country specific factors. According to them, these factors empirically influence debt financing decisions of corporations, either positively or negatively. This study is an attempt to examine the determinants of debt financing in the listed industrial goods firms in Nigeria.

Research Problem

There has been an increasing interest among regulators, capital markets, investors and researchers in the factors that influence debt financing within corporations. The issue of debt financing has been a research topic since the initial work of the author in [10]. Though determinants of debt financing continue to be a topic of interest in financial economics and have produced an enormous volume of research, in Nigeria little is known especially in the industrial goods sector of the economy. Similarly, recent empirical studies on debt financing like in ([8], [11], [12] & [9]) have provide evidences on the determinants of debt financing, but the findings are inclusive and conflicting. For instance, reference [7] argued that in spite of the lot of theoretical literature and decades of empirical tests, the factors that influence debt financing decisions remain indefinable. This generally necessitated the need for more studies on the topic, especially from developing countries, like Nigeria, where researchers have done little about the determinants of debt financing. This study is therefore designed to answer the research question of what are the determinants of debt financing in the quoted industrial goods companies in Nigeria?

Research Objectives

The major objective of the study is to critically examine the determinants of debt financing of listed industrial goods companies in Nigeria. The specific objectives of the study are to:

i. Examine the impact of firm liquidity on the debt financing of listed industrial goods firms in Nigeria.
ii. Determine the impact of assets tangibility on the debt financing of listed industrial goods firms in Nigeria.
iii. Investigate the impact of firm profitability on the debt financing of listed industrial goods firms in Nigeria.
iv. Evaluate the impact of firm growth on the debt financing of listed industrial goods firms in Nigeria.
v. Assess the impact of firm size on the debt financing of listed industrial goods firms in Nigeria.

Research Hypotheses

To guide the study, the following research hypotheses are formulated in null form:
H_{01}: Firm liquidity has no significant effect on the debt financing of listed industrial goods firms in Nigeria.
H_{02}: Assets tangibility has no significant effect on the debt financing of listed industrial goods firms in Nigeria.
H_{03}: Firm profitability has no significant effect on the debt financing of listed industrial goods firms in Nigeria.
H_{04}: Firm growth has no significant effect on the debt financing of listed industrial goods firms in Nigeria.
H_{05}: Firm size has no significant effect on the debt financing of listed industrial goods firms in Nigeria.

Scope and Significant of the Study

This study is significant in providing empirical evidence on the determinants of corporate debt financing in the Nigerian listed industrial goods companies. The study will add to the existing body of literature on debt or leverage financing in developing countries. The study will be useful to shareholders, investors, creditors, managers, students and researchers. Specifically, the finding from the research is important motivation for future research on the determinants debt financing. Therefore, the study is restricted to all companies classified by the NSE under the industrial goods sector, who are in operations during the period of ten years (2005 and 2014). The rest of the chapter is as follows; section two covers the review of related literature, section three discusses the research methodology, section four presents the results and discussion of findings, while section five covers the conclusion and recommendations.

I. Review of Related Literature

According to the author in [2] debt refers to funds that a firm borrows and is obliged to pay back and this is usually obtained from banks, individuals and other lending sources. They adds that debt instruments refer to all forms of borrowing available in the capital market, which could be bonds, bank loans, etc. The authors in [8] stated that specific factors have remained the main focus of debt financing studies based on the two proposition of the authors in ([10] & [13]). Existing empirical studies such as in ([9], [7], [14] & [15]) mentioned some corporation specific factors influencing debt financing. These firm specific factors include firm profitability, corporation size and growth, nature of assets, non-debt tax shields, liquidity and probability of bankruptcy. On the other hand, the authors in ([9] & [14] stated firm factors like corporation tax rates, business risk, access to capital markets, the finance manager's gender and the composition of the board of directors, are also considered to have influence on debt financing.

The authors in [2] examined the financing decisions of 19 listed companies in comparison with 16 nonlisted companies in Ghana. The study tests some hypotheses related to capital structure determinants and debt policy decisions. The study found support for the pecking order hypothesis across all firms. The free cash flow hypothesis holds for long-term debt decisions across firms but not the capital structure decisions. All forms of debt policy decisions are consistent with the matching principle except non-listed firms' long term debt. The study does not find any significant differences between listed and non-listed firms in the application of debt.

For example, debt could be served as a tax shield. So, the more profitable firms demand more debt and the relation between profitability and leverage is positive. On the other hand, when asymmetric information is great and, consequently, bank interest rates are high, large profitable firms will choose to use their internal sources, but others will have to borrow. This implies a negative relation between profitability and leverage. Previous studies as in ([16], [17], & [18]) have identified statistically significant negative relationships between profitability and leverage. On the other hand, the authors in [19] find a negative relationship between size and leverage, while the authors in ([18] & [17] report a positive relationship. The difference in obtained results could be determined by the fact that larger firms are able to issue more equity than small firms due to lower asymmetric information with financial markets. In a more study by the authors in [20] the results identified long-term debt to be irrelevant component of capital structure of large unquoted and quoted firms in Ghana as there is a greater reliance on equity. Furthermore, profitability, size, business risk and tangible assets have positive correlation with level of gearing of companies in Ghana. On the other hand, growth, and tax indicate a negative correlation with the level of gearing.

The author in [21] in a research on the sensitivity of performance to capital structure in selected Food and Beverage companies in Nigeria used performance indicators like the EBIT (earnings before interest and tax), EPS (earnings per share) and DPS (Dividend per share) and the level of turnover as a performance measure of capital structure of these companies. Results from the research showed that for most of the companies analyzed, their EBIT, EPS and DPS were sensitive to capital structure, in other words, an increase in turnover reflected a corresponding increase in EBIT, EPS and DPS and vice versa. In another study, the author in [22] examined the relationship between capital structure and corporate performance in the Nigerian petroleum industry. The study used the earnings per share (EPS) and dividend per share (DPS) as performance indicators, and results showed that the relationship between the EPS and the leverage ratio was positive implying that an increase in leverage ratio would lead to an increase in EPS, the paper also showed that there exists a positive relationship between the DPS and the leverage ratio, thus showing that debt has a huge impacts on performance in the Nigerian petroleum industry.

Reference [23] examined the determinants of capital structure of non-financial listed firms in Nigeria. The research was conducted using panel data methodology for a sample of 20 firms listed on Nigerian Stock Exchange during 2006-2010. The results showed that the major determinants of capital structure based on this study include: profitability, tangibility and liquidity. Age, Size and tangibility play determining roles in accessing long-term debt finance within the Nigerian context. The authors in [24] carried out a study on the determinants of capital structure of large non-financial listed firms in Nigeria and found that profitability has a positive relationship with debt of large firms in Nigeria, and also that the large and profitable firms prefer debt because of the tax saving advantage. The results of the study also show that the large firms prefer short-term debt to long-term debt financing and also that relationship between tangibility and long-term debt ratios was significantly positive, thus showing the importance of collateral in the issue of debt finance. Size of the firm also showed a statistically significant and positive relationship with total debt and short-term debt.

Theoretical Framework

The link between debt financing and firm specific determinants in corporate finance have been highlighted by the theories of capital structure, founded from the initial work of the authors in [10], which assumed a perfect market where there is no tax and bankruptcy disasters, based on this assumption they concluded that debt is irrelevant to determining a firm's value as in [25]. In response to the authors in ([10 &13] the trade-off theory and pecking order theory were introduced in opposition to the unrealistic assumption of Modigliani and Miller's proposition of perfect capital structure. Trade-off and pecking order theory were developed to explain the rules of debt and equity in firms' capital structure performance in the real capital structure market founded on tax and bankruptcy disasters.

The pecking order theory holds that management strongly prefers to use internal funds when available, and prefers not to use external sources of funds unless internal sources are unavailable. That is, avoiding debt could positively affect firm value. According to the authors in ([26] & [27]) information is the base that managers and investors depend upon when making a decision regarding issuing equity or borrowing money. Managers will hesitate to issue equity if they feel that it is undervalued by the market. However, investors realise that managers will hesitate to issue new equity when it is underpriced. Thus, both managers and investors react according to their available information. Based on this argument, if managers tend to issue undervalued equity (low priced equity), the wealth will be transferred to the investors against the shareholders' benefits and wealth. In this situation, internal funds and debt will be preferred to equity. Reference [26] referred to this as the 'pecking order theory' of financing. This states that firms prefer to finance new investment first internally with retained earnings, second with debt, and last by issuing new equity.

Therefore, the theory suggests that firms consider all the financing methods available and choose the least expensive option. The pecking order theory predicts that high growth firms, typically with large financing needs, will end up with high debt ratios due to their managers' unwillingness to issue equity as in [28]. However, the authors in [29] found that firms with consistently high growth use less debt in their capital structures. This implies that firms with high liquidity tend to use less debt because they are willing to use internal funds when these are available.

The trade-off theory on the other hand concludes that an optimal capital structure derives from balancing the benefits of tax that has come from using debt, against the costs associated with debt, such as bankruptcy and financial distress, and agency costs. The first form of the static trade-off theory of capital structure suggested that the trade-off between the tax benefits of debt and the costs of financial distress expect to yield the optimal level of debt to maximize the value of the firm as in [26]. The benefits of maximizing a firm's value, as suggested by the trade-off theory, can be traded for the cost of issuing debt. In other words, the benefits of the trade-off theory are traded against their costs to maximize a firm's value. In short, the trade-off theory suggests that an optimal capital structure exists. Therefore, a firm can predict its optimal capital structure by balancing the benefits and costs associated with issuing debt.

I. Research Methodology

In this study, correlation research design is adopted to examine the determinants of debt financing of listed industrial goods firms in Nigeria. The design is chosen because of its effectiveness in the cause and effect analysis. The study used secondary data from the financial statements of the sampled companies for the period of 10 years (2005-2014). The population of this study comprises of all the 17 companies classified by the NSE under industrial goods sector. The firms must be in operation through the period of ten years (2005-2014), to form part of the sample.

However, five firms were not selected due to difficulties in accessing their data. Based on this, the population was reduced to 12 firms, and hence the sample size of the study.

The study employed panel regression technique of data analysis; tests like heteroskedasticity test and multicolinearity test are conducted, because they lead to spurious regression problem that can lead to statistical bias. This is also informed by the classical traditional regression assumptions which among others require that the variance of the error term has to be constant and the same for all observations (homoscedastic) and the explanatory variables are not perfectly correlated. Failure to ensure that may cause the usual standard error terms of the estimated parameters to be biased and inconsistent. Therefore, robustness tests help produces estimators that are BLUE (Best Linear Unbiased Estimators). The analysis was conducted using Statistics/Data Analysis Software (STATA 11.2).

Variables Measurement and Model Specification

The definitions and measurements of the variables used in this study are presented in Table 1 below;

TABLE I. VARIABLES MEASUREMENTS

Variables	Definition/Measurements
Dependent Variable	
Debt Financing	Defined as the long-term liabilities, and measured by the proportion of long-term liabilities to total capital (long-term debt plus equity share capital)
Independent Variables	
Liquidity	Is measured by the ratio of current assets to current liabilities (short-term debt)
Firm Size	Is measured by the natural logarithm of total assets
Profitability (PROF)	Is defined as the return on assets, and measured by the ratio of profit after tax to total assets.
Firm Growth	Defined as revenue growth (difference between revenue in year t and year t-1), scaled by total assets.
Assets Tangibility	Is the composition of tangible fixed assets, and measured by total tangible fixed assets over total assets.

Model Specification

To examine the determinants of debt financing in the quoted industrial goods firms in Nigeria, the following econometric model is estimated:

DFINit = β0 + β1LIQit + β2TANGit + β3PROFit + β4GRWTit + β5FSIZit + μit…………………i

Where;
DFINit =   Debt financing of firm I in year t
LIQit   =   Liquidity of firm I in year t
TANGit   =   Assets tangibility of firm I in year t
PROFit   =   Profitability of firm I in year t
GRWTit   =   firm growth of firm I in year t
FSIZit   =   Size of firm I in year t
β0   =   the intercept/constant;
β1 – β5 =   are the parameters;
μit   =   the residual/error term of bank I in year t

I. Results and Discussions

In this section, the results obtained from the tests conducted on the data collected for the study are presented and discussed. The section also presented the test of the research hypotheses; it begins with the description of the data collected for the study and then the inferential statistics.

Descriptive Statistics

The descriptive statistics of the data collected for the study is presented in Table 2;

Table iII. Descriptive Statistics

Variables	Mean	SD	Min	Max	N
DFIN	0.4371	0.2622	0.0089	0.9553	120
LIQ	1.4893	0.8173	0.0414	4.3969	120
TANG	0.4657	0.2354	0.0877	0.9959	120
PROF	0.0668	0.1208	-0.2904	0.4668	120
GRWT	0.0706	0.1839	-0.6711	0.5832	120
FSIZ	15.32	1.5422	12.90	19.54	120

Source: STATA Output (Appendix).

Table 2 presents the descriptive statistics of the data collected from the sample of industrial goods firms quoted in the NSE. The descriptive results in Table 2 shows that the measures of debt financing (DFIN), which is the ratio of long term debt to total capital has a minimum value of 0.0089 (0.89%) and 0.9553 (95.53%) as the maximum value. The average value of the DFIN is 0.4371 (43.71%) with standard deviation of 0.2622, signifying that the data deviate from the mean value from both sides by 26.22%. This implies that the data for the debt financing variable is widely dispersed among the sample firms. The table also indicates that the minimum and maximum values of the firm liquidity (LIQ) are 0.0414 (0.04:1) and 4.3969 (4.39:1) respectively, with the mean value of 1.4893 (1.49:1) and standard deviation of 0.8173. The descriptive statistic implies that the average current ratio of the sample firm is satisfactory, but there are firms with poor liquidity position with current ratio of 0.04:1 which is far below the benchmark. Moreover, the analysis implies the presence of idle liquidity as the maximum current ratio of the sample firms is 4.39:1. The standard deviation also indicates a wide dispersion from the mean value. The table shows an average asset tangibility (TANG) of 0.4657 (46.57% of the total assets) of the sample industrial goods firms in Nigeria, with standard deviation of 0.2354. This implies that the deviation from the mean is 23.54%, suggesting a high dispersion among the sampled firms. The minimum value of asset tangibility is 0.0877 (8.77% of the total assets) and 0.9959 (99.59% of the total assets) as the maximum value.

Moreover, the descriptive results in Table 2 shows that the average profitability (PROF) which is the return on assets is 0.0668 (6.68%), with standard deviation of 0.1208. The minimum profitability -0.2904 (-29.04%) and 0.4668 (46.88%) as the maximum value. The standard deviation signifies that the data deviate from both sides of the mean by 12.08%. The table also indicates that the minimum and maximum values of the firm growth (GRWT) are -0.6711 (-67.11%) and 0.5832 (58.32%) respectively, with the mean value of 0.0706 (7.06%) and standard deviation of 0.1839. The analysis indicates that there are firms with decline growth in terms of revenue. Lastly, the table shows an average firm size (FSIZ), which is the natural logarithm of total asset of 15.32 of the sample industrial goods firms in Nigeria, with standard deviation of 1.5422. This implies that the deviation from the mean is 1.5422, suggesting a slight dispersion among the sampled firms. The minimum value of firm size is 12.90 and 19.54 as maximum value.

However, the analysis of the descriptive statistics results of the data collected for the study suggested that the data is widely dispersed as indicated by the standard deviations, which is an indication of non-normally distributed. The study employs the Shapiro Wilk Test for Normal Data.

Under the Shapiro-WIlk (W) test for normal data, null hypothesis principle is used to check a variable that came from a normally distributed population. The null hypothesis of the test is that, the data is normally distributed. The test (in appendix) indicates that data from all the variables of the study are not normally distributed, because the P-values are not normally distributed because the P-values are statistically significant at 1% level of significance, thus, the null hypothesis (that, the data is normally distributed) is rejected. This may have effects on the results, as most of the parametric tools of analysis including regression assumed that the data is normally distributed.

Correlation Results

The summary of the Pearson correlation Coefficients of the variables of the study are presented in Table 3 as follows;

Table 3: Correlation Matrix
Table IiIII. Descriptive Statistics

VAR	DFIN	LIQ	TANG	PROF	GRWT	FSIZ
DFIN	1.0000					
LIQ	0.0266 (0.7734)	1.0000				
TANG	0.4779 (0.0000)	-0.2669 (0.0032)	1.0000			
PROF	0.0434 (0.6378)	-0.1080 (0.2402)	-0.1588 (0.0832)	1.0000		
GRWT	-0.1684 (0.0659)	-0.0532 (0.5642)	-0.1663 (0.0695)	0.4008 (0.0000)	1.0000	
FSIZ	0.7912 (0.0000)	-0.1380 (0.1327)	0.5644 (0.0000)	0.1374 (0.1346)	-0.0586 (0.5250)	1.0000

P-Values in Parentheses
Source: STATA Output (Appendix).

The correlation result in table 3 presents the results of the degree of associations between the determinants of debt financing of listed industrial goods firms in Nigeria. The table shows that there is a positive relationship between firm liquidity (LIQ) and debt financing, from the correlation coefficient of 0.0266, which is not statistically significant at alpha level (pvalue of 0.7734). This implies that liquidity is not significantly related with debt financing in the quoted industrial goods companies in Nigeria. The result from the table also indicates that there is a statistical significant positive association between assets tangibility (TANG) and debt financing of the sample firms, from the correlation coefficient of 0.4779 which is statistically significant at 1% level of significance (p-value of 0.0000). This relationship implies that, a high tangible fixed asset is directly related with debt financing. Moreover, table 3 shows a positive relationship between the firm profitability (PROF) and debt financing of the sample industrial goods firms in Nigeria, from the correlation coefficient of 0.0434, which is not statistically significant at all levels of significance (p-value of 0.6378). This implies that profitability is not significantly related with debt financing of industrial goods firms in Nigeria. The result from the table also shows that there is a statistical significant negative correlation between firm growth (GRWT) and debt financing of the sample industrial goods firms, from the correlation coefficient of -0.1684 which is statistically significant at 10% level of significance (p-value of 0.0659). This relationship implies that, high revenue growth is indirectly related with debt financing. Table 3 shows a significant positive relationship between the firm size (FSIZ) and debt financing of the sample industrial goods firms in Nigeria, from the correlation coefficient of 0.7192, which is statistically significant at 1% level of significance (p-value of 0.0000). This implies that firm size is significantly related with debt financing of industrial goods firms in Nigeria.

Regression Results and Hypotheses Testing

In this section, the hypotheses formulated for the study are tested; the section begins with the discussion of the regression model as presented in table 4;

TABLE IV. Regression Model Summary

Variables	Statistics	Prob.
R Square	0.5393	
Wald Chi2	151.87	0.0000
Mean VIF	1.40	
Hausman Test	8.90	0.1133
Random Effect (LM) Test	127.88	0.0000

Source: STATA Output (Appendix).

The regression table indicates that the explanatory variables of the study (firm size, firm profitability, liquidity, tangibility and firm growth) explained 53.93% of the total variations in the debt financing of the listed industrial goods firms in Nigeria, from the coefficient of multiple determination (Adjusted R square of 0.5393).

The table also shows that the model of the study is fit at 1% level of significance as indicated by the Wald Chi2 of 151.87 with the Probability value of 0.0000. The results from the table also indicates the absence of heteroscedasticity (that is, the variance of the error term is constant), as shown by the Breuch Pagan/Cook-Weisberg test for heteroskedasticity (Hettest) Chi2 of 1.69 with p-value of 0.1935. The results on the other hand, show the absence of perfect multicollinearity Variables Statistics Prob. R Square 0.5393 Wald Chi2 151.87 0.0000 Hettest: Chi2 1.69 0.1935 Mean VIF 1.40 Hausman Test 8.90 0.1133 Random Effect (LM) Test 127.88 0.0000 among the independent variables, because the mean Variance Inflation Factor (VIF) is 1.40. This is far below the benchmark of 10, which is an indication of perfect multicollinearity.

Moreover, the table shows that the Hausman specification test and the Breusch and Pagan Lagrangian Multiplier Test for Random Effects indicated that Random effect regression model (Generalized Least Squares, GLS) is the most appropriate for the study. However, in view of the nature of the data which did not follow the normal distribution assumption, the study employed feasible GLS because of its robustness under this condition. Therefore, the hypotheses of the study are tested in the following section.

Hypotheses Testing

In this section, the hypotheses formulated to test the determinants of debt financing of listed industrial goods firms in Nigeria. Table 5 present the regression coefficient for the analysis;

TABLE V. GLS Regression Coefficients

Variables	Coefficients	t-values	Prob.
LIQ	0.0486	2.37	0.018
TANG	0.1542	1.73	0.083
PROF	0.0834	0.55	0.584
GRWT	-0.1635	-1.72	0.086
FSIZ	0.1105	8.46	0.000
CONSTANT	-1.3943	-7.72	0.000

Source: STATA Output (Appendix).

The results in table 5 shows that firm liquidity (LIQ) in the sample industrial goods firms in Nigeria has a significant statistical positive effect on the debt financing of the sample firms, from the coefficient of 0.0486 and t-value of 2.37 which is statistically significant at 5% level of significance (p-value of 0.018). This signifies that firm liquidity of quoted industrial goods companies in Nigeria significantly influenced the debt financing during the period of the study. This implies a direct relationship between the liquidity and debt financing; that is, when liquidity increase by N1, debt financing increases by 4.86k. The result is statistically significant at 95% confidence level. Therefore, the study rejects the null hypothesis one (H01), which states that firm liquidity has no significant effect on debt financing of listed industrial goods firms in Nigeria. The study therefore, infers that the liquidity position of the firms significantly determined the use of debt financing in the listed industrial goods firms in Nigeria, during the period covered by the study.

Similarly, table 5 shows that assets tangibility (TANG) in the sample industrial goods firms in Nigeria has a significant statistical positive effect on the debt financing of the sample firms, from the coefficient of 0.1542 and t-value of 1.73 which is statistically significant at 10% level of significance (p-value of 0.083).

This suggests that tangible fixed assets of quoted industrial goods companies in Nigeria significantly influenced the debt financing during the period of the study. It also implies a direct relationship between the assets tangibility and debt financing; that is, when tangible fixed assets increase by N1, debt financing increases by 15.42K. The result is statistically significant at 90% confidence level. Therefore, the study rejects the null hypothesis two (H_{02}), which states that assets tangibility has no significant effect on debt financing of listed industrial goods firms in Nigeria. The study infers that the tangible fixed assets of the firms significantly determined the use of debt financing in the listed industrial goods firms in Nigeria, during the period of the study.

The table also show that profitability (PROF) of the sample listed industrial goods firms in Nigeria has a positive impact on the debt financing of the firms, from the coefficients of 0.0834 with t-value of 0.55 which is not statistically significant at all levels of significance (p-value of 0.584). This implies that profitability has not significantly influenced the debt financing of listed industrial goods firms in Nigeria. Although the results indicated a direct relationship between the profitability and debt financing; that is, a N1 increase in profitability, debt financing increases by 8.34k, the results lack statistical significance.

Based on this, the study failed to reject the null hypothesis three (H_{03}), which states that profitability has no significant effect on the debt financing of listed industrial goods firms in Nigeria. The study infers that profitability has not significantly determined the debt financing of listed industrial goods firms in Nigeria, during the period covered by the study.

Similarly, the table show that firm growth (GRWT) in the sample listed industrial goods firms in Nigeria has significant negative impact on debt financing of the sampled firms, from the coefficients of -0.1635 with t-value of -1.72 which is statistically significant at 10% level of significance (p-value of 0.086). The result suggest that firm growth in terms of revenue growth has an indirect relation with the debt financing of the firms; that when revenue falls by N1, debt financing increases by 16.35k, the result is statistically significant. Based on this, the study rejects the null hypothesis four (H_{04}), which states that firm growth has no significant effect on debt financing of listed industrial goods firms in Nigeria. The study therefore, infers that firm growth is a significant determinant of debt financing of listed industrial goods firms in Nigeria, during the period covered by the study.

Lastly, the results in table 5 shows that firm size (FSIZ) in the sample industrial goods firms in Nigeria has significant statistical positive effect on the debt financing of the sample firms, from the coefficient of 0.1105 and t-value of 8.46 which is statistically significant at 1% level of significance (p-value of 0.000). This signifies that size of firm in the quoted industrial goods companies in Nigeria significantly influenced the debt financing during the period of the study. It suggests a direct relationship between the size of firm and debt financing; that is, when firm size increase by N1, debt financing increases by 11.05k. The result is statistically significant at 99% confidence level. Therefore, the study rejects the null hypothesis five (H05), which states that firm size has no significant effect on debt financing of listed industrial goods firms in Nigeria. The study therefore, infers that the size of the firms significantly determined the use of debt financing in the listed industrial goods firms in Nigeria, during the period covered by the study.

Conclusion and Recommendations

This study examined the determinants of debt financing of listed industrial goods firms in Nigeria. Emanating from the analysis conducted on the data, together with the hypotheses testing, the study found a significant positive association between firm size, assets tangibility, firm growth, liquidity and debt financing of the sample firms. The study therefore concludes that firm liquidity position, assets tangibility, firm growth and firm size are a significant determinants of debt financing in the Nigerian industrial goods companies during the period covered by the study. The study on the other hand concludes that the profitability did not significantly determine the use of debt by Nigerian industrial goods firms. Specifically, the study is of the opinion that larger firms with higher liquidity position financing their operations through debt in the quoted industrial goods firms in Nigeria. This is also supported by the asset tangibility, which also determined debt financing significantly, and the inverse relation of growth with debt financing.

Based on the findings and conclusions from this research, the study recommends that the regulators of the industrial goods companies in Nigeria should make favourable policies in respect of the use of debt financing as it could improve operational efficiency and performance. Managements of the listed industrial goods firms in Nigeria should try and create a debt financing strategy for their firms, as this could have positive impact on the market values of their firms. Specifically, the managers should consider the growth rate of their firms, size, liquidity and the level of assets tangibility when making decisions regarding debt financing.

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Appendices

```
. xtset id year, yearly
        panel variable:  id (strongly balanced)
         time variable:  year, 2005 to 2014
                 delta:  1 year
```

Descriptive Statistics

```
. xtsum
```

Variable		Mean	Std. Dev.	Min	Max	Observations	
year	overall	2009.5	2.884324	2005	2014	N =	120
	between		0	2009.5	2009.5	n =	12
	within		2.884324	2005	2014	T =	10
id	overall	6.5	3.466527	1	12	N =	120
	between		3.605551	1	12	n =	12
	within		0	6.5	6.5	T =	10
dfin	overall	.4370661	.2622235	.008876	.9552945	N =	120
	between		.2405985	.0620517	.8375795	n =	12
	within		.1234973	.0553995	.7013045	T =	10
liq	overall	1.48929	.8173112	.0414838	4.396905	N =	120
	between		.4247847	.5495521	2.1993	n =	12
	within		.7079566	.04263	3.694194	T =	10
tang	overall	.4656662	.2353593	.0876708	.9958674	N =	120
	between		.2024318	.1404212	.8254649	n =	12
	within		.1323427	.0382329	.8069148	T =	10
prof	overall	.0668496	.1207901	-.2903583	.4668169	N =	120
	between		.0936842	-.0659616	.2604485	n =	12
	within		.0804817	-.1843053	.3169352	T =	10
grwt	overall	.0705687	.1838948	-.671106	.5831627	N =	120
	between		.0826008	-.0337998	.2170199	n =	12
	within		.1658627	-.6305567	.657278	T =	10
fsiz	overall	15.32079	1.542168	12.90042	19.5387	N =	120
	between		1.498508	13.38476	17.93756	n =	12
	within		.5500773	11.50424	16.92193	T =	10
_est_f~d	overall	1	0	1	1	N =	120
	between		0	1	1	n =	12
	within		0	1	1	T =	10
_est_r~m	overall	1	0	1	1	N =	120
	between		0	1	1	n =	12
	within		0	1	1	T =	10

```
.
```

```
. swilk dfin liq tang prof grwt fsiz
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
dfin	120	0.95497	4.333	3.285	0.00051
liq	120	0.90601	9.045	4.934	0.00000
tang	120	0.95874	3.971	3.089	0.00100
prof	120	0.95616	4.219	3.225	0.00063
grwt	120	0.95514	4.317	3.277	0.00053
fsiz	120	0.95958	3.889	3.043	0.00117

```
. pwcorr dfin liq tang prof grwt fsiz, star (0.05) sig
```

	dfin	liq	tang	prof	grwt	fsiz
dfin	1.0000					
liq	0.0266	1.0000				
	0.7734					
tang	0.4779*	-0.2669*	1.0000			
	0.0000	0.0032				
prof	0.0434	-0.1080	-0.1588	1.0000		
	0.6378	0.2402	0.0832			
grwt	-0.1684	-0.0532	-0.1663	0.4008*	1.0000	
	0.0669	0.5642	0.0695	0.0000		
fsiz	0.7192*	-0.1380	0.5644*	0.1374	-0.0586	1.0000
	0.0000	0.1327	0.0000	0.1346	0.5250	

```
. reg dfin liq tang prof grwt fsiz
```

Source	SS	df	MS		
Model	4.57093604	5	.914187209	Number of obs =	120
Residual	3.61164284	114	.031681078	F(5, 114) =	28.86
				Prob > F =	0.0000
				R-squared =	0.5586
				Adj R-squared =	0.5393
Total	8.18257889	119	.068761167	Root MSE =	.17799

dfin	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
liq	.0486377	.0210389	2.31	0.023	.0068599	.0902155
tang	.1542279	.0912605	1.69	0.094	-.0266584	.3350142
prof	.0833773	.1561295	0.53	0.594	-.225914	.3926687
grwt	-.1635177	.0978126	-1.67	0.097	-.3572836	.0302483
fsiz	.1105184	.0134037	8.25	0.000	.0839658	.1370709
_cons	-1.394302	.185419	-7.52	0.000	-1.761616	-1.026989

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of dfin

        chi2(1)      =       1.69
        Prob > chi2  =     0.1935
```

Multicollinearity Test

```
. vif

    Variable |       VIF        1/VIF
-------------+----------------------
        tang |      1.73      0.577065
        fsiz |      1.60      0.623078
        prof |      1.34      0.748549
        grwt |      1.22      0.822858
         liq |      1.11      0.900396
-------------+----------------------
    Mean VIF |      1.40
```

```
. xtreg dfin liq tang prof grwt fsiz, fe

Fixed-effects (within) regression              Number of obs      =        120
Group variable: id                             Number of groups   =         12

R-sq:   within  = 0.2065                        Obs per group: min =         10
        between = 0.6382                                       avg =       10.0
        overall = 0.5321                                       max =         10

                                                F(5,103)           =       5.36
corr(u_i, Xb)  = 0.3771                         Prob > F           =     0.0002

------------------------------------------------------------------------------
        dfin |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         liq |   .0043285   .0172745     0.25   0.803    -.0299313    .0385884
        tang |   .0885202   .0967485     0.91   0.362    -.1033576     .280398
        prof |  -.1371311   .1429378    -0.96   0.340    -.4206145    .1463522
        grwt |  -.0688991   .0701033    -0.98   0.328    -.2079325    .0701344
        fsiz |   .0775351    .023622     3.28   0.001     .0306865    .1243837
       _cons |  -.7844705    .337469    -2.32   0.022    -1.453761   -.1151803
-------------+----------------------------------------------------------------
     sigma_u |  .15909326
     sigma_e |  .11824554
         rho |  .64415736   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(11, 103) =     14.12             Prob > F = 0.0000

. est store fixed
```

Random Effect Regression Test

```
. xtreg dfin liq tang prof grwt fsiz, re

Random-effects GLS regression              Number of obs     =       120
Group variable: id                         Number of groups  =        12

R-sq:  within  = 0.2053                     Obs per group: min =       10
       between = 0.6429                                    avg =      10.0
       overall = 0.5374                                    max =        10

                                           Wald chi2(5)      =     43.39
corr(u_i, X)   = 0 (assumed)               Prob > chi2       =    0.0000

─────────────┬────────────────────────────────────────────────────────────────
        dfin │      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
─────────────┼────────────────────────────────────────────────────────────────
         liq │   .0051936   .0167203     0.31   0.756    -.0275775    .0379648
        tang │   .0893347   .0917625     0.97   0.330    -.0905166     .269186
        prof │   -.102661    .138314    -0.74   0.458    -.3737514    .1684294
        grwt │  -.0702134   .0696546    -1.01   0.313     -.206734    .0663072
        fsiz │   .0910072   .0193678     4.70   0.000     .0530469    .1289675
       _cons │  -.9947526   .2777849    -3.58   0.000    -1.539201   -.4503042
─────────────┼────────────────────────────────────────────────────────────────
     sigma_u │  .14399017
     sigma_e │  .11824554
         rho │  .59723645   (fraction of variance due to u_i)
─────────────┴────────────────────────────────────────────────────────────────

. est store random
```

```
. hausman fixed random

                 ──── Coefficients ────
             │      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             │    fixed        random         Difference         S.E.
─────────────┼────────────────────────────────────────────────────────────────
         liq │   .0043285     .0051936       -.0008651          .0043405
        tang │   .0885202     .0893347       -.0008145          .0306579
        prof │  -.1371311     -.102661        -.0344701          .0360618
        grwt │  -.0688991    -.0702134         .0013143          .0079188
        fsiz │   .0775351     .0910072        -.0134721          .0135234
─────────────┴────────────────────────────────────────────────────────────────
                     b = consistent under Ho and Ha; obtained from xtreg
          B = inconsistent under Ha, efficient under Ho; obtained from xtreg

   Test:  Ho:  difference in coefficients not systematic

            chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                    =        8.90
          Prob>chi2 =      0.1133
          (V_b-V_B is not positive definite)
```

Random Effect Test

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        dfin[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                                    Var        sd = sqrt(Var)

                        dfin |    .0687612         .2622235
                           e |    .013982          .1182455
                           u |    .0207332         .1439902

        Test:   Var(u) = 0
                              chibar2(01) =    127.88
                              Prob > chibar2 =  0.0000
```

```
. xtgls dfin liq tang prof grwt fsiz

Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        homoskedastic
Correlation:   no autocorrelation

Estimated covariances      =       1       Number of obs      =        120
Estimated autocorrelations =       0       Number of groups   =         12
Estimated coefficients     =       6       Time periods       =         10
                                           Wald chi2(5)       =     151.87
Log likelihood             = 39.92712      Prob > chi2        =     0.0000
```

dfin	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
liq	.0485377	.0205061	2.37	0.018	.0083464	.088729
tang	.1542279	.0889497	1.73	0.083	-.0201103	.3285661
prof	.0833773	.1521762	0.55	0.584	-.2148826	.3816372
grwt	-.1635177	.0953359	-1.72	0.086	-.3503726	.0233373
fsiz	.1105184	.0130643	8.46	0.000	.0849129	.1361239
_cons	-1.394302	.1807241	-7.72	0.000	-1.748515	-1.040089