Determinants of Capital Structure in the Nigerian Chemical and Paints Sector

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Abstract

The study assessed the determinants of capital structure in Nigerian Chemical and Paints companies listed in Nigeria, for a period of five years from 2005 to 2009. The study employed secondary data from the annual reports and the Nigerian Stock Exchange (NSE) fact books covering the study period Ordinary least square (OLS) was employed to determine whether relationship exists between leverage ratio and various independent variables in the model. The study reveals that for the Nigerian Chemical and Paints sector, tangibility and profitability have significant impact on leverage at 1% level, while size, growth and age have insignificant impact on the dependent variable. It also shows that the coefficient of the two significant explanatory variables, which are tangibility and profitably are negative. The effect of tangibility on capital structure suggests a negative relationship between tangibility and leverage contrary to both trade off theory and pecking order theory. Also the relationship between growth rate and level of leverage contradict both the pecking order and the trade off theory. All in all, three out of five of the explanatory variables have significant on the dependent variable whereas the remaining two, which include profitability and tangibility are not significant. The study therefore, recommends that in carrying out their debt financing decision, Chemical and Paints, should deploy and properly measure variables like size, age, growth, profitability and tangibility of the firms.

Introduction

A firm can combine different proportions of debt and equity in an order to increase the market value of the firm and this is recognized as capital structure of the firm. Capital structure decision is one of the most crucial decisions made by financial managers, and borders on the mix of debt and equity used by firms in financing their assets. In as much as wealth maximization remains a primary motive to going concern business firms, capital structure decision should be regarded as expedient and indispensable phenomenon to business firms, as it facilitates maximisation of return on investment over a long-run perspective while risk is minimized through boosting the efficiency of project financing, financing of mergers, acquisition and expansion as well as dividend decisions. Capital structure which is the proportion of financing mix of a firm in the form of debt-to-equity ratio, may thus be perceived as pivotal to the growth and future of a firm.

This therefore calls call for a concerted effort towards ensuring efficient capital mix, by the firm's management; such that will protect the shareholders' interest through maximization of their earnings and market value, while minimizing their inherent risks attributable to the mix. An optimal capital structure entails a proper mix of funds sources towards attaining organisational objectives.

Questions bordering on choice of debt to equity ratio, optimal capital structure of a firm, existence of optimal capital structure, potential determinants of such optimal capital structure, require critical decision (Myers, 1984). It is obvious that since firms' sizes do not remain stagnant and because cost of capital is not something that remains static due to constant changes in interest rates, inflation and other variables, the risks inherent in capital mix also perpetually remains dynamic and thus optimal capital structure should continue to keep changing. What is thus, important here is identifying those factors that derive/determine capital structure over time and constantly observe them to enable the financial manager to continuously keep abreast on how and when to adjust to this ephemerally dynamic optimum level of capital structure.

Going by wealth maximization rule, it is cogent to assume that an optimum level of capital structure of a firm should the level where the risk of venturing in outsider to share in the firm's earnings, commensurates with the returns of equity holders; and this level as given by the rational analysis above, is constantly changing and thus the need to identify those factors that drive capital structure so as to equip the manager with the tools needed in constantly restructuring his capital structure in such a way that maximimises his firm's wealth. Some of the prominents ones among these determinants as identified by literature includes: profitability, age, size, growth and a firm's tangibility. Profitability here refers to the degree at which a firm generate excess income over its operational expenses. Logically, unless a firm has financing deficit, it would rather use its own money than to risk diluting the claim on its assets with external financing. Thus a rational manager ought to first consider whether financing deficit exist- unless there is a room for growth opportunity which the internal source is deficient in shouldering.

With respect to age, size and asset tangibility, the manager may use these from the dimension of assessing his firm's eligibility to borrow if at all financing deficit exist, and also to be aware of his firm's bargaining power as regards to the price of external debt. Obviously, if his firm is relatively old (with accumulated reputation) or big in terms of total assets in general and or in terms of tangibly disposable/collateralizable assets, he should be able to bargain low interest on loan. if the foregoing happened to be correct, then managers may have some yardsticks in managing their finances. The major problems of this study include the disparity of evidence provided by most of the few studies carried out on developing countries all have different views on the basic facts. For instance the work of Singh and Hamid (1992) and Singh (1995) all make use of data on the largest companies in selected developing countries. Their findings reveals that firms in developing countries used external finance in financing their growth than is typically the case in the industrialized countries and depend more on equity finance than debt finance.

But all these findings appears surprising considering the fact that stock markets in developing countries are always less well developed than those in the industrial countries, especially for equities. However, Cobham and Subramaniam (1998) in an Indian study used a sample of larger firms and advocated that Indian firms use lower external and equity financing. In a study of large companies in ten developing countries discovered that debt ratios varied significantly across developing countries, but overall were not out of line with similar data for industrial countries (Booth et al., 2001). Research has revealed that the development policies of most countries in the last decade have been moved to rely more on private companies and on the use of organized capital markets to finance their companies. This emphasizes the importance of conducting a research on the functioning and financing of private companies in a wide range of institutional environments, particularly in developing countries (Green, Murinde and Suppakitjarak, 2002).

To the best of researcher's knowledge only researches such as Ajao and Ema (2013), Olowoniyi et al (2012), Ajao and Ema (2012), (Shehu (2011), Iwarere (2010), Ezeoha (2010), Adesola (2009), Kajola (2008), Salawu (2007), Eboh (2004), Olatundun (2002) and Odedokun (1995), which relate to determinants of Capital Structure in Nigeria have been conducted in Nigeria However, their results did not concur on the common attributes in the capital structure of Nigerian firms. The various determinants, which this study will adopt, include Tangibility, Size, Growth, Profitability, and Age. Although this list of variables discussed subsequently is not exhaustive, it comprises the most common variables used, and for the Nigerian situation provides room for easily accessible data. Research has revealed that the development policies of most countries in the last decade have been moved to rely more on private companies and on the use of organized capital markets to finance their companies.

This emphasizes the importance of conducting a research on the functioning and financing of private companies in a wide range of institutional environments, particularly in developing countries (Green, Murinde and Suppakitjarak, 2002).With all these issues raised above, managers here in Nigeria may be without a clear direction as to what are actually the directions of these relationships, which may hamper efficient policy making on capital structure. Any attempt to apply these findings may be like fumbling in the dark and thus error-prone.Owing to the above therefore, the objectives of this study are to assess the impact of firms tangibility, firm's size, firm's growth, firm's profitability as well as the impact of firm's age, on a firm's capital structure. In view of the foregoing objectives, it is hypothesized thus, tangibility, size, growth, profitability and age has no significant impact on the leverage of the listed firms. It is therefore, anticipated that the findings of the study will go along way in providing inputs to the policy makers of the Nigerian listed Chemical and Paints. This could eventually enhance effective and efficient manage of capital structure within the economy. This paper is comprised of: the introductory section; literature review, which delves on review of empirical findings including the determinants, and the theoretical framework; methodology; findings; conclusion and recommendations.

Literature Review

The modem theory of capital structure originated from the seminal paper of Modigliani and Miller (1958), deployed some restrictive set of assumptions and contended in their first proposition that the impact of financing on the value of the firm is irrelevant. The Miller and Modigliani (M&M) propositions posited that there would be arbitrage opportunities in the perfect capital market provided the value of the firm depends on its capital structure. Their theory was modified by the trade off theory which was propounded by De Angelo and Masulis (1990). Another theory that has generated empirical support is the agency theory which as built on the work Jensen and Meckling, (1976). They posited that capital structure is determined by agency cost that is cost due to conflict of interest.

Leverage and Tangibility of Assets of Firms

A firm with large amount of fixed asset can borrow at relatively lower rate of interest if it provides the security of these assets to creditors. Since it has the incentive of getting debt at lower interest rate, a firm with higher percentage of fixed asset is expected to borrow more as compared to a firm whose cost of borrowing is higher because of having less fixed assets (Shah and Khan, 2007). Degree to which the firm's assets are tangible should result in the firm having greater liquidation value Titman and Wessels, 1988; Harris and Raviv, (1991). Bradley et al. (1984) assert that firms that invest heavily in tangible assets also have higher financial leverage since they borrow at lower interest rates if their debt is secured with such assets. It is believed that debt may be available for use when there are durable assets to serve as collateral Wedig et al., (1988). It is further suggested that bank financing will depend upon whether the lending can be secured by tangible assets Storey (1994).

Empirical results show a positive relationship consistent with theoretical argument between asset structure and leverage for the firms Bradley et al. (1984); Rajan and Zingales. Kim and Sorensen (1986), however, found a significant and negative coefficient between depreciation expense as a percentage of total assets and financial leverage.Other studies specifically suggest a positive relationship between asset structure and long-term debt, and a negative relationship between asset structure and short-term debt Van der Wijst and Thurik, (1993); Hall et al., (2004). Esperanca et al. (2003) found positive relationships between asset structure and both long- erm and short-term debt. Marsh (1982) also maintains that firms with few fixed assets are more likely to issue equity. In a similar work, MacKie-Mason (1990) concluded that a high fraction of plant and equipment (tangible assets) in the asset base makes the debt choice more likely. Booth et al. (2001) document a positive correlation between tangible fixed assets and debt financing; they link this to the maturity structure of the debt. From the foregoing, a positive significant relationship is predicted between tangibility of assets and leverage.

Leverage and Size of Firms

Size has been viewed as a determinant of a firm's capital structure. Two point of view conflict on the relationship between size and leverage of a firm. The first point says that large firms do not consider the direct bankruptcy costs as an active variable in deciding the level of leverage because these costs are fixed by constitution and constitute a smaller proportion of the total firm's value. And also, larger firms being more diversified have lesser chances of bankruptcy (Titman and Wessels 1988).

Following this, one may expect a positive relationship between size and leverage of a firm. Second, contrary to first view, Rajan and Zingales (1995) argue that there is less asymmetrical information about the larger firms. This reduces the chances of undervaluation of the new equity issue and thus encourages the large firms to use equity financing. This means that there is negative relationship between size and leverage of a firm.

Empirical evidence on the relationship between size and capital structure supports a positive relationship. Several works show a positive relationship between firm size and leverage (see Barclay and Smith, 1996; Al-Sakran, 2001,). Their results suggest that smaller firms are more likely to use equity finance, while larger firms are more likely to issue debt rather than stock. In a Ghanaian study, Aryeetey et al. (1994) found that smaller enterprises have greater problems with credit than larger firms do. Their results showed that the rate at which large firms apply for bank loans was higher than that of smaller firms. In a study of six African countries, Bigsten et al. (2000) also showed that about 64% of micro firms, 42% of small firms and 21 % of medium firms appear constrained, while this is only 10% for the large firms. Cassar and Holmes (2003), and Esperanca et al. (2003) found a positive association between firm size and long-term debt ratio, but a negative relationship between size and short-term debt ratio.

Some studies also support a negative relationship between firm size and short-term debt ratio (Chittenden et al., 1996; Michaelas et al., 1999). According to Titman and Wessels (1988), small firms seem to use more short-term finance than their larger counterparts because smaller firms have higher transaction costs when they issue long-term debt or equity. They further add that such behaviour may cause a "small firm risk effect", by borrowing more short term. These types of firms will be more sensitive to temporary economic downturns than larger, longer-geared firms. A positive relationship is therefore expected between size and leverage.

Leverage and Growth of Firms

Empirically, a lot of controversy exists on the relationship between growth rate and leverage. The pecking order theory hypothesis posits that, a firm will first use internally generated funds which may not be sufficient for a growing firm. And the next option for the growing firms is to use debt financing which implies that a growing firm will have a high leverage (Drobetz and Fix 2003). The agency costs on the other hand, for growing firms are expected to be higher because these firms have more flexibility with regard to future investments. The reason being that bondholders fear that such firms may go for risky projects in future since they have more choice of selecting between risky and safe investment opportunities. Believing their investments will be at risk in future, bondholders will impose higher costs of lending to growing firms. Growing firms, thus, facing higher cost of debt will use less debt and more equity. In line with this, Titman and Wessels (1988), Barclay et al. (1995) and Rajan and Zingales (1995) all find a negative relationship between growth opportunities and leverage.

Another relationship exists between the degree of previous growth and future growth. Michaelas et al. (1999) argue that future opportunities will be positively related to leverage, particularly short term leverage. They argue that the agency problem and the cost of financing are reduced if the firm issues short-term debt rather than long-term debt. Myers (1977), however, is of the view that firms with growth opportunities will have a smaller proportion of debt in their capital structure. This is because the conflicts of interest between debt and equity holders are serious for asset that gives the firm the option to undertake such growth opportunities in the future. He argues further that growth opportunities can produce moral hazard situations and small-scale entrepreneurs have an incentive to take risks to grow. Empirical evidence seems inconclusive in this regard as there is much controversy about the relationship between growth rate and level of leverage. Some researchers found positive relationships between sales growth and leverage (see Titman and Wessels, 1988; Barton et al., 1989). Other evidence suggests that higher growth firms use less debt Rajan and Zingales;(1995); Michaelas et al. (1999) found future growth to be positive relative to leverage and long-term debt.

Cassar and Holmes (2003) showed positive associations between growth and both long-term debt and short-term debt ratios, while Chittenden et al. (1996); and Jordan et al. (1998), found mixed evidence. Dividend payout of a firm could affect choice of capital in financing growth. Generally, firms with low dividend payout are able to retain more profits for investments. Such firms would therefore depend more on internally generated funds and less on debt finance. On the other hand, firms with high dividend payout are expected to rely more on debt in order to finance their growth opportunities. Given the structure of our anticipated data, we will measure growth (GT) as a percentage increase in net total assets.

Leverage and Profitability of Firms

Given the pecking order hypothesis firms tend to use internally generated funds first and then resort to external financing. This implies that profitable firms will have less amount of leverage (Myers and Majluf 1984). By this, profitable firms that have access to retained profits can rely on them as opposed to depending on outside sources (debt). Murinde et at. (2004) observe that retentions are a principal source of finance. Titman and Wessels (1988) and Barton et al. (1989) agree that firms with high profit rates would maintain relatively lower debt ratios since they can generate such funds from internal sources. Empirical evidence from previous studies seems to be consistent with the pecking order theory. Most studies found a negative relationship between profitability and capital structure Barton et al., (1989); and Cassar and Holmes (2003), also suggest negative relationships between profitability and both long-term debt and short-term debt ratios. Petersen and Rajan (1994), however, found a significantly positive association between profitability and debt ratio. Also consistent with the pecking order theory, work of Titman and Wessels (1988), Rajan and Zingales (1995), in developed countries all find a negative relationship between leverage ratios and profitability. We therefore propose based on the pecking order theory that a negative relationship exist between profitability and leverage.

Leverage and AGE

Age is a significant determinant of capital structure of a firm. The age of the firm connotes a standard measure of reputation in capital structure models (Shehu, 2011). As a firm grows longer in business, it establishes itself as an ongoing business and therefore increases its capacity to take on more debt; hence age is positively related to debt. To address issues of creditworthiness, Diamond (1984) suggests the use of firm reputation, which must have been developed over the years. By implication, reputation entails good name a firm has built up, which must factor in its age; this is recognized by the market, which has observed the firm's ability to meet its obligations efficiently. We therefore hypothesized that age of the firm is positively related to leverage.

Theoretical Framework

The trade off theorists De Angelo and Mansulis (1990), postulate the non-existence of optimal capital structure. They posit that a firm sets its target debt level and then works towards it. The theory refers to the idea that a company chooses how much debt finance and how much equity finance to use by balancing the costs and benefits. It identifies the benefit of financing with debt, the tax benefit of debt, as well as a cost of financing with debt, financial distress including bankruptcy costs of debt. The static trade off theory of capital structure predicts that firms will choose their mix of debt and equity financing to balance the cost and benefits of debt. It should however be realized that a company cannot continuously minimize its overall cost of capital by employing debt. Therefore it would not be advantageous to employ debt further, so there is a combination of debt and equity which minimizes the firm's average cost of capital and maximizes the market value per share.

This has suffered many criticisms by most scholars, some of which believe that it creates conflict of interest between shareholders and creditors, as well as the negative relationship between debt and profitability as documented by Titman and Wessels (1988). The Agency cost theory developed by Jensen and Meckling (1976) suggests that, for an optimal debt level in capital structure by minimizing the agency costs arising from the divergent interest of managers with shareholders and debt holders. They suggest that either ownership of the managers in the firm should be increased in order to align the interest of managers with that of the owners or use of debt should be motivated to control managers' tendency for excessive extra consumptions. Jensen (1986) presents agency problem associated with free-cash flow.

He suggests that free cash flow problem can be somehow controlled by increasing the stake of managers in the business or by increasing debt in the capital structure, thereby reducing the amount of "free" cash available to managers. Ross (1977) laid the foundations of signaling theory where he assumes that managers being the insiders have a better knowledge about the true distribution of future returns of the firm whereas investors do not. Investors take larger levels of leverage as a signal of the firm's current stable income, high future cash flows and managers' confidence about the performance of their own firm. He concluded that, investors take larger levels of debt as a signal of higher quality. He then concludes that profitability (as a proxy of quality performance) and leverage are thus positively related.

The pecking order theory postulates that firms will not have a target optimal capital structure, but will instead follow a pecking order of incremental financing choices that places internally generated funds at the top of the order, followed by debt issues, and finally only when the firm reached its "debt capacity" new equity financing.

Myers and Majluf (1984) noted that this theory is based upon costs derived from asymmetric information between managers and the market and the idea that trade-off theory costs and benefits to debt financing are of issuing new securities.The cost of equity includes the cost of new issue of shares and the cost of retained earnings. The cost of debt is cheaper than the cost of both these sources of equity funds. Considering the cost of new issue and retained earnings, the latter is cheaper because personal taxes have to be paid by shareholders on distributed earnings while no taxes are paid on retained earnings as also there is no floatation costs incurred when the earnings are retained. As a result, between the two sources of equity funds, retained earnings are preferred. It has been found in practice that firms prefer internal financing. If the internal funds are not sufficient to meet the investment outlays, firms go for external finance, issuing the safest security first.

They start with debt, then possible hybrid securities such as convertible debentures, then perhaps equity as a last resort. There are other theories, such as Modigliani and miller's and also those based on agency theory. In addition, Myers (1984) states that companies prioritized their sources of financing according to the law of least effort or resistance. That is firms fulfill their financing needs by preferring retained earnings as their main source of financing, then debt and finally external equity financing as a last resort. Capital structure is thus arranged by a hierarchy of preferences for the issuance of new capital, maintains that businesses adhere to a hierarchy of financing sources and prefer internal financing when available, and debt was preferred over equity if external financing was required (Myers, 1984). Kester (1986), in his study of debt policy in U.S. and Japanese manufacturing corporations, finds that the return on assets is the most significant explanatory variable for actual debt ratios. MacKie- Mason's (1990) findings suggest that the importance of information asymmetric gives reason for firms to care about who provides the funds.

For example, in considering the case of public and private debt, it is evident that different fund providers have different access to information about the firm and unique ability to monitor the firm behaviour. This is consistent with the pecking order theory implied by Myers and Majluf (1984) since private debt will require better information about the firm than public debt. Shyam- Sunder and Myers (1999) show that firms follow the pecking order in their financing decisions where firms with a positive financial deficit are more likely to issue debt. The financial deficit is perceived as a function of dividend payments, net capital expenditure, net changes of working capital and operating cash flows after interest and taxes. This paper therefore adopts the Pecking Order Theory in line with other similar studies, to add to demonstrate the numbers that explain the need for further application of the theory to the Nigeria's context.

Methodology

The study uses secondary data from annual reports and NSE Fact book which contained the ten chemical and paint companies in Nigeria as at the 2009. The study covered the period from 2005-2009. The hypotheses were tested based on the information obtained from the historical data documented in the annual reports and accounts of the listed firms. This is because the phenomenon observed in the study has already taken place. Therefore, the research adopted correlation and ex post factor research design because of the relationship, and cause and effect examination of the numbers. The panel data generated from the aforementioned source were used in hypotheses test models.The initial population contained nineteen Chemicals and Paint companies quoted on the Nigeria Stock Exchange as at 2009.

However, seven of these firms were sieved out as a result their age, being not in existence at the inception of the period under study. Thus the remaining twelve companies were taken as the sample size. Ordinary least squares (OLS) regression was employed to establish the relationship between leverage ratio and the independent variables and also to determine the parameters of each variable in the model, which was adopted from Shehu (2010). SPSS software was employed to analyse the OLS regressions. The model seems, suitable given the objective of the study and it is consistence with most previous studies discussed in the literature.

Model Specification and Variable Measurement

Multiple regression model was used to analyse the variables that explain the determinants of capital structure. The dependent variable is Leverage (LEV) while the independent variables include profitability, tangibility, growth opportunities, size and age respectively.

The model is specified as follows:
DRit = f(TANGit, SIZEit, GROWTHit, PROFit, AGE_{it}, ε_{it})
$DR_{it} = a_0 + \beta_1 TANG_{it} + \beta_2 SIZEit + \beta_3 GROWTH_{it} + \beta_4 PROF_{it} + \beta_5 AGE_{it} + \varepsilon_{it}$

Where:
A_0 = Constant or intercept.
i = represents the firm (which is the cross-section)
t = represents the time/year (which is the time series)
β_{1-5} = Coefficients of explanatory variables.
ε_t = Error term representing other explanatory variables that were not captured.
DR_{it} (Debt Ratio) = , represents leverage (measured as book value of long term debts divided by Capital Employed that is .long term debts plus shareholder funds).

$$DRit = \frac{Boots\ Value\ of Lang\ TermDebt}{Capital\ Employed}$$

TANG = Tangibility of Assets calculated as Fixed Assets divided by Net Total Assets i.e.

$$TANG = \frac{FixedAsset}{Net\ TotalAsset}$$

SIZE = Size of the firms (measured as log of turnover)

GROWTH = Growth Potentiality (calculated as % Increase in Net Total Assets)

$$GROWTH = \frac{\Delta Net\ Total\ Asset}{Net\ Total\ Asset}$$

PROF = Profitability calculated as earning after tax divided capital employed. i.e.

$$PAT = \frac{PAT}{Capital\ Employed}$$

AGE = number of years in which the firm was incorporated. Measured as the natural logarithm of number of the year of incorporation (no of years of incorporation)

Analysis and Discussion of Results

This section focuses on the analysis and discussion of the study. Regression analysis was conducted and conclusion drawn from it. The summary of the regression results from the SPSS output were presented in a tabular form, from where detailed analysis and discussion of the result was given.

Table 1: Summary of Coefficient of Correlation

	AGE	TANG	GRWTH	SIZE	PROFT
AGE	1.000	0.055	-0.034	-0.503	0.140
TANG		1.000	.121	-0.182	0.862
GRWTH			1.000	0.026	0.083
SIZE				1.000	-.350
PROFT					1.000

Source: Output of data analysis by author 2012 using SPSS

The result presented on table 1 above shows that tangibility, growth; profitability and age have positive correlation with leverage whereas size is negatively correlated with the dependent variable. This therefore, means that an increase in growth, tangibility, growth, profitability and age will result to increase in debt. On the other hand, a decrease in size will lead to decrease in debt.

Table 2: Summary of Descriptive Statistics

	DIRT	TANG	SIZE	GRWT	PROFT	AGE
Mean	0.1506	2.3475	5.7909	0.4019	-0.1028	34.7963
Std. Dev.	10.14690	4.84629	0.96770	1.10261	0.75949	13.71596
Skewness	8.894	5.736	-0.472	-0.431	7.215	-0.624
Kurtosis	2.883	5.925	-0.741	0.670	5.235	-0.830
Obs		54	54	54	54	54

Source: Output of data analysis by author 2012 using SPSS

From the table above, looking at the mean, tagibility of fims from this sector seems to reasonably high. A high proportion of total assets seem to be dominated by tangible assets, which makes them likely candidates for heavy long term loans. In addition, firms from the sector have an average age of 35years and an average leverage ratio of 15%. Their bargaining power may be limited in this regards. However, the sector seems to have a low growth rate and retrogressive profitability at 40.19% and an average loss of 10.28% respectively, on the average. This has a tendency of discouraging cheap loans. The pattern depicted by standard deviation all through is that the data of less noisy order, as all the standards deviations fall within the normal range of ±1. However, severe skewness and kurtosis is evident in leverage, tangibility and profitability. This could be as a result of the parity that exist between the number of highly levered firms and very low levered firm, in the case of leverage. In the case of tangibility, there seems to be few firms with highly tangible assets and many with few tangible assets. The explanation regarding profitability could be the contrasting and outlier image of the year of global melt down among the consistent years of flourishing profit.

Table 3: Summary of Regression result				
Variable	**Coefficient**	**VIF**	**T-value**	**P-value**
(Constant)	2.044		0.369	0.714
TANG	-3.285	4.181	-9.267	0.000
SIZE	0.710	1.574	0.652	0.518
GRWTH	0.130	1.018	0.169	0.867
PROFT	-15.125	4.576	-6.39	0.000
AGE	0.003	1.342	0.041	0.968
R-squared		0.671		
Adjusted R-squared		0.637		
F -statistic		19.571		
Prob (F-statistic)		0.000		
Durbin- Watson stat		1.973		

Source: Output of data analysis by author 2012 using SPSS Regression equation:

DRIT = 2.044 - 3.285(TANG) + 0.710(SIZE) + 0.130(GRWT) -15. 125(PROFT) + 0.003(AGE)

The result shows that tangibility and profitability have significant impact on leverage at 1 % level, while size, growth and age have insignificant impact on the dependent variable. It can also be observed that the coefficient of the two significant explanatory variables, which are tangibility and profitably are negative, which contradict the pecking order theory. The effect of tangibility on capital structure according to both trade off theory and pecking order theory suggests a positive relationship between tangibility and leverage. The result of our findings also indicates a positive significant relationship between tangibility of assets and leverage of Nigerian listed Chemical and Paints firms. The logical explanation for this finding is that lenders give more favourable lending conditions and low interest rates to firms with collateralizable assets.

In additions, these assets are insurance for the lenders in the event of winding up. This finding agrees with the findings of Prasad, Green, Murinde (2003) and Suto (2003) who find a positively significant relationship for Malaysian firms.

The finding also disagrees with the findings of Wiwattanakantang (1999) and Booth et al (2001) who found negative relationship between tangibility and leverage for Thai firms. On the relationship between leverage and size, the direction of the impact is negative as shown on the table. This is contrary to our prior expectation, as bigger firms have lower cost of borrowing owing to their lower cost of bankruptcy and lesser information assymetry. Looking at what we obtained, the possible explanation here could be because of the Nigerian government policy on industrialisation by making finances accessible and affordable to ailing firms through agencies like the Bank of Industry/ with that, the smaller firms may want to use the opportunity and make hay while the sun still shines. The finding in this regard is consistent with the findings of Titman and Wessels (1988) and disagrees with the Pecking order theory of Myer and Majluf (1984) who argued that there is less asymmetrical information about the larger firms (Kester, 1986) and as such they are viewed as less risky by lenders, which then enable them to go for loans more frequent than smaller firms.

The positive relationship obtained on the relationship between growth and leverage may be explained in the light of the explanation forwarded by Aryeetey et al. (1994), where they stated that firms with high growth requires high finances which can hardly be shouldered by internal source, and of the external source, debt is more prefereable than new issue. This finding is in consonance with that of Hall et al. (2004) and contradict Titman and Wessels (1988), Barclay, Smith and Watts (1995) who all found a negative relationship between growth opportunities and leverage. The age of the firm was found to be positively correlated with leverage and this supports the findings of Diamond (1984) who takes reputation to mean the good name a firm has built up over the years; the name is recognized by the market, which has observed the firm's ability to meet its obligations in a timely manner. The cumulative influence of all the exogenous variables put together is able to explain the dependent variable up to 50% as indicated by the adjusted R2 and remaining 50% is explained by other factors. Similarly, the result of the F- statistic value of 8.393 implies that the joint explanation given by the independent variables is significant at 1%. The Durbin- Watson of 1.631 indicates a tolerable serial correlation within the period of the study.

The tolerance value and the variance inflation factor (VIF) are two advanced measures of assessing multicollinearity between the independent valuables of the study. In appendix iii, the variance inflation factors were consistently Smaller than ten and the tolerance values are consistently smaller than 1.00, indicating absence of harmful multicollinearity (see Cassey, et al; 1999). This shows the appropriateness of fitting the model of the study with the five independent variables. On the basis of the significant result obtained in all the hypotheses tested, we here by reject all the null hypothesis formulated and upholds that firm's tangibility, firm's age, firm's size, profitability and firm's growth indeed have significant impact on capital structure.

Summary and Recommendation

The study reveals that for the Nigerian Chemical and paints sector, all of five explanatory variables are significant with the dependent variable. It can also be observed that the coefficient of two explanatory variables, that is size and profitability, are negative, and are both significant at 1 %. Whereas tangibility, growth and age show a positive coefficient even though it is only age that is significant at 5% and the other two explanatory variables are significant at 1 %. Finally, the entire result shows that all the explanatory variables put together explain the dependent up to 50% as indicated by the adjusted R2. Similarly, the result of the F- statistic shows that the model is well fitted as it is significant at 1 %. The study has provided insight into predictor variables that have important impact in explaining the dependent variable of the listed firms in Nigerian chemical and paints sector. These findings may be considered by the managers of this sector in managing their finances and there by mitigate financial risk in their various firms. Similarly, given the outcome of this study, the model used in this study could be used as a basis for formulating debt equity policy in Nigeria that will maximise the wealth of shareholders and increase the value of firms. The findings should be of policy relevance to SEC in issuing out guidelines for sourcing fund at capital market which would boost the economic activities in the market in particular and economy in general. This study is not without limitation, one of which is that the study relies on certain methodologies of measuring the study variables.

The validity of such methods is still subject of an ongoing debate in the literature. Other methodologies too exist. Notwithstanding the above limitations, the accuracy and the validity of the tests and the findings, remain unaffected, subject to the validity of the adopted methodologies. Also, only one sector of the market was covered by the study. In light of the above, the study therefore recommends further studies using different methodologies and different population.

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Appendix I

Data from the Eleven Chemical and Paints Companies

Year	ID	DRIT	TANG	SIZE	GRWTH	PROF	AGE
2005	1	8.908	6.906	4.847	0	-2.073	29
2006	1	35.768	11.811	4.893	-0.445	-2.671	30
2007	1	-63.206	34.08	4.777	-0.67	-3.671	31
2008	1	8.1	7.419	4.629	5.1	-1.526	32
2009	1	4.514	4.349	4.349	0.675	-0.477	33
2005	2	0.133	2.465	6.08	-0.026	0.242	38
2006	2	0.133	2.008	6.166	0.489	0.252	39
2007	2	0.089	1.896	6.183	-0.04	0.246	40
2008	2	0.096	2.089	6.298	-0.029	0.348	41
2009	2	0.095	3.72	6.322	-0.526	0.326	42
2005	3	0.157	2.27	6.428	1.682	0.893	43
2006	3	0.147	2.216	6.481	0.06	0.383	44
2007	3	0.183	0.51	6.278	0	0.192	44
2008	3	0.177	0.056	6.265	0.79	0.168	45
2009	3	0.161	1.444	6.282	0.777	0	46
2005	4	0.155	0.825	6.362	0.092	0.071	47
2006	4	0.146	0.98	6.357	0.116	0.091	48
2007	4	0.135	1.287	6.404	0.126	0.106	49
2008	4	0.131	1.459	6.377	0.105	0.125	50
2009	4	0.056	1.03	5.277	0	0.043	23
2005	5	0.221	1.414	5.308	-0.177	0.084	24
2006	5	0.065	1.316	5.27	0	0.071	25
2007	5	0.003	1.271	5.37	0.432	0.052	26
2008	5	0.015	1.449	5.349	-1.474	0.043	27
2009	5	0	0	0	0	0	0
2005	6	0.05	1.334	6.07	0	0	20
2006	6	0.022	1.245	6.159	0.197	0.004	21
2007	6	0.035	1.27	6.233	0.195	0.393	22
2008	6	0.073	1.187	6.293	0.423	0.244	23
2009	6	0.044	1.103	6.359	0.089	0.231	24
2005	7	1.771	2.771	5.358	0	-0.48	42
2006	7	1.5	2.5	5.465	0.027	-0.211	43
2007	7	2.195	3.195	5.405	0.267	-0.281	44
2008	7	2.527	3.527	5.483	0.414	-0.706	45
2009	7	0	0.635	5.689	4.361	0.18	46
2005	8	0	0.012	5.75	0.052	0.054	47
2006	8	0	0.537	5.602	0.015	-0.011	48
2007	8	0.632	0.112	5.715	0	0.2	4
2008	8	0.404	0.119	5.73	0.169	0.308	5
2009	8	0	0.06	5.796	-0.202	0.516	6
2005	9	0	0.019	5.778	1.997	0.291	7
2006	9	0	0.183	5.745	2.336	0.02	8
2007	9	0.015	0.85	6.205	0	0.076	40
2008	9	0.015	0.676	6.319	0.048	0.105	41
2009	9	0.045	0.633	6.394	0.086	0.111	42
2005	10	0.214	0.558	6.397	0.082	0.134	43
2006	10	0.358	0.503	6.42	0.055	0.101	44
2007	10	0.536	1.269	6.454	-0.039	0.015	45
2008	10	0.176	0.957	6.176	0	0.19	43
2009	10	0.184	0.877	6.246	0.081	0.163	44
2005	11	0.209	2.449	6.136	-0.672	-0.631	45
2006	11	0.548	1.386	6.303	0.592	0.131	46
2007	11	0.121	1.081	6.321	2.694	0.101	47
2008	11	0.077	1.447	6.355	1.376	-0.117	48

Regression descriptives mean stddev corr SIG N missing listwise statistics coeff outs bcov R Anova Collin Tol Criteria=Pin(.05) POUT(.10) Noorigin dependent drit Method=enter tang size grwth proft age Residuals durbin

Descriptive Statistics

	Mean	Std. Deviation	N
DR IT	.1506	10.14690	54
TANG	2.3475	4.84629	54
SIZE	5.7909	.96770	54
GRWTH	.4019	1.10261	54
PROFT	-.1028	.75949	54
AGE	34.7963	13.71596	54

Correlations

		DRIT	TANG	SIZE	GRWTH	PROFT	AGE
Pearson Correlation	DRIT	1.000	-.606	.013	.119	.249	.008
	TANG	-.606	1.000	-.215	-.087	-.865	.007
	SIZE	.013	-.215	1.000	-.022	.347	.475
	GRWTH	.119	-.087	-.022	1.000	.027	.019
	PROFT	.249	-.865	.347	.027	1.000	.015
	AGE	.008	.007	.475	.019	.015	1.000
Sig. (1-tailed)	DRIT		.000	.462	.196	.035	.476
	TANG	.000		.059	.266	.000	.481
	SIZE	.462	.059		.438	.005	.000
	GRWTH	.196	.266	.438		.423	.446
	PROFT	.035	.000	.005	.423		.456
	AGE	.476	.481	.000	.446	.456	
N	DRIT	54	54	54	54	54	54
	TANG	54	54	54	54	54	54
	SIZE	54	54	54	54	54	54
	GRWTH	54	54	54	54	54	54
	PROFT	54	54	54	54	54	54
	AGE	54	54	54	54	54	54

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	AGE, TANG, GRWTH, SIZE, PROFT(a)		Enter

a) All requested variables entered.
b) Dependent Variable: DRIT

ANOVA (b)

Model		Sum of Squares	Of	Mean Square	F	Sig.
1	Regression	3661.026	5	732.205	19.571	.000(a)
	Residual	1795.829	48	37.413		
	Total	5456.855	53			

a) Predictors: (Constant), AGE, TANG, GRWTH, SIZE, PROFT
b) Dependent Variable: DRIT

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.819(a)	.671	.637	6.11663	1.973

a) Predictors: (Constant), AGE, TANG, GRWTH, SIZE, PROFT
b) Dependent Variable: DRIT

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	T	SiQ.	Collinearit	Statistics
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.044	5.543		.369	.714		
	TANG	-3.285	.354	-1.569	-9.267	.000	.239	4.181
	SIZE	.710	1.089	.068	.652	.518	.635	1.574
	GRWTH	.130	.769	.014	.169	.867	.982	1.018
	PROFT	-15.125	2.367	-1.132	-6.391	.000	.219	4.576
	AGE	.003	.071	.004	.041	.968	.745	1.342

a. Dependent Variable: DRIT

Coefficient Correlations(a)

Model			AGE	TANG	GRWTH	SIZE	PROFT
1	Correlations	AGE	1.000	.055	-.034	-.503	.140
		TANG	.055	1.000	.121	-.182	.862
		GRWTH	-.034	.121	1.000	.026	.083
		SIZE	-.503	-.182	.026	1.000	-.350
		PROFT	.140	.862	.083	-.350	1.000
	Covariances	AGE	.005	.001	-.002	-.039	.024
		TANG	.001	.126	.033	-.070	.723
		GRWTH	-.002	.033	.591	.022	.150
		SIZE	-.039	-.070	.022	1.186	-.902
		PROFT	.024	.723	.150	-.902	5.600

Dependent Variable: DRIT

Collinearity Diagnostics(a)

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
		(Constant)	TANG	SIZE	GRWTH	PROFT	AGE	(Constant)	TANG
1	1	3.384	1.000	.00	.01	.00	.01	.00	
	2	1.585	1.461	.00	.04	.00	.03	.07	
	3	.830	2.019	.00	.00	.00	.93	.01	
	4	.116	5.402	.00	.85	.00	.02	.74	
	5	.075	6.707	.08	.08	.02	.00	.07	
	6	.010	18.436	.91	.02	.98	.00	.11	

Dependent Variable: DRIT

Residuals Statistics(a)

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-50.9926	14.2362	.1506	8.31119	54
Residual	-12.21340	28.62235	.00000	5.82096	54
Std. Predicted Value	-6.154	1.695	.000	1.000	54
Std. Residual	-1.997	4.679	.000	.952	54

Dependent Variable: DRIT

APPENDIX II

Model Summary[b]

					Chance Statistics						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Df1	df2	sig. F Change	Watson	Durbin Wastson
1	.566"	.541	.501	839.41163	.320	8.393	5	89	.000	1.631	

Predictors: (Constant), AG, SZEit, PROFit, TANGit, GRW
Dependent Variable: LEV_{it}

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	SiQ.	95% Confidence Interval for B		Correlations			Collinearif Statistic"S	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	,VIF
1	(Constant)	6.401	1.825		3.507	.001	22.649	5043.451					
	TANGit	1.109	.212	.037	5.231	.000	.747	.528	.029	.036	.030	.666	1.501
	SZEit	-3.930	1.129	-.164	-3.480	.001	-244.930	17.070	-.129	-.180	-.151	.849	1.178
	GRW	5.431	.993	.024	5.469	.000	60.814	75.676	.112	.023	.019	.601	1.663
	PROFit	-.700	.123	.533	-5.677	.000	.455	.945	-.539	-.516	-.496	.867	1.153
	AG	1.108	.545	.070	2.033	.003	-587.802	265.586	.196	.079	.066	.875	1.143

Dependent Variable: LEVit

Correlations

		LEVII	TANGit	SZEit	GRW	PROFit	AG
LEVit	Pearson Correlation	1	.025	-.128	.112	.539-	.192
	Sig. (2-tailed)		.810	.215	.282	.000	.061
	N	96	96	96	95	96	96
TANGit	Pearson Correlation	.025	1	-.113	-.516-	-.027	-.197
	Si9. (2-tailed)	.810		.272	.000	.791	.054
	N	96	96	96	95	96	96
SZEit	Pearson Correlation	-.128	-.113	1	-.358	-.048	-.059
	Sig. (2-tailed)	.215	.272		.000	.644	.571
	N	96	96	96	95	96	96
GRW	Pearson Correlation	.112	-.516	-.358-	1	-.168	-.096
	Sig. (2-tailed)	.282	.000	.000		.104	.353
	N	95	95	95	95	95	95
PROFit	Pearson Correlation	.539~	-.027	-.048	-.168	1	-.236-
	Si9. (2-tailed)	.000	.791	.644	.104		.020
	N	96	96	96	95	96	96
AG	Pearson Correlation	.192	-.197	-.059	-.096	-.236-	1
	Si9. (2-tailed)	.061	.054	.571	.353	.020	
	N	96	96	96	95	96	96

..

**. Correlation IS siqnificant at the 0.01 level (2-talled).

*. Correlation is significant at the 0.05 level (2-tailed).

Descriptive Statistics

	N	Mean	Std.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
LEVit	96	.4165	.73763	8.894	.246	2.883	.488
TANGit	96	.0154	.45107	5.736	.246	5.925	.488
SZEit	96	.4506	.42085	-.472	.246	-.741	.488
GRW	95	.9485	.25097	-.431	.247	.670	.490
PROFit	96	.6572	.10776	7.215	.246	5.235	.488
AG	96	.5561	.43268	-.624	.246	-.830	.488
Valid N	95						