Research Article
Another Look at Capital Structure and Corporate Performance in Emerging Markets: The Case of Nigeria

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Abstract: The paper explores the long and short run dynamic relationships between capital structure and firm's performance variables based on financial statements' data of (62) non-banking firms quoted on the Nigerian Stock Exchange. The study reveals that quoted firms use long term debts in the short run to boost profitability and earnings but in the long run, as they become more profitable, they resort to internal source of financing. It further reveals that while the combination of debt and equity capital that optimizes return on assets differ from that which optimizes return on equity, it submits that long term debts contribute positively and significantly to enhancing returns to equity owners. It recommends that a firm should determine the appropriate mix of capital that optimizes its own performance suggesting that the combination of debts and equity that optimizes return to equity owners should represent that optimum structure.

Keywords: Debt, equity, error correction mechanism, leverage, optimum capital structure, return on assets and return on equity

INTRODUCTION

Focus on the importance of the financing decision started with the early works of Duran (1952) in his separate income theories which postulate that leverage increases the value of the firm. However, it was the capital irrelevance theory of Modigliani and Miller [MM] (1958) that provides the foundation for the on-going search for the right mix of equity and debt that maximizes the value of the firm. The irrelevance theory posits that a firm's a value is independent of its capital structure. That was in a world without taxes, no transaction and bankruptcy costs. Ever since, there have been several departures from the irrelevance theory in the finance literature. In an empirical world with corporate tax, transaction and bankruptcy costs, imperfect markets and agency relationships, several theories - the arbitrage, information asymmetry and the pecking order, the agency, the trade off and signaling have all provided justifiable departures.

In spite of all the theories, Krishnan and Moyer (1997) submit that the relationship between capital structure and corporate performance is influenced by a firm's country of origin. Indeed, while the various theories have not made the relationship between capital structure and firm performance any easier to determine in developed capital markets, the situation appears much more challenging in emerging capital markets like Nigeria's with all her market imperfections, national economic and environmental challenges. Thus, no effort is too much in the search for the right capital combination that optimizes a firm's performance particularly in an emerging market. The main research questions this present study seeks to provide answers to are-what is the relationship between capital structure and firm's performance? What is the right combination of debt and equity capital that optimizes a firm's performance (defined in terms of return on assets and return on equity)? And what major factors influence the relationship between a firm's capital structure and its performance in an emerging capital market such as Nigeria's?

Therefore, the objectives of this study are to: ascertain the relationship between a firm's capital structure and its performance, determine the right combination of debt and equity capital that optimizes firm's performance (defined in terms of return on assets and return on equity) and identify the major factors that influence the relationship between a firm's capital structure and its performance in an emerging capital market; using Nigeria's as an example.

The Nigerian capital market is an emerging one still very much in search of breadth and depth in its structure. It is just recovering from the aftermaths of the global financial crisis which saw the market index dipped by 67% while market capitalization shed about 62% of its value in just a year between March 2008 and March 2009 (Ajakaiye and Fakiyesi, 2009). However, the Nigerian capital market is the most developed after South Africa's in Sub-Saharan Africa.

This study uses corporate leverage and

performance data of (62) quoted companies in Nigerian capital market to evaluate the impact of capital structure variables on firm's performance. The study period is 2006 to 2013.

THE LITERATURE

Ever since Modigliani and Miller (1958) came up with the irrelevance theory of capital structure, the issue of an optimum capital structure for corporations has remained largely unresolved in the finance literature. Though Modigliani and Miller's (1963) [MM] initial thesis was that a firm's value is independent of its capital structure in a world without taxes, no transaction and bankruptcy costs (MM, 1958); that submission was revised in their arbitrage proposition that recognizes the tax shield benefit of corporate debt-that leverage increases the value of the firm (MM, 1963). Since then, the search for the right combination of equity and debt capital that optimizes a firm's performance has become more empirical though more complicated with a growing number of theories that have expanded the frontiers of the debate. The pecking order theory recognizing the existence of information asymmetry and the relative costs of various financing options, opines that managers of more profitable firms prefer to use internal source, notably retained earnings, before resorting to external sources, firstly debt and later equity, in that order, in their financing decisions (Myers, 1984; Myers and Majluf, 1984). Thus, the pecking order theory expects highly profitable firms with high earnings to use less debt finance than their less profitable counterparts.

However, the desire by investors to incur low agency costs, may necessitates the need to use more debts than equity in the capital structure (Jensen and Meckling, 1976). Agency costs arise in many ways including but not limited to increased costs due to conflict of interests between shareholders and managers on the one hand; and shareholders and bond holders on the other. Furthermore, the agency theory avers that the necessity to pay interest on debts often compels managers to become more disciplined and leaves them with lesser funds for activities that are of little benefit to fund owners. Given this scenario, increased leverage maximizes firm's performance but higher debt level may also come with increased risk of bankruptcy.

The signaling and tradeoff theories have also contributed to the search for the right capital structure that optimizes firm's value. The existence of information asymmetry that motivates managers who are better informed than outsiders, to send positive signals to the market about their expectations of firms' future performance is the focus of the signaling theory (Ross, 1977). Based on the signaling theory, managers use various means to send positive signals about their firms to outsiders. In this regards, the use of debt financing sends positive signals to the market; and contrariwise, the use of equity conveys some negative signals about managers' expectations of the firm's future performance. Nevertheless, the tradeoff theory believes that an optimal capital structure is one that balances the costs and benefits of each financing option. For example, the decision to use debt must consider its tax shield benefit against the associated bankruptcy risk. The same goes for equity finance. In this regards, the tradeoff theory suggests that highly profitability firms that enjoy high tax shield benefit and low risk of bankruptcy would prefer to use more debts than the relatively more costly equity.

However, further studies have shown that environmental factors such as the dynamism and competitiveness of the market (Simerly and Li, 2000), market inefficiency and information asymmetry (Eldomiaty *et al*., 2007)), financial distress and volatility in some economic indicators like interest and inflation rates (Karadeniz *et al*., 2009) all affect the capital structure decision and performance of firms. The result is that firms in emerging markets operate in highly limiting environment that makes the financing decision not only challenging but highly unpredictable in terms of its impact on firm's performance.

EMPIRICAL WORKS ON CAPITAL STRUCTURE AND FIRM'S PERFORMANCE

The extant literature has a number of empirical works on the impact of capital structure on firm's performance. The results are mixed. Some report negative relationship between leverage and corporate performance yet others show a positive one. Some others reveal mixed findings based on industry or firm specific characteristics. We begin with studies that reveal positive relationship between leverage and corporate performance. Others follow in subsequent subsections. Holz (2002) finds a positive relationship between leverage (debt ratio) and firm's performance. In a similar work based on East Asia companies, Warokka *et al*. (2011) find a positive relationship between leverage and firm's performance. Other works that find positive relationship between leverage and firm performance include Petersen and Rajan (1994), Roden and Lewellen (1995), Ghosh *et al*. (2000) and Margaritis and Psillaki (2010).

The following studies find negative relationship between leverage and firm performance. In his study of 36 engineering sector firms from the Karachi Stock Exchange (KSE), Khan (2012) show that financial leverage measured by the ratios of Short Term Debts to Total Assets (STDTA) and Total Debts to Total Assets (TDTA) have significant negative relationship with firm's performance measured by Return On Assets (ROA) and Gross profit Margin (GM). In a study of the manufacturing industry in Turkey, Toraman *et al*. (2013) find negative relationship between the ratios of short and long liabilities to total assets and performance (ROA), respectively. In the same vein, Majumdar and Chhibber (1999) and Ghosh (2007) also find an inverse relationship between leverage and firm performance.

Similar result is revealed by Rajan and Zingales (1995) who use data from G7 countries and Krishnan and Moyer (1997) who find a negative relationship between leverage and firm performance. In his study of firm's performance based on data from nearly 400 thousand companies from four European countries, Shen (2012) finds a negative relationship between leverage and firm's performance but notes that the relationship might not be linear in the case of two (Germany and France).

In Nigeria, Onaolapo and Kajola (2010) and Arowoshegbe and Idialu (2013) also find a significant negative relationship between leverage (debt ratio) and firm performance. Akinlo (2011) similarly finds a negative relationship between profitability and leverage.

The present study differs from prior studies in one significant way. It explores both the long run and short term dynamic relationships between capital structure variables and firm's performance, unlike prior studies that focus only on the long run relationships. The short run dynamic relationships coupled with the long run analysis between leverage and firm's performance are expected to give better explanations of the much desired optimal capital mix that optimizes firm's performance.

MATERIALS AND METHODS

The study examines the relationship between capital structure and firm's performance based on financial statement data of non-banking firms quoted on the Nigerian Stock Exchange. Data were sourced from annual reports and statement of accounts of firms obtained from African financials' website and supplemented by data from Cashcraft Asset Management Company's database. A random sample of 62 firms were selected using stratified sampling technique from the list of quoted firms as at December 31 of each year of study by means of random numbers. To avoid survival bias data were elicited from every sampled company as long as they traded in the exchange irrespective of whether or not such firm ceased to operate in the market at any time within the study period. The period of study, January 2006 to December 2013 was chosen in order to gain better insights into firms' financing decisions and performance across various economic and financial situations faced by firms particularly before, during and after the recent global financial crisis.

The study uses the Panel Least Squares (PLS) estimation technique, Engle and Granger (1987) two-stage procedures and the Error Correction Mechanism (ECM) to explore the long run and short run dynamic relationships between capital structure and firm's performance variables in two econometric models. The Eviews 7.0 econometric software is used for data analysis.

Models specification and operationalization of variables: A firm's performance can be measured in several ways depending on the aspect of performance (profitability, wealth maximization, value creation or managerial efficiency) one is concerned with. Gross Profit Margin (GPM), Profit Before Tax (PBT), Profit After Tax (PAT), Return On Investment (ROI), Return On Equity (ROE), Return On Assets (ROA) and Price-Earnings ratio (P/E ratio) are examples of common measures of firm's performance in the finance literature. In line with prior studies, Zeitun and Tian (2007), Onaolapo and Kajola (2010), Khan (2012) and Toraman *et al.* (2013), two measures of firm's performance the study uses are-Return On Assets (ROA) (defined as profit after tax divide by total assets) and Return On Equity (ROE) (profit after tax divide by shareholders' funds or net worth).

Capital structure is the appropriate mix of equity and debt capital that a firm uses in financing its assets. In the extant literature, leverage which is the proportion of debt capital in the financing structure is used as proxy for capital structure. This study uses two measures of leverage to proxy capital structure. The first, is Short term Debt Ratio (SDR) (defined as short term debts divide by total assets) and the second, Long term Debt Ratio (LDR) (long term debts divide by total assets).

Control variables that are commonly used in the literature and adopted in this study include-asset tangibility (ASTAN) (fixed assets divide by total assets), Growth Rate (GR) [defined quantitatively as current year turnover divide by prior year turnover less 1] and firm size (the natural logarithm of total assets).

Based on the research questions and objectives and following prior studies (Zeitun and Tian, 2007; Onaolapo and Kajola, 2010; and Khan, 2012), we specify the functional forms of our models below:

$$ROA = f (SDR+LDR+ASTAN+GR+SIZE) \qquad (1)$$

$$ROE = f (SDR+LDR+ASTAN+GR+SIZE) \qquad (2)$$

where,

ROA = Return on assets ratio (profit after tax/total assets)

ROE = Return on equity ratio (profit after tax/shareholders' funds or net worth)

SDR = Short-term debt ratio (short term debts/total assets)

LDR = Long-term debt ratio (long term debts/total assets)

ASTAN = Assets tangibility ratio (fixed assets/total assets),

GR = Growth rate [(turnover$_t$/turnover$_{t-1}$) -1]

SIZE = Firm size [log (total assets)]

The econometric forms of the above models in the panel data analytical formats are as shown respectively in Eq. (3) and 4 below:

$$\text{ROA}_{it} = \alpha_0 + \alpha_1 \text{SDR}_{it} + \alpha_2 \text{LDR}_{it} + \alpha_3 \text{ASTAN}_{it} + \alpha_4 \text{GR}_{it} + \alpha_5 \text{SIZE}_{it} + \mu \quad (3)$$

$$\text{ROE}_{it} = \beta_0 + \beta_1 \text{SDR}_{it} + \beta_2 \text{LDR}_{it} + \beta_3 \text{ASTAN}_{it} + \beta_4 \text{GR}_{it} + \beta_5 \text{SIZE} + v \quad (4)$$

where,

ROA_{it}	= Return on assets of firm i in year t
ROE_{it}	= Return on shareholders' equity or networth of firm i in year t
SDR_{it}	= Short-term ratio of firm i in year t
LDR_{it}	= Long-term debt ratio of firm i in year t
ASTAN_{it}	= Asset tangibility of firm i in year t
GR_{it}	= Growth rate of firm i in year t
SIZE_{it}	= Size of firm i in year t
μ and v	= The error terms

Theoretical expectations between dependent and independent variables: The coefficients α_0 to α_5 and β_0 to β_5 are the coefficients of the two models to be estimated. According to agency theory, leverage compels managers to be more disciplined (Jensen, 1986) and to use free cash flows less on non-productive activities due to the risk associated with debts (Grossman and Hart, 1982). Also, the use of debts, according to signaling theory, sends positive signals about the company. In line with agency and signaling theories, a positive relationship is expected between leverage and performance. However, according to pecking order theory, profitable firms with high earnings prefer to use more of retained earnings and less of debts in assets financing. In this regards, a negative relationship is expected between leverage and firm's performance. Therefore, we expect the coefficients of leverage in the above models to be either positive ($\alpha_1, \alpha_2, \beta_1$ and $\beta_2 > 0$) in accordance with agency and signaling theories or negative ($\alpha_1, \alpha_2, \beta_1, \beta_2 < 0$) in accordance with pecking order theory.

Assets tangibility refers to a firm's investment in tangible assets. Tangibility is related to higher flexibility in financing decision and cheaper access to finance. On this basis, we expect a positive relationship between tangibility and firm's performance (and the coefficients to be positive (α_3 and $\beta_3 > 0$). In the same vein, the relationship between growth rate and firm's performance is expected to be positive because growing firms have more profitable investment opportunities (Zeitun and Tian, 2007) and may enjoy economies of scale. Expectedly, the growth coefficients of the models should have positive values (α_4 and $\beta_4 > 0$). The relationship between size and performance is mixed. On the positive side, larger firms enjoy economies of scales and face lower risk of bankruptcy. However, some firms may become too large that they incur high structural and operational costs. Under these scenarios, either a positive or a negative relationship is expected between size and firm's performance (that is, coefficients of size, α_5 and $\beta_5 > 0$ or < 0).

DATA ANALYSIS, RESULTS AND DISCUSSION

Although the capital structure and firm's performance data are not strictly time series, the temporal dimensions span a period of eight years (2006 to 2013), hence we first conduct stationary tests using the panel unit root tests based on Levin, Lin and Chu test statistic (t*) under the assumption of the existence of a unit root and non-stationary variable (H_0), against alternate hypothesis (Ha) -that the variable is stationary and does not contain a unit root. The summaries of the results show that all variables are stationary at levels. Table 1 shows that the Levin, Lin and Chu test statistics for both Return On Assets (ROA) and Return On Equity (ROE) variables are statistically significant at 1% level. Thus, all the variables in the two models are stationary at levels and are integrated of order zero [I(0)] and the regression analysis produces non-spurious results.

Next, we conduct co-integration tests to verify the existence of a long-run relationship between the capital structure and performance variables.

Determination of long run or equilibrium relationships: The tests for co-integration are based on Engle and Granger (1987) two-stage technique. Table 2 shows the Panel Least Squares (PLS) regression analysis (regressing ROA and ROE on the independent variables) from where we extracted the regression residuals.

The panel unit roots test on ECM was conducted on the residuals at levels to verify the null hypothesis,

Table 1: Panel Unit Root test Summary for ROA and ROE Variables at Levels

	Levin, Lin Chu t*		Probability Values		
Variables	ROA variables At levels	ROE variables At levels	ROA At 5%	ROE At 5%	Remarks
ROA	-4.6982	-	0.0000	-	Stationary
ROE	-	-4.1002	-	0.0000	Stationary
SDR	-3.7667	-4.0073	0.0001	0.0000	Stationary
LDR	3.1865	-2.3730	0.0007	0.0088	Stationary
ASTAN	-5.2829	-3.6784	0.0000	0.0001	Stationary
GR	3.1673	3.5273	0.0006	0.0006	Stationary
SIZE	-6.7322	-6.7322	0.0000	0.0049	Stationary

Table 2: Panel Least Squares Multiple Regression Analysis of ROA and ROE Variables on Capital Structure Variables Showing Long run Relationships

Dep. Variable: ROA	Coefficient	t-statistic	Probability	Dep. Variable ROE	Coefficient	t-statistic	Probability
C	0.1254	0.9393	0.3485	C	8.5644	0.0667	0.9469
SDR	-1.096	-3.9552	0.0001*	SDR	-17.1496	-0.0620	0.9506
LDR	-0.0906	-1.4185	0.1573	LDR	125.8372	2.0831	0.0383**
ASTAN	0.0048	0.2251	0.8221	ASTAN	-6.7780	-0.3395	0.7345
GR	-1.3E-09	-0.0076	0.9940	GR	1.3E-05	0.0818	0.9349
SIZE	-0.0073	-0.5273	0.5984	SIZE	-2.4687	-0.1853	0.8532
R^2	0.3996			R^2	0.4695		
Adj. R^2	0.2392			Adj. R^2	0.3260		
F-statistic	2.4908			F-statistic	3.2713		
Pro (F-statistic)	0.0000	DW = 2.39		Pro.(F-statistic)	0.0000	DW = 3.49	

Data analysis by Researcher, April, 2014; *P Significant at 1% level; **P Significant at 5% level

Table 3: Panel Unit Roots Tests on ECM

Variable	Levin, Lin and Chu t* (TEST STATISTIC)	Probability values @ 5%	Remark
ECM1	-2.58771	0.0048	Co-integrated
ECM2	-2.51641	0.0051	Co-integrated

Table 4: ARDL Representation of the Error Correction Mechanism of ROA and ROE on Leverage and other Variables-the Short Run Dynamic Analyses

Dep. Variable: ROA	Coefficient	t-statistic	Probability	Dep. Variable: ROE	Coefficient	t-statistic	Probability
C	-0.0034	-0.0091	0.9927	C	-19.8038	-0.2141	0.8307
ROA (-2)	-0.1260	-0.3895	0.6983	ROE(-1)	-0.0708	-0.0360	0.9714
SDR	-1.4971	-3.8579	0.0003*	SDR	27.4117	0.1418	0.8874
SDR (-2)	-0.4709	-1.2653	0.2108	SDR(-1)	104.1322	0.5490	0.5837
SDR (-3)	0.3238	0.8879	0.3782				
LDR	0.1631	0.8176	0.4169	LDR	326.2445	6.5136	0.0000*
LDR (-2)	-0.0388	-0.2660	0.7912	LDR(-1)	-162.6718	-0.6587	0.5109
LDR (-3)	0.0253	0.2720	0.7866				
ASTAN	-0.0211	-0.3991	0.6913				
GR (-1)	-7.58E-008	-0.2607	0.7952	GR	1.11E-05	0.1065	0.9153
SIZE (-1)	0.0052	0.1294	0.8974	SIZE	-0.8559	-0.0916	0.9272
ECM1 (-1)	-0.7457	-8.1823	0.0000*	ECM2(-1)	-0.4581	-2.1492	0.0383**
R^2	0.8632				0.8390		
Adj. R^2	0.7055				0.7763		
F-statistic	5.4740				13.3704		
Pro (F-statistic)	0.000000	DW = 2.08			0.000000	DW = 1.56	

Data analysis by Researcher, April, 2014; *Significant at 1% level; **Significant at 5% level

H_0, that there is no co-integration between the variables. Results of the tests summarized in Table 3 show that the Levin, Lin and Chu test statistics (-2.5877) and (-2.5164) are statistically significant at the 1% levels (0.0048 and 0.0051, respectively) for ECM1 and ECM2, respectively. Rejecting the null hypotheses, I conclude that the relationships between the independent variables and the dependent variables are co-integrated and there exists stable long-run equilibrium relationships between the independent corporate structure variables and firm's performance variables (ROA and ROE).

Short run dynamic relationships: With the existence of co-integration relationship between corporate structure variables (leverage ratios) and firm performance variables, we undertake the Error Correction Mechanism (ECM) following Engle and Granger (1987). The ECM framework corrects the long run or equilibrium relationship for disequilibrium. It shows the temporary behavior of the dependent variable given short run changes in the independent variables. We test the null hypothesis that there is no significant short run linear relationship between the independent capital structure variables and firm performance variables (ROA and ROE). Furthermore, we estimate the ECM using Autoregressive Distributed Lags (ARDL) approach. We also use the adjusted R-squared criterion, information criteria (akaike info criterion, Schwarz criterion and the Hannan-Quinn criteria) and the Durbin Watson statistic (that checks for autocorrelation) in selecting the best models from the over parameterized ECM models. The absolute values of the error correction parameters [ECM1(-1) and ECM2(-1)] determine how quickly equilibrium is restored in the models given temporary shocks in long run relationships. The results are contained in Table 4.

As Table 4 reveals, the results of the Error Correction Mechanism (ECM) show that the goodness of fit statistics are impressive for both ROA and ROE models. The adjusted R-squared values for ROA and ROE models indicate that about 71 and 78% of the systematic variation in return on assets (ROA) and return on equity (ROE) respectively, are accounted for by variations in the explanatory variables including changes in the error correction term of the models. Similarly, the F-statistic, of 5.47 and 13.37, passes the

significant test at 1% level for both models. In addition, the ECM coefficients are negative and lies between zero and one [ECM1(-1) = -0.746; and ECM2(-1) =-0.458] and statistically significant at 1% (prob, value is 0.0000) and 5% (prob. value is 0.0383) levels respectively. These are strong indications that the error correction models (ECM1 and ECM2) have strong predictive power. Thus, we reject the null hypothesis of no significant short run linear relationships between the capital structure variables and the performance variables (ROA and ROE). Hence, we confirm that significant short run dynamic relationships exist between the independent capital structure variables and firm's performance variables (ROA and ROE). Appendix contains the full tables of the regression output of ROA and ROE on capital structure variables; output of panel unit root tests on both ECM1 and ECM2; and the PLS output of the short run dynamic analysis of ROA and ROE on capital structure.

CAPITAL STRUCTURE VARIABLES AND RETURN ON ASSETS: RESULTS AND DISCUSSION

Table 2 shows the long run relationships between capital structure and firm's performance defined in terms of Return On Assets (ROA). As shown in the table both Short term Debt Ratio (SDR) and Long term Debt Ratio (LDR) are negatively related to Return On Assets (ROA). However, only the first relationship between SDR and ROA is statistically significant at the 1% level (prob. value is 0.0001). For the control variables, a positive but not statistically significant relationship exist between assets tangibility (ASTAN) and Return On Assets (ROA) in the long run. In the same vein, both Growth Rate (GR) and firm size (SIZE) are negatively related to ROA in the long run and the relationships are not statistically significant.

Table 3 shows the short run dynamic relationships between capital structure variables and firm's performance (ROA) in ECM1 model. In summary, the coefficient of the second year lag value of return on assets is negative [ROA(-2)] but it is not statistically significant with current year value of return on assets (ROA). However, Short term Debt Ratios (SDR), one of our proxies for capital structure (leverage), has a negative and statistically significant relationship at the 1% level (prob. value is 0.0003) with return on assets (ROA). The same is also true of the second year lag value of short term debt ratio [SDR(-2)] that is also negatively related to Return On Assets (ROA). However, the third year lag value of short term debt ratio [SDR(-3)] is positively related to ROA. However, the impact of both lag values [SDR(-2) and SDR(-3)] is not statistically significant with return on assets (ROA).

Furthermore, Long term Debt Ratio (LDR), our second proxy for capital structure (leverage), is positively related to return on assets (ROA) although such relationship is not statistically significant at the 5% level (prob. value is 0.38). Also, while the second

year lag value of long term debt ratio [LDR(-2)] is negatively related to Return On Assets (ROA), its third year lag value [LDR(-3)] is positively related to the latter. However, both long term debt lag values [LDR(-2) and LDR(-3)] have no statistically significant relationship with return on assets (ROA).

The relationships between the control variables and Return On Assets (ROA) are mixed. Assets tangibility is negatively related to Return On Assets (ROA) and the relationship is not statistically significant. Also, while the first year lag of firm Growth Rate [GR(-1)] is negatively related to the dependent variable, return on assets (ROA); the relationship between the first year lag of firm size [SIZE(-1)] and the former is a positive one. Again, these relationships between the control variables and Return On Assets (ROA) are not statistically significant.

In this short run, any shock or deviation from the equilibrium state is speedily restored to equilibrium level at the rate of 76%.

Given that the ECM(-1) model has strong predictive power with a Durbin Watson statistic of 2.1 (an indication of the absence of autocorrelation in the temporal dimension of the data), we conclude that the results of the regression analyses and the coefficients of the ROA model could be useful for policy direction.

Combining the long and short run relationships between capital structure and ROA: As Indicated above, there exists a long run stable relationship between corporate structure variables and Return On Assets (ROA). In the long run, both short term debt (SDR) and long term debt ratios (LDR) are negatively related to return on assets (ROA) (Table 2). However, in the short run (Table 3) the Short Debt Ratio (SDR) and its second year lag [SDR(-2)] are negatively to ROA while long term debt (LDR) is positively related to it. Hence, in both the short and long run analyses, Short Debt Ratio (SDR) is negative and statistically significant with Return On Assets (ROA). This agrees with the works of Khan (2012) and Toraman *et al.* (2013) and the results conforms with one of our *apriori* expectations in line with pecking order theory. Thus, the more profitable the quoted firms are, the less of short term debts they employ in asset financing.

However, whereas long term debt (LDR) is positive in the short run, it is negatively related to ROA in the long run and both relationships are not statistically significant. The positive sign between LDR and ROA in the short run conforms with the second *apriori* expectation in line with agency and signaling theories and the works of Holz (2002), Margaritis and Psillaki (2010) and Warokka *et al.* (2011). However, in the long run, LDR is negatively related to ROA in agreement with pecking order theory. These results imply that firms use debts in the short run to boost profitability and earnings (agency and signaling) but in the long run, as they become more profitable, they resort to internal source of financing (retain earnings)

and less of debts to finance assets (pecking order theory).

In the case of the control variables, first, asset tangibility is negatively related to ROA in the short run but it is a positive relationship in the long run. This may suggests that quoted firms have low flexibility in asset financing decision in the short run that may give way to higher flexibility in the long run. Similarly, for firm growth rate, first year lag is negative in the short run while the current year growth rate is also negative in the long run which may indicate that investment opportunities available to the firms are largely not profitably exploited to boost sales level (turnover). In the case of size, it is positive in the short run but negatively related to ROA in the long run. The results seem to tally with our mixed *apriori* expectations. In the short run growing firms enjoy economies of scales while in the long run diseconomies may set in when firms become too large.

CAPITAL STRUCTURE VARIABLES AND RETURN ON EQUITY: RESULTS AND DISCUSSION

Table 2 shows the long run relationships between capital structure variables and firm performance defined by Return On Equity (ROE). From the table, short term debt ratio (SDR) is negatively but not significantly related to return on equity (ROE). However, Long term Debt (LDR) is positively and significantly related to Return On Equity (ROE) at the 5% level (Prob. value is 0.0383). Also, the long run relationships between control variables-assets tangibility (ASTAN) and firm size (SIZE) with Return On Equity (ROE) are both negatively and not significantly related to Return On Equity (ROE). However, the relationship between growth rate (GR) and ROE is positive and also not statistically significant.

The results of the error correction mechanism [ECM(-2)] of the Return On Equity (ROE) model in Table 3 also reveal some interesting outcomes about the short run dynamic relationships between capital structure variables and Return On Equity (ROE). In the model, the first year lag value of return on equity [ROE(-1)] has a negative impact on current year Return On Equity (ROE) although such impact is not statistically significant at 5% level (prob. is 0.971). However, both the Short term Debt Ratio (SDR) and its first year lag value (proxy for capital structure) (leverage), have positive but not statistically significant relationships with Return On Equity (ROE). Similarly, the long term debt ratio (LDR) has a positive and statistically significant relationship (prob. is 0.0000) with Return On Equity (ROE). Nevertheless, the first year lag value of long term debt (LDR(-1)) has negative but not statistically significant impact on Return On Equity (ROE).

Furthermore, the short run relationships between the control variables and Return On Equity (ROE) are also mixed. First, assets tangibility is econometrically

out of the equation. While firm's Growth Rate (GR) is positively related to the dependent variable, Return On Equity (ROE); the relationship between the firm size (SIZE) and the former is a negative one. And these relationships between the control variables and Return On Equity (ROE) are not statistically significant.

In the short run, any shock or deviation from the equilibrium state is speedily restored to the level at the rate of 46%.

Given that the ECM2(-1) model has strong predictive power with a Durbin Watson statistic of 1.56 (an indication of the absence of autocorrelation in the temporal dimension of the data), we conclude that the results of the regression analyses and the coefficients of the ROE model could be useful for policy direction.

Combining long and short run relationships between capital structure and ROE: As reported above, there is a long run stable relationship between the corporate structure variables and Return On Equity (ROE). In the long run, while short term debt (SDR) is negatively related to Return On Equity (ROE), Long term Debt Ratios (LDR) is positively and significantly related to it (Table 2). However, in the short run (see table 3), both Short Debt Ratio (SDR) and long term debt are positively related to ROE. Hence, in both the short and long run analyses, Long term Debt Ratio (LDR) has a positive and statistically significant relationships at 1 and 5% levels (prob. values of 0.0000 and 0.0383), respectively with Return On Equity (ROE). The positive and statistically significant relationship of long term debt and return on equity is in accordance with one of the *apriori* expectations of the study in line with agency and signaling theories and agrees with some prior studies (Holz, 2002; Margaritis and Psillaki, 2010; Warokka *et al.*, 2011). This suggests that long term loans contributes positively and significantly to magnify returns to equity owners in both the long and short runs. However, while short term debt (SDR) is positively related to Return On Equity (ROE) in the short run, it is negatively related to the latter in the long run and the relationships are not statistically significant. Again, these results imply that quoted firms resort to the use of short term debts to improve profitability in the short run but as they become more profitable in the long run, they use less of short term debts in assets financing in line with pecking order theory.

In the case of the control variables, asset tangibility is negatively related to ROE in the long run but disappears out of the error correction model 2 [ECM2(-1)] analysis in the short run. Although this may suggest less flexibility in asset financing decision in the long run, the result may be subject to other interpretation that is beyond the scope of this study. However, firm growth rate is positively but not significantly related to ROE in both short and long run analyses. The positive

relationship is in agreement with *apriori* expectation of the study and the result suggests that growth in turnover contributes positively to increases in return to equity holders but the available investment opportunities are not being fully exploited to optimize the return. In the case of size, it is negatively but not significantly related to ROE in both the short and long run analyses. This implies that firm size is negatively related to Return On Equity (ROE). This conforms with one of the theoretical expectations about large firms suggesting that larger firms pay lower return to equity owners.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The study examines the relationships between capital structure variables on firm performance using two econometric models. The ratios of short term debt (SDR) and long term debts (LDR) serve as proxies for capital structure (the independent variables of the study) while return on assets (ROA) and Return On Equity (ROE) are proxies for performance (the dependent variables of study). Control variables which also serve as independent variables are assets tangibility (ASTAN), Growth Rate (GR) and firm size (SIZE). Using firm specific data obtained from annual reports and statement accounts of 62 quoted firms from non-banking subsectors listed in the Nigerian Stock Exchange between the period 2006 and 2014, the long run and short run dynamic relationships between the variables captured by two econometric models were exploited in a panel least squares regression analyses based on co-integration and Error Correction Mechanism (ECM) methodologies. The variables were stationary at the first level of integration. The panel unit roots tests based on Levin, Lin and Chu test statistic on two ECM models [(ECM1(-1) and ECM2(-1)] show that there is co-integration between the capital structure variables and the two measures of firm performance leading to the conclusion of the existence of stable long-run relationships between the capital structure variables and firm performance variables.

In specific terms, analyses of the first performance model (ROA) shows that short term debt ratios (SDR) has a negative and statistically significant relationship with Return On Assets (ROA) in both the short and long runs. This agrees the works of Khan (2012) and Toraman *et al*. (2013) and the results conform with *apriori* expectation in line with pecking order theory. The result suggests that more profitable firms use less of short debts in financing of assets. Also, the study finds that long term debt is positively related to ROA in the short run but negatively related to it in the long run and both relationships are not statistically significant. The short run positive relationship conforms with one of the theoretical expectations of the study in line with agency and signaling theories and the result agrees with

the works of Holz (2002), Margaritis and Psillaki (2010) and Warokka *et al*. (2011). However, that long term debt is positively but not significantly related to ROA in the short run and negatively in the long run, imply that firms use debts in the short run to boost profitability and earnings (agency and signaling) but in the long run, as they become more profitable, they resort to internal source of financing (retain earnings) and less of debts to finance assets (pecking order theory).

Furthermore, asset tangibility is negatively related to ROA in the short run (contrary to *apriori* expectation) but it is positively related to it in the long run. This implies that low flexibility in asset financing decision in the short run often gives way to higher flexibility in the long run. For firm growth rate, while the first year lag is negative in the short run, it is the current year growth rate that is negative in the long run contrary to *apriori* expectations and prior works (Zeitun and Tian, 2007). This appears an indication that investment opportunities available to the firms are largely not profitably exploited to boost annual sales (turnover). Size is positive in the short run but negatively related to ROA in the long run. This agrees with our mixed *apriori* expectations. In the short run growing firms enjoy economies of scales while in the long run diseconomies may set in when firms become too large. A positive sign for size agrees with the work of Shen (2012) who finds a positive but not statistically significant sign in the case of German, French and Italian firms but not for UK's and Twairesh (2014) for Saudi Arabian firms.

In the second model, Return On Equity (ROE) and capital structure, we find that Short term Debt (SDR) is positively related to ROE in the short run but negatively related to it in the long run and both relationships are not statistically significant. This suggests that in the short run less than proportionate mix of short debts increases return to equity owners but in the long run as firms become more profitable with high cash flows, they prefer to use more internal capital source than debt capital in line with pecking order theory. Furthermore, the study finds that in both short and long run analyses, Long term Debt Ratio (LDR) is positively and significantly related to return on equity (ROE). The positive and statistically significant relationship between LDR and ROE conforms with first *apriori* expectation of the study in line with agency and signaling theories and agrees with some prior studies. This suggests that long term debts contribute positively and significantly to enhancing returns to equity owners.

On the relationships between control variables and ROE, asset tangibility is negatively related to ROE in the long run but disappears out of the error correction model 2 [ECM2(-1)] analysis in the short run. Although this may suggest less flexibility in asset financing decision, the result may be subject to other interpretation that is beyond the scope of this study.

However, firm growth rate is positively but not significantly related to ROE in both short and long run analyses. The positive relationship is in agreement with *apriori* expectation of the study and the result suggests that growth in turnover contributes positively to increases in return to equity holders but the available investment opportunities are not being fully exploited to optimize the return to equity stock holders. In the case of size, it is negatively but not significantly related to ROE in both the short run and long run analyses. This implies that firm size is negatively related to Return On Equity (ROE). This conforms with one of our *apriori* expectations about large firms suggesting that larger firms pay lower return to equity owners.

In Summary, the study reached following conclusions that:

- The more profitable firms are, the less of short term debts they employ in asset financing
- Firms use long term debts in the short run to boost profitability and earnings (agency and signalling) but in the long run, as they become more profitable, they resort to internal source of financing (retain earnings) and less of debts to finance assets (pecking order theory)
- Long term debts contribute positively and significantly to enhancing returns to equity owners.

The study confirms the position in the finance literature that although leverage may not change the total earnings of the firm, but it does (as this study reveals) significantly affect the return on shareholders' equity

- The combination of debt and equity capital that optimizes return on assets differ from that that optimizes return on equity.

Furthermore, apart from short term debts and long term debts, other major factors that influence the relationship between a firm's capital structure and its performance in an emerging market like Nigeria's, are mainly growth rate and firm's size.

Based on the above and following DeAngelo and Mausulis (1980) position that every firm has an internal optimal capital structure that maximizes its value, we recommend that a firm should determine the appropriate mix of capital that optimizes its own performance. And in seeking the capital structure appropriate to a firm, the return to be maximized or optimized should simultaneously be considered. In particular, that combination of debts and equity that optimizes the return to equity owners should represents that optimum capital structure.

Appendix: Regression and Panel Unit Roots Test on Ecm Outputs

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/11/14   Time: 15:03
Sample: 2006 2013
Periods included: 8
Cross-section included: 62
Total panel (unbalanced) observations: 314

Variable	Coefficient	S.E.	t-Statistic	Prob.
C	0.125370	0.133470	0.939312	0.3485
SDR	-1.096080	0.277122	-3.955232	0.0001
LDR	-0.090574	0.063851	-1.418513	0.1573
ASTAN	0.004761	0.021151	0.225117	0.8221
GR	-1.29E-0.9	1.71E-07	-0.007569	0.9940
SIZE	-0.007330	0.013901	-0.527321	0.5984

Effects Specification
Cross-section fixed (dummy variable)

R-squared	0.399597	Mean dependent var		0.040401
Adjusted R-squared	0.239166	S.D. dependent var		0.159868
S.E. of regression	0.139446	Akaike info criterion		-0.915525
Sum squared resid	4.802994	Schwarz criterion		-0.115495
Log likelihood	210.7374	Hannan-Quinn criter		-0.595848
F-statistic	2.490767	Durbin-Watson stat		2.397815
Prob (F-statistic)	0.000000			

Dependent Variable: ROE
Method: Panel Least Squares
Date: 05/08/14   Time: 18:27
Sample: 2006 2013
Periods included: 8
Cross-section included: 62
Total panel (unbalanced) observations: 311

Variable	Coefficient	S.E.	t-Statistic	Prob.
C	8.556440	128.3613	0.066659	0.9469
SDR	-17.14956	276.4241	-0.062041	0.9506
LDR	125.8372	60.40974	2.083061	0.0383
ASTAN	-6.777958	19.96238	-0.339537	0.7345
GR	1.32E-05	0.000161	0.081803	0.9349
SIZE	-2.468727	13.32798	-0.185229	0.8532

Appendix: Continue

Effects Specification			
Cross-section fixed (dummy variable)			
R-squared	0.469458	Mean dependent var	-6.773094
Adjusted R-squared	0.325951	S.D. dependent var	160.0869
S.E. of regression	131.4321	Akaike info criterion	12.78310
Sum squared resid	4214953.	Schwarz criterion	13.58878
Log likelihood	-1920.772	Hannan-Quinn criter.	13.10514
F-statistic	3.271321	Durbin-Watson stat	3.498588
Prob (F-statistic)	0.000000		

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/11/14 Time: 15:27
Sample (adjusted): 2009 2013
Periods included: 5
Cross-section included: 58
Total panel (unbalanced) observations: 128

Variable	Coefficient	S.E.	t-Statistic	Prob.
C	0.088759	0.217368	0.408336	0.6845
ROA(-2)	-0.125292	0.323697	-0.387064	0.7001
SDR	-1.493819	0.388012	-3.849932	0.0003
SDR(-2)	-0.469180	0.372814	-1.258482	0.2132
SDR(-3)	0.332834	0.362800	0.917403	0.3627
LDR	0.167785	0.198872	0.843683	0.4023
LDR(-2)	-0.039510	0.145922	-0.270758	0.7875
LDR(-3)	0.025064	0.092852	0.269931	0.7882
ASTAN	-0.020592	0.052871	-0.389481	0.6983
GR	-1.85E-08	1.63E-07	-0.113703	0.9099
SIZE(-1)	-0.004856	0.022796	-0.213021	0.8320
ECM1(-1)	-0.742544	0.090496	-8.205287	0.0000

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.863055	Mean dependent var	0.024775
Adjusted R-squared	0.705221	S.D. dependent var	0.216940
S.E. of regression	0.117784	Akaike info criterion	-1.136291
Sum squared resid	0.818516	Schwarz criterion	0.401131
Log likelihood	141.7226	Hannan-Quinn criter.	-0.511628
F-statistic	5.468108	Durbin-Watson stat	2.075851
Prob (F-statistic)	0.000000		

Dependent Variable: ROE
Method: Panel Least Squares
Date: 05/11/14 Time: 15:10
Sample (adjusted): 2007 2013
Periods included: 7
Cross-section included: 62
Total panel (unbalanced) observations: 247

Variable	Coefficient	S.E.	t-Statistic	Prob.
C	-19.80383	92.50183	-0.214091	0.8307
ROE(-1)	-0.070822	1.969161	-0.035966	0.9714
SDR	27-41173	193.2856	0.141820	0.8874
SDR(-1)	104.1322	189.6653	0.549031	0.5837
LDR	326.2445	50.08662	6.513606	0.0000
LDR(-1)	-162.6718	246.9599	-0.658697	0.5109
GR	1.11E-05	0.000104	0.106518	0.9153
SIZE	-0.855896	9.348234	-0.091557	0.9272
ECM2(-1)	-0.458066	0.213130	-2.149232	0.0383

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.839026	Mean dependent var	-5.855281
Adjusted R-squared	0.776274	S.D. dependent var	174.1851
S.E. of regression	82.38902	Akaike info criterion	11.89434
Sum squared resid	1201467.	Schwarz criterion	12.88891
Log likelihood	-1398.952	Hannan-Quinn criter.	12.29476
F-statistic	13.37041	Durbin-Watson stat	1.561128
Prob (F-statistic)	0.000000		

Panel unit root test: Summary
Series: ECM1
Date: 05/08/14 Time: 15:15
Sample: 2006 2013

Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-2.58771	0.0048	6	33
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	0.58209	0.7197	6	33
ADF-Fisher Chi-square	10.4925	0.5728	6	33
PP-Fisher Chi-square	9.92597	0.6225	6	39

**Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality

Panel unit root test: Summary
Series: ECM2
Date:05/08/14 Time: 18:28
Sample: 2006 2013
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-section	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	2.57202	0.0049	5	26
Null: Unit root (assumes individual unit root process)				
Im, pesaran and Shin W-stat	0.82064	0.7941	5	26
ADF-Fisher Chi-square	5.49917	0.8554	5	26
PP-Fisher Chi-square	8.80954	0.5503	5	31

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normalty

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