Macroeconomic variables and their effects on the capital structure of quoted Nigerian firms

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MACROECONOMIC VARIABLES AND THEIR EFFECTS ON THE CAPITAL STRUCTURE OF QUOTED NIGERIAN FIRMS.

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Abstract
This study examines the impact of macroeconomic factors on the capital structures of Nigerian quoted firms. The two-stage least squares (2SLS), GMM and GARCH estimation techniques reveal that corporate borrowing is a declining function of macroeconomic conditions in Nigeria and macro-effects are significant across the 17 selected industries. Specifically, market leverage increases with debt market access and economic growth (measured by growth in GDP) but book leverage behaves counter-cyclically as it declines with equity market conditions, term spread and expected inflation. Unemployment rate, monetary policy, government borrowing have no significant impact on the borrowing behavior of firms. Taken together, the macroeconomic conditions rationalize conservative debt usage of Nigerian quoted firms and low leverage puzzle for some firms. The study recommends prudent use of debt in order to manage the overall risk of firms and preserve long-term stability.

Keywords: Capital structure, Macroeconomic conditions, Unemployment risk, Monetary policy, Fiscal policy.
JEL Classification: G30, G32, G33, E20, E30, E40, E50, E60.

1.0 Introduction.

Capital structure is the mix of debt and equity in financing of modern corporations. In other words, capital structure is the financing mix of any company. The subject of capital structure has occupied researchers for many years. Since the path-breaking work of Modigliani & Miller (1958, 1963), researchers have continued to examine how specific market imperfections such as taxes, bankruptcy costs, information and agency effects affect capital structure choice and by extension the cost of capital and investment behaviour of firms. This study examines the impact of macroeconomic conditions on the capital structure of Nigeria quoted firms.

Practitioners view the possibility that macroeconomic shocks could adversely affect their firms' access to capital markets and therefore macroeconomic conditions could constitute a vital factor in their capital structure choice. For instance, Erel, Julio, Kim & Weisbach (2012) report the comments of Richard Passov, that the main reason high bond rating is pursued by

corporations is to avert the risk of being shut out of the bond segment of the capital market. In fact, Graham & Harvey's (2001) survey reveals that the main goal of Chief Financial Officers (CFOs) in the pursuit of financial flexibility is "so that they do not need to shrink their business in case of an economic downturn" (Graham &Harvey, 2001:218). Moreover, given the realities of market incompleteness and imperfections in both advanced and developing economies, the supply of capital cannot be assumed to be perfectly inelastic as many neoclassical models of finance will assume. Consistent with Modigliani & Miller (1958, 1963) assumption that capital supply is inelastic, many scholars have inherently assumed that capital structures are determined solely by firms' demand for debt/equity capital. However, a growing body of research shows that the supply of capital has significant impact on the financial policies of firms (Alter & Elekdag, 2020; Barclay & Smith, 2020; Cardoso & Pinheiro, 2020). Gan, Lv & Chen (2020) argue that the speed of capital structure adjustment is sensitive to the state of the macroeconomy.

Attempts made on the study of capital structure in Nigeria have emphasized the following issues namely: empirical tests of competing views of capital structure, that is, the pecking order theory against the trade-off theory (Adesola, 2009); the impact of capital structure on performance (Olokoyo, 2012; Akinyomi, 2013, Adesina, Nwidobie & Adesina, 2015); avoiding corporate failure through optimal structure (Adenikinju, 2009); agency effects (Ezeoha & Okafor, 2010); tax effects (Adelegan, 2006; Amah & Ezike, 2013); and the role of firm-specific characteristics (Aregbeyen & Periola, 2011).

These papers largely analyzed the determinants of capital structure based on firm-specific attributes and product market competition such as financial performance and conditions, marginal tax position, bankruptcy costs, information, agency and governance problems with resulting *pecking order*, *trade-off*, *agency* and *market conditions* models of capital structure. Thus, the underlying assumption by these authors is that capital structure is purely determined by micro-analysis of firms' own conditions without any influence from the external economic environment. This is equivalent to saying that corporate capital structure is demand-driven so that the supply side is perfectly inelastic in tune with the original Modigliani and Miller position. However, in reality this micro approach, despite its impact in the Nigerian corporate finance literature, does not capture the effects of macroeconomic conditions on capital structure. In fact, macroeconomic risk (or unfavourable macroeconomic conditions) may account for most of the factors relevant for predicting corporate distress.

The purpose of this study is to investigate the impact of macroeconomic conditions on the capital structure of selected Nigerian quoted firms for a period of 16 years from 1999 through 2014. Thus, the broad hypothesis of the study borders on whether or not some selected macroeconomic factors influence corporate borrowing behavior in Nigeria. The year 1999 was chosen as a start year in order to coincide the study with democratic political regime in Nigeria and thus absolve the effect of significant macroeconomic volatility experienced during prolonged military regime in Nigeria.

This paper utilizes panel data regression techniques such as the two-stage least squares (2SLS), generalized method of moments (GMM) and generalized autoregressive conditional heteroscedasticity (GARCH) to estimate the impact of macroeconomic conditions on the capital structure of Nigerian quoted firms. The corporate debt policy is revealed by the ratio of borrowing to the entire capital utilized in financing operations and long-term investments. The key result is that corporate borrowing increases with debt market access and growth in gross domestic product (economic growth proxy) but behaves counter-cyclically as borrowing ratio declines with equity market conditions, term spread and expected inflation. Monetary policy has a weak impact on the borrowing behaviour of firms. Unemployment rate

has no strong impact on corporate borrowing behaviour of Nigerian quoted firms. With regard to the common models of capital structure, the empirical results are mixed though the *pecking order* appears to dominate with respect to theoretical predictions between leverage and growth options, profitability, liquidity and intangibility or riskiness of assets.

2.0 Literature Review

Many related studies have been carried out by scholars across the globe but much of the empirical research since the seminal work of Modigliani & Miller (1958) has focused on testing the implications of two competing views of capital structure namely the trade-off theory and the pecking order view. The trade-off theory which has many authors, holds that firms have leverage targets that optimally balance the various costs (e.g., bankruptcy costs, stockholder-bondholder agency costs) and benefits (e.g. tax savings, mitigated stockholder-manager agency costs) of debt. The pecking order of Myers & Majluf (1984) and Myers (1984) postulates that firms follow a financing hierarchy designed to minimize the adverse selection costs of security issuance. Other views of capital structure choice include the agency and market conditions (or timing) models (Fama & French, 2012, Welch 2015).

The trade-off theory emphasizes taxes and bankruptcy costs. The pecking order emphasizes information asymmetry while agency theories emphasize agency effects. The market conditions model is an offshoot of the behavioural story of security prices' reaction (over- and under-) to economic events and emphasizes timing in security issuance. Empirically, the theories have experienced both successes and challenges. Each view succeeds in explaining a number of broad patterns in observed debt ratios, such as the association between leverage and various firm characteristics and the composite use of different sources of capital. However, no view has succeeded in explaining the observed heterogeneity in capital structures, leverage changes and security issuance decisions. Graham & Leary (2011) provide an overview of some empirical properties of corporate capital structures to highlight the successes and failures of empirical models. They conclude that the real sources of incremental knowledge in corporate debt policy will emanate from identifying economic forces that are most important to capital structure choices.

Katagiri (2014) embeds a dynamic trade-off theory of firm financing into a general equilibrium model with firm dynamics and finds that the stationary equilibrium replicates fairly well the distribution of leverage as well as the relationship between leverage, size and profitability. Katagiri's counterfactual experiment uncovers relatively small effects of tax benefits on corporate capital structure. Further, Katagiri (2014) finds that the effects of default cost on macroeconomic variables are almost negligible under endogenous capital structure choice.

Chang, Chen & Dasgupta (2019) examine how time-varying macroeconomic conditions affect firms' financing decisions. Their principal components decomposition of several macroeconomic variables characterizes three phases of the business cycle relative to recessions: early recovery, robust recovery, and economic crest; a fourth phase dubbed "windows of opportunity" in capital markets that are unrelated to recessions. This characterization yields interesting novel results. Debt issuance exhibits a non-monotonic pattern during the upward phase of the business cycle: it declines in robust recovery relative to recessions but peaks at the economic crest. Financially constrained firms issue more equity during windows of high stock market valuation, whereas unconstrained firms time debt issuance in response to debt market spreads. However, in the Mclean & Zhao (2014) paper, share issuance plays a bigger role than debt issuance in causing these effects. Mclean & Zhao (2014) document similar results as Chang, Chen & Dasgupta (2019) for US firms in the

context of time-varying external finance costs whereby both investment and employment are less sensitive to Tobin's q and more sensitive to cash flow during recessions and low investment sentiment periods.
Bhamra, Kuehn & Strebulaev (2010) find that capital structure is procyclical at dates when firms re-lever but countercyclical in aggregate dynamics consistent with earlier studies. Gan, Lv & Chen (2020) report evidence that the speed of capital structure adjustment is faster in good macroeconomic states than in poor economic states. In a related study utilizing South African companies, Machokoto, Areneke & Ibrahim (2020) use a large sample of 775 listed companies to evaluate the dynamics and determinants of corporate borrowing and find that increase in leverage cannot be explained entirely by firm attributes and macroeconomic factors.

From the foregoing, it is clear that financial and economic theory provide rich insights on the interaction of macroeconomic variables and firm-specific variables out of which testable hypotheses can be formulated or empirical work replicated using different sample characteristics. Indeed, the strength of any financial theory is proven through empirical work. This paper's objective is apparent – to investigate the impact of macroeconomic conditions such as inflation, interest rates, unemployment and economic growth on the corporate borrowing behaviour of Nigerian quoted firms. The study finds that corporate leverage (or borrowing behaviour) moves counter cyclically. The next section discusses the data and related methodological issues.

3.0 Methodology

This study utilizes secondary data. The use of secondary data provides a systematic and empirical solution to research problems, by using data which are already in existence. The examination of audited financial statements of the selected firms provides a basis for subjecting the theoretical hypotheses to reliable and robust empirical tests. Data for the study were obtained from both public and private sources. Official sources such as the Nigerian Stock Exchange (NSE) and Central Bank of Nigeria (CBN) publications were veritable sources of data for this research. The data relating to market conditions were obtained from the daily official list of the Stock Exchange. Macroeconomic data were obtained from the CBN Statistical Bulletins and Annual Reports and Accounts (various years). Company-specific data were obtained from the annual financial reports of the selected quoted companies. The final selection was in favour of companies with the highest data availability.
The population for this study is the number of quoted companies in Nigeria, whose equities are listed on the Nigerian Stock Exchange (NSE) for the period 1999-2014. The year 1999 is chosen as start year to coincide with the return of civilian/democratic rule in Nigeria and therefore remove potential confounding effects of military regime on macroeconomic conditions. The year 2014 was chosen as end-year because as at the time the research analysis was conducted, the financial statements of some of the 50 sample firms were unavailable for the post-2014 period and balanced panel is preferred. The number of listed (quoted) equities was 158 as at December 2019. Equities are listed under 20 broad industry sectors.

However, the sample for this study was biased towards a survivalist approach, because given the study period of 1999-2014, only companies with available data were retained which produced a balanced panel of 50 sample firms across 17 sectors. There is stratification of sample in terms of companies selected for the study as displayed in table 1 below.

Table 1: Distribution of Sample of Study

S/N	SECTOR	POPULATION	SAMPLE	SAMPLING RATIO (%)
1	Agriculture	6	4	66
2	Aviation/Airline	2	1	50
3	Automobile & Tyre	3	2	66
4	Breweries	7	3	43
5	Building Materials	7	3	43
6	Chemical and Paints	9	4	44
7	Computer	6	1	17
8	Conglomerate	8	4	50
9	Construction/Real	6	3	50
10	Engineering	3	1	33
11	Food and Beverages	18	6	33
12	Health Care	12	5	42
13	Hotels and Tourism	4	1	25
14	Industrial/Domestic	10	4	40
15	Oil and Gas	9	5	56
16	Packaging	8	0	0
17	Publishing	4	2	50
18	Road Transport	1	1	100
19	Textiles	3	0	0
	TOTAL	126	50	40

Source: Underlying Data from the Nigerian Stock Exchange Factbooks (Various Years).

Estimation Procedures

Panel data regression techniques are utilized for the study namely 2SLS, GMM and GARCH.

Model Specification

The usual dependent variable for capital structure studies is a measure of leverage such as the book debt ratio or the market debt ratio. The book debt ratio (*BLt*) or market debt ratio can be categorized into two measures namely: First, the book or market value of total liabilities-to-total-liabilities-plus-equity ratio (labeled *ML2t* in this study) and, second, the total financial liabilities-to-total-financial-liabilities-plus-equity ratio (*ML1t*). Another dimension to evaluating the capital structure interaction with macroeconomic variables is the debt maturity structure (*DMS*) defined as the ratio of short-term liabilities to total liabilities. Thus, BLT, ML1t, ML2t and DMS are the endogenous capital structure variables.

$D_{i,t} = f\ (MTR_{it}, NDTS_{it}, TANG_{it}, GROW_{it}, SIZE_{it}, VOL_{it}, PROF_{it}, QUICK_{it}, RD_{it}, DEF_{it}, DIV_{it}, AGE_{it}, UNQ_{it}, RSI_{it}, UNR_{it}, STC_{it}, RAT_{it}, TS_{t}, ASI_{t}, UER_{t}, E_{t,} CPS_{t}, EMC_{t}, GB_{t}, GDPG_{t})$

D_{it} is the leverage measure while the explanatory variables are as described in table 2 below.

The explanatory variables are as described in table 2.

Table 2: Determinants of Capital Structure and their Expected Signs and Magnitudes

S/N	EXPLANATORY VARIABLE	DEFINITION	INDICATION	EXPECTED SIGN	EXPECTED MAGNITUDE
1	MTR	Marginal tax rate, Tax expense divided by Earnings before tax as in Barakat and Rao (2013).	Effect of debt tax shield	+	$0 < \beta_{MTR} < 1$
2	NDTS	Non-debt tax shield, following DeAngelo-Masulis famous analysis, (Depreciation+ Investment tax credit)/ Total assets less current liabilities	Substitute for the debt tax shield	-	$-1 < \beta_{NDTS} < 0$
3	TANG	Tangible assets defined as PPE divided by total assets less current liabilities.	Collateral, a measure of debt capacity (Cerqueiro, *et al,* 2016).	+/-	$-1 < \beta_{TANG} < 1$
4	GROWTH	Growth opportunities, measured by the ratio of market-to-book value of the firm or market to book value of equity.	Growth	-	$-1 < \beta_{GROW} < 0$
5	SIZE	Size defined as the natural logarithm of Sales (LNS)	Size effect	+	$0 < \beta_{SIZE} < \infty$
6	VOL	Volatility of earnings defined as the standard deviation of EBIT scaled by Total Assets less current liabilities	Business Risk	-	$-1 < \beta_{VOL} < 0$
7	PROF	Defined by ROCE or ROA = Earnings before Interest and Taxes/ Total Assets less current liabilities	Profitability	+/-	$-1 < \beta_{PROF} \leq 1$
8	QUICK	A stricter measure of liquidity relative to current ratio. Quick ratio is defined as Current assets less inventory divided by current liabilities	Liquidity. Myers & Rajan (1998), Daley & Green (2016)	+/-	$-1 < \beta_{QUICK} \leq 1$
9	R&D	Research & Development plus other intangible assets / (Total Assets – Current Liabilities)	Asset Uniqueness or intangibility	-	$-1 < \beta_{RD} < 0$
10	DEF	Financing deficit = change in total assets+ dividends - profit after tax OR net decrease in cash and cash equivalents scaled by (Total assets less current liabilities).	Adverse selection in external financing	+	$0 < \beta_{DEF} \leq 1$ OR $\beta_{DEF}=\beta_{PO}=$ 1..(3.9)
11	DIV	Dividend payout ratio defined as Dividends divided by Profit after tax (PAT)	1)Asymmetric information. Low	-	$-1 < \beta_{DIV} < 0$
		or Dividend per share (DPS) divided by Earnings per share (EPS). This variable was utilized in Barakat and Rao (2013)	payout firms will prefer debt over equity financing. 2)Effect of personal taxes – relative advantage of dividend to interest income		
12	**E**	Expected inflation proxied by the treasury bill rate	Impact of macroeconomic conditions on financing.	+	$0 < \beta_{INF} < 1$

13	AGE	Ln (Number of years since incorporation).	Impact of the firm's age on financing decisions. AGE may be correlated with SIZE.	+	$0 < \beta_{AGE} < 1$
14	UNQ	Uniqueness dummy (for distress risk) that takes the value of one for firms producing computers, semiconductors, chemicals and allied, aircraft, space vehicles and other sensitive industries, and zero otherwise.	Asset uniqueness/ Industry uniqueness.	-	$-1 < \beta_{UNQ} < 0$
15	RSI	Measured as bought in materials and services divided by Depreciation.	Relationship-specific investments with suppliers and customers	-	$-1 < \beta RSI < 0$
16	UER	Unemployment rate. Unemployment risk is a substantial concern for workers. Workers' concerns about becoming unemployed reduce their labour supply and affect firms' policies on layoffs and wage setting (Agrawal & Matsa, 2013, Brown & Matsa, 2016, Serfling, 2016).	A control variable: Unemployment Risk, measuring impact of employees' exposure to unemployment on capital structure. Agrawal & Matsa (2013) and Kim (2020) find that labour market frictions affect corporate financing decisions	-	$-1 < \beta_{UER} < 0$
17	UNR	Unionization ratio measured as natural log of value-added per employee.	Unionization ratio, the higher the ratio, the greater the employees' bargaining power. Measures the impact of labor bargaining on capital structure	+	$0 < \beta_{UNR} < 1$
18	STC	Staff costs to depreciation ratio.	STC, albeit historical, is a measure of human capital intensity in the production process.	-	$-1 < \beta_{STC} < 0$
19	RAT	A dummy variable representing debt rating. Assumes the value of one if firm has rated debt and zero otherwise.	Access to debt markets.	+	$0 < \beta_{RAT} < 1$
20	TS	Term spread measured as the difference between returns on Treasury Bond and Treasury Bills.	Debt market conditions. Higher term spread indicates higher term premium required by investors.	-	$-1 < \beta_{TS} < 0$
21	ASI	Growth in the NSE All-Share Index measured in percentage.	Equity market conditions as in Akintola-Bello (2004).	-	$-1 < \beta_{ASI} < 0$
22	CPS	Private credit to GDP ratio.	A measure of expansionary credit or otherwise in the economy	+	$0 < \beta_{CPS} < 1$
23	EMC	Equity market capitalization to GDP ratio.	A measure of the buoyancy of the equity stock market.	-	$-1 < \beta_{EMC} < 0$
24	GB	Measured as government borrowing to GDP ratio as in Graham, Leary & Roberts (2014b).	Government borrowing impact on corporate borrowing. GB may crowd out corporate borrowing (Badoer & James, 2016).	-	$-1 < \beta_{GB} < 0$
25	GDPG	GDP growth rate	General macroeconomic conditions	-/+	$-1 < \beta_{GDPG} < 1$

Sources: Paseda (2016) and Paseda & Olowe (2018)

4.0 Results

This section presents the empirical results of the study. Again, the main aim is to determine the impact of macroeconomic conditions on the corporate capital structure choice of selected firms. For robustness, the following levels of explanatory variables are included in line with some empirical studies:

1) Firm-level variables and industry factors including potential peer effects as in Leary & Roberts (2014) or in the case of collusion to lessen product market competition as in Ferres, *et al* (2020).
2) The marginal tax rate
3) Human capital investment proxy represented by staff costs (STC), employee bargaining power represented by the unionization ratio (UNR) and relationship-specific investments (RSI)
4) Macroeconomic variables such as unemployment rate, GDP growth (GDPG), term spread (TS), all-share index (ASI), credit to private sector (CPS), equity market capitalization (EMC).

From the summary statistics in Table 3 above, several facts can be deduced as statistical features of the variables utilized for the study. First, the relationship between the three measures of leverage is revealing of the relative weights of financial to non-financial debt in corporate balance sheets. For instance, the relative ***means*** of market leverage measure I (ML1) which captures only financial liabilities relative to market leverage II is suggestive that over 40 percent of corporate liabilities are non-financial. These liabilities are operational in nature. In other words, the leverage measure II is 1.71 times as high as leverage ratio I (ML1). The book leverage is 1.34 times as high as the market leverage. The magnitude of book leverage over market leverage is most pronounced in firms and industries where the book equity is depressed or even negative (e.g., agriculture, automobile and breweries (2005-2007) as shown in results not presented here). In finance terms, these firms' stocks are referred to as *penny* or *distressed stocks*. They are different from *value stocks* – stocks with high book-to-market values - in the asset pricing literature albeit closely related. The relative ratios of the leverage ***median*** statistics reveal that non-financial liabilities could in fact be representing 56 percent of corporate liabilities when ML1t and ML2t are compared. In fact, the comparison between ML1t and BLt median values magnifies the relative use of non-financial liabilities to 69 percent of entire corporate liabilities. Thus, before any rigorous analysis, it is clear that non-financial liabilities are significant sources of financing for modern corporations in Nigeria. In addition, the maturity structure of corporate liabilities (DMS) indicates that over 75 percent are current or *short-term* in nature. The firms' average marginal tax rate (MTR) variable approximates the corporate tax rate in Nigeria.

Table 3: Summary Statistics of Variables Used in the Study

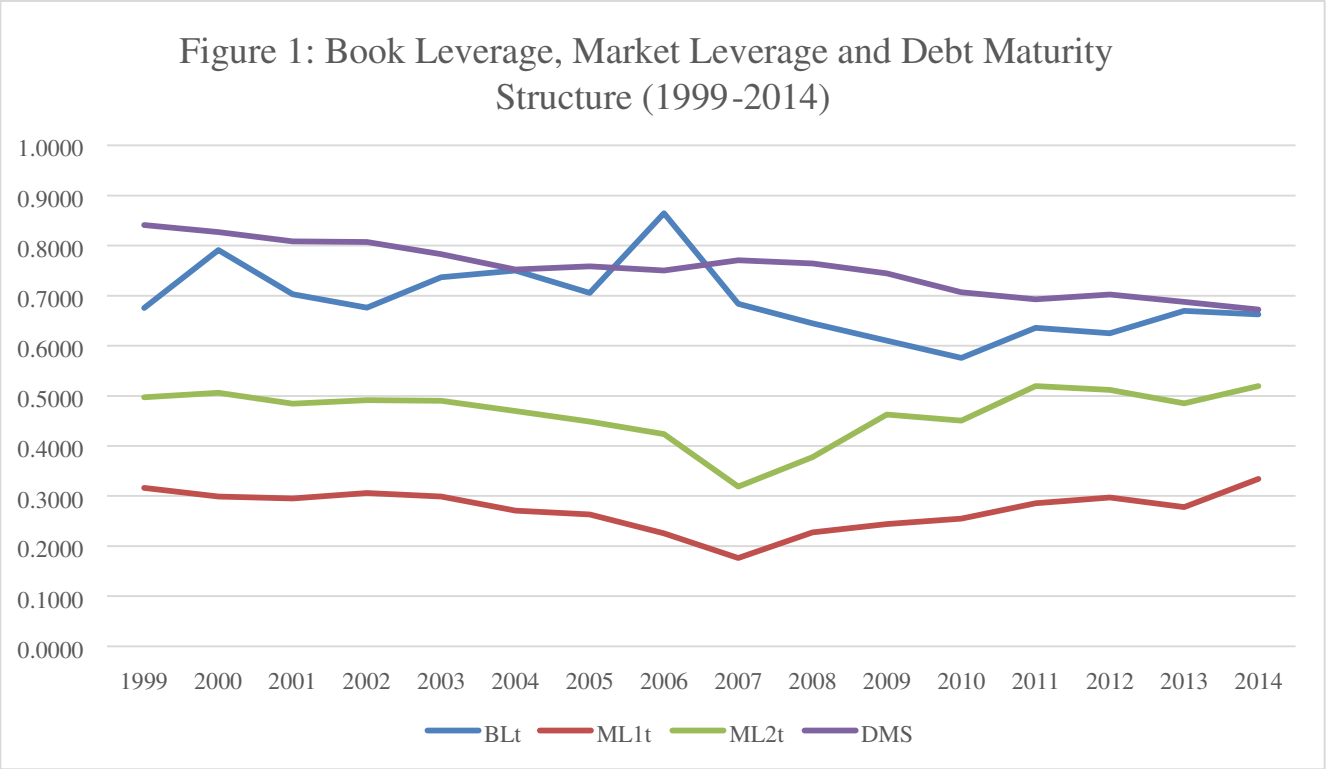
*The variables are as defined in table 4. There are 800 observations for each firm-specific variable so that the sum of each firm-specific variable is equivalent to mean value*800. The probability values are zero for almost all the variables. To resolve the issue of outliers, most of the variables with outlier presence were winsorized at the 5th and 95th percentiles corresponding to lower and upper values respectively.*

VAR	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
BLT	0.6230	0.606	0.999	0.111	0.208	-0.008	2.499	8.368
ML1T	0.273	0.1902	0.953	0.0000	0.2605	0.820	2.57	95.751
ML2T	0.466	0.429	0.989	0.072	0.256	0.329	1.961	50.411
DMS	0.754	0.809	1.000	0.030	0.212	-1.340	4.79	346.147
MTR	0.311	0.301	13.3333	-0.793	0.875	12.351	173.095	984752.445
NDTS	0.120	0.077	0.776	0.021	0.136	2.931	12.432	4110.674
TANG	0.639	0.635	1.334	0.105	0.329	0.281	2.418	21.809
GROW	3.047	1.772	13.238	-13.238	3.857	0.961	5.622	352.193
SIZE	15.406	15.433	20.293	8.500	2.249	-0.663	3.914	86.504
VOL	0.193	0.107	0.990	0.030	0.237	2.382	7.895	1555.552
PROF	0.239	0.215	0.792	-0.298	0.263	0.157	2.947	3.365
QUICK	0.695	0.626	2.995	0.163	0.414	1.83	8.041	1293.410
RD	0.022	0.000	0.739	0.000	0.091	6.000	41.41	53978.451
UNQ	0.620	1.000	1.000	0.0000	0.486	-0.494	1.244	135.326
DEF	0.199	0.133	0.799	-0.209	0.260	0.737	2.954	72.470
DIV	0.387	0.372	1.000	0.000	0.346	0.311	1.774	62.966
EINF	0.112	0.114	0.189	0.040	0.040	0.070	2.208	21.596
AGE	3.717	3.773	4.511	1.792	0.392	-1.363	6.682	699.444
DDTA	0.018	-0.001	0.548	-0.296	0.182	1.109	4.993	296.249
RSI	26.517	17.777	98.564	3.426	25.707	1.623	4.736	451.496
UNR	7.609	7.559	10.235	5.078	1.426	0.115	2.156	25.530
STC	2.744	2.277	7.272	0.945	1.567	1.326	4.357	295.712
RAT	0.177	0.000	1.000	0.000	0.382	1.688	3.850	404.009
UER	0.168	0.148	0.239	0.0820	0.0510	0.2195	1.667	65.794
CPS	0.1599	0.1690	0.3690	0.0090	0.0820	0.7615	3.839	101.132
EMC	0.167	0.139	0.493	0.063	0.102	1.989	6.924	1040.641
MPR	0.124	0.123	0.1900	0.0613	0.0347	0.0892	2.39	679.81
TS	0.896	0.898	0.977	0.821	0.043	0.067	2.124	26.166
ASI	0.176	0.193	0.747	-0.458	0.342	-0.147	2.061	32.264
GB	0.376	0.339	0.741	0.197	0.144	1.199	3.625	204.793
GDPG	0.075	0.067	0.213	0.004	0.042	1.929	7.864	1284.91

SOURCE: Authors' Computation

The non-financial stakeholders (NFS) variables namely RSI, UNR and STC show significant dispersion away from their mean values. The exception is UER which is more of a macroeconomic variable and shows relative stability over the study period. Firm-by-firm analysis and industry-by-industry analysis reveal where the effects of these NFS are concentrated.

Source: Authors' estimation



BL_t represents the book leverage measure of the average firm per annum. $ML1_t$ is the market leverage measure for financial debt only. $ML2_t$ is the market leverage measure for all liabilities both financial and non-financial liabilities. DMS is the debt maturity structure. The primary leverage measure for this study, however, is the $ML1_t$ – the market leverage which captures financial debt only.

Table 4: Correlation coefficients of Selected Variables Used

	ML1T	ML2T	BLT	GROW	SIZE	QUICK	EINF	RAT	UER	PRC	EMC	MPR	TS	ASI	GB	GDPG
ML1T	1.00	0.79	0.43	-0.47	-0.30	-0.24	0.10	0.17	0.03	-0.06	-0.13	0.09	0.10	-0.02	-0.13	0.01
ML2T	0.79	1.00	0.56	-0.52	-0.26	-0.18	0.12	0.08	0.08	-0.06	-0.19	0.08	0.12	-0.02	-0.18	0.01
BLT	0.43	0.56	1.00	0.04	-0.02	-0.31	0.02	-0.09	-0.04	-0.03	0.02	0.04	0.01	0.02	0.01	0.01
GROW	-0.47	-0.52	0.04	1.00	0.38	0.02	-0.10	-0.16	-0.06	0.03	0.16	-0.07	-0.10	0.05	0.14	0.01
SIZE	-0.30	-0.26	-0.02	0.38	1.00	0.07	-0.14	-0.01	0.21	0.20	0.10	-0.20	-0.14	-0.08	0.13	-0.05
QUICK	-0.24	-0.18	-0.31	0.02	0.07	1.00	-0.05	0.03	0.04	0.04	0.02	-0.05	-0.05	-0.02	0.03	0.01
EINF	0.10	0.12	0.02	-0.10	-0.14	-0.05	1.00	-0.01	-0.21	-0.78	-0.59	0.82	0.99	0.21	-0.71	0.36
RAT	0.17	0.08	-0.09	-0.16	-0.01	0.03	-0.01	1.00	0.04	0.03	-0.01	-0.02	-0.01	-0.01	0.00	-0.01
UER	0.03	0.08	-0.04	-0.06	0.21	0.04	-0.21	0.04	1.00	0.47	-0.18	-0.54	-0.19	-0.10	-0.08	-0.15
PRC	-0.06	-0.06	-0.03	0.03	0.20	0.04	-0.78	0.03	0.47	1.00	0.39	-0.77	-0.77	-0.47	0.63	-0.39
EMC	-0.13	-0.19	0.02	0.16	0.10	0.02	-0.59	-0.01	-0.18	0.39	1.00	-0.48	-0.61	0.17	0.93	-0.06
MPR	0.09	0.08	0.04	-0.07	-0.20	-0.05	0.82	-0.02	-0.54	-0.77	-0.48	1.00	0.81	0.18	-0.58	0.36
TS	0.10	0.12	0.01	-0.10	-0.14	-0.05	0.99	-	-	-	-0.61	0.81	1.00	0.21	-	0.35

								0.01	0.19	0.77					0.72	
ASI	-0.02	-0.02	0.02	0.05	-0.08	-0.02	0.21	-0.01	-0.10	-0.47	0.17	0.18	0.21	1.00	-0.08	0.14
GB	-0.13	-0.18	0.01	0.14	0.13	0.03	-0.71	0.00	-0.08	0.63	0.93	-0.58	-0.72	-0.08	1.00	-0.02
GDPG	0.01	0.01	0.01	0.01	-0.05	0.01	0.36	-0.01	-0.15	-0.39	-0.06	0.36	0.35	0.14	-0.02	1.00

Source: Underlying data from Authors' analysis

The Influence of Macroeconomic Factors – The Main Study Objective.

Here, the study investigates the impact of the following nine variables on debt ratios:

- Rating (RAT): a proxy for access to debt markets.
- Credit to private sector to GDP ratio (CPS): a measure of the volume of credit supply by banks. This variable is sensitive to the monetary policy regime. A tight monetary policy or regime is expected to exert downward pressure on CPS and vice versa (Foley-Fisher, Ramcharan & Yu, 2016).
- Monetary policy rate (MPR): This variable captures the monetary policy regime viz hawkish (rising MPR) versus dovish (declining MPR). Monetary policy could be either conventional or unconventional (Foley-Fisher, Ramcharan & Yu, 2016).
- Equity market capitalization to GDP ratio (EMC): A measure of equity market conditions. The higher this ratio, then the more buoyant (or bullish) the stock market is and vice versa. All other things equal, a bullish stock market will be accompanied by relatively lower levels of debt in corporate capital structures.
- All-share index (ASI)
- Term spread (TS)
- Unemployment rate (UER)
- Government borrowing to GDP ratio (GB)
- Economic growth proxied by GDP growth rate (GDPG)

Table 5: Impact Of Macroeconomic Factors: Leverage Regressions

The dependent variable is the market leverage ratio I (ML1) which captures financial liabilities only, defined as the ratio of financial liabilities to sum of financial liabilities and equity, using market values. The market leverage ratio II (ML2) is the ratio of the sum of all corporate liabilities (both financial and non-financial) to total liabilities and equity. The book leverage is the ratio of the sum of all corporate liabilities to total corporate liabilities and equity using book values. The explanatory variables are as defined in Table 2. All variables capture both firm-specific and macroeconomic risks. To resolve the issue of ***outliers****, most of the variables with outlier presence were winsorized at the 5th and 95th percentiles corresponding to lower and upper values respectively.*

	Leverage measures (ML1, ML2 and BL) Regressions								
	ML1 Regressions			ML2 Regressions			BL Regressions		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2SLS	GMM	GARCH	2SLS	GMM	GARCH	2SLS	GMM	GARCH
MTR	-0.0025 (-0.2962)	-0.0021 (-0.3324)	-0.002858 (-0.2749)	0.004491 (0.5822)	0.004788 (0.7798)	0.003790 (0.4143)	0.0111*** (1.6517)	0.0111*** (1.7270)	0.0110*** (1.7032)
NDTS	0.070337 (1.1778)	0.069888 (1.0257)	0.042776 (0.8160)	0.1847* (3.4165)	0.178862* (2.7362)	0.1844* (4.2702)	0.1304* (2.7727)	0.1297* (2.6488)	0.1388* (2.8125)
TANG	0.0405 (1.5092)	0.0389 (1.4140)	0.0503** (2.0378)	-0.0045 (-0.1851)	-0.0040 (-0.1618)	0.0206 (0.8677)	-0.0276 (-1.3091)	-0.0280 (-1.1648)	-0.0324 (-1.6001)
GROW	-0.0216* (-8.9921)	-0.0216* (-7.2650)	-0.0217* (-9.0956)	-0.0272* (-12.518)	-0.0270* (-8.4175)	-0.0317* (-17.554)	0.001550 (0.8216)	0.001545 (0.8445)	0.001597 (0.7784)
SIZE	-0.0142** (-2.4176)	-0.0143** (-2.0599)	-0.0174* (-3.2453)	0.0136* (2.5723)	0.0133** (2.1929)	0.0106** (2.2360)	0.0080*** (1.7403)	0.008085 (1.4548)	0.0086** (2.1176)
VOL	0.030900 (0.8378)	0.032653 (0.7680)	0.040348 (1.2390)	0.1634* (4.8918)	0.1663* (5.4028)	0.1716* (5.6869)	0.2200* (7.5781)	0.2202* (7.3371)	0.2214* (7.4547)
PROF	-0.044258 (-1.2906)	-0.047112 (-1.2203)	-0.035774 (-1.1788)	-0.039460 (-1.2708)	-0.036378 (-1.1345)	-0.029866 (-1.1260)	0.008540 (0.3163)	0.009295 (0.3127)	0.009150 (0.3547)
QUICK	-0.0747* (-3.6439)	-0.0771* (-3.4378)	-0.0844* (-4.1950)	-0.0502* (-2.7052)	-0.0478** (-2.4880)	-0.0592* (-3.5856)	-0.1070* (-6.6304)	-0.1074* (-5.1794)	-0.1087* (-7.9965)
RD	0.1988** (2.3692)	0.2033* (2.8479)	0.1851** (2.3774)	0.1209 (1.5904)	0.1200** (2.0390)	0.0923 (1.2225)	0.083312 (1.2608)	0.084132 (1.5466)	0.081826 (1.0099)
UNQ	0.020299 (1.0478)	0.020976 (1.2026)	0.015960 (0.7887)	0.0839* (4.7806)	0.0831* (5.0420)	0.0672* (4.0567)	0.0442* (2.8978)	0.0442* (2.8688)	0.0442* (2.9351)
DEF	0.1018* (3.3363)	0.099500* (2.8833)	0.127162* (4.5668)	0.1070* (3.8731)	0.106791* (3.3199)	0.1367* (5.4434)	0.2240* (9.3279)	0.2235* (8.3194)	0.2224* (9.9666)
DIV	-0.1517* (-5.8222)	-0.1492* (-5.7961)	-0.1420* (-5.3073)	-0.1480* (-6.2724)	-0.1470* (-5.9031)	-0.1298* (-5.9658)	-0.0620* (-3.0219)	-0.0628* (-3.0762)	-0.0652* (-3.0723)
EINF	-0.412291 (-0.8433)	-0.361656 (-0.8634)	-0.441176 (-0.9227)	-0.108568 (-0.2452)	-0.175034 (-0.4232)	0.171230 (0.4111)	-0.122852 (-0.3192)	-0.107924 (-0.2873)	-0.140203 (-0.3529)
AGE	0.0763* (3.3915)	0.077466* (4.0423)	0.083854* (3.4074)	0.0825* (4.0548)	0.082851* (4.5084)	0.0909* (4.5545)	0.0919* (5.1939)	0.0917* (5.3232)	0.0907* (4.5935)
DDTA	-0.0900** (-2.1108)	-0.0896*** (-1.8119)	-0.0969* (-2.5529)	-0.0757** (1.9601)	-0.078*** (-1.7580)	-0.1295* (-3.6582)	-0.1892* (-5.6346)	-0.1896* (-4.8662)	-0.1894* (-5.7666)
RSI	0.0011* (3.1346)	0.0011* (3.2024)	0.0010* (3.1828)	0.00139* (4.4575)	0.001355* (4.4654)	0.0017* (5.5328)	0.0015* (5.4293)	0.0015* (6.1217)	0.0015* (5.0009)
UNR	-0.004081 (-0.5002)	-0.004020 (-0.4532)	-0.007253 (-0.9173)	-0.0246* (-3.3261)	-0.0245* (-3.2735)	-0.0281* (-3.9572)	-0.0069 (-1.0746)	-0.0069 (-0.9959)	-0.0075 (-1.0877)
STC	-0.0094*** (-1.8912)	-0.0101** (-2.0699)	-0.008*** (-1.6631)	0.007180 (1.5957)	0.0071 (1.5099)	0.0093** (2.2415)	0.0193* (4.9407)	0.0193* (4.4810)	0.0198* (4.8132)
RAT	0.0662* (3.2052)	0.0672* (3.2031)	0.0672* (3.1743)	-0.0122 (-0.6523)	-0.0123 (-0.6538)	-0.0150 (-0.8247)	-0.0596* (-3.6646)	-0.0594* (-4.1540)	-0.0586* (-3.2410)
UER	0.302371 (0.8082)	0.2513 (0.7742)	0.6412*** (1.7592)	0.527611 (1.5574)	0.5343*** (1.6474)	0.6888** (2.4825)	0.5120*** (1.7383)	0.5118*** (1.8101)	0.5199*** (1.6884)
PRC	0.165313 (0.3160)	0.297441 (0.6746)	-0.099824 (-0.1955)	0.086708 (0.1830)	0.071091 (0.1584)	0.075724 (0.3218)	-0.221226 (-0.5370)	-0.220734 (-0.6018)	-0.219390 (-0.5044)
EMC	0.398914 (0.6035)	0.594804 (1.0423)	0.180469 (0.2800)	0.010716 (0.0179)	0.042247 (0.0738)	0.064123 (1.4115)	-0.035440 (-0.0681)	-0.050001 (-0.1007)	-0.021673 (-0.0404)
MPR	0.637313 (1.1717)	0.642061 (1.4102)	0.573397 (1.0686)	0.501880 (1.0190)	0.533419 (1.1750)	0.290020 (0.6049)	0.7838*** (1.8303)	0.7835*** (1.8991)	0.8183*** (1.8494)
TS	0.3254*** (1.6738)	0.3304** (1.9433)	0.307147 (1.5643)	0.053886 (0.3061)	0.063614 (0.3502)	0.048773 (0.3262)	-0.072376 (-0.4728)	-0.075609 (-0.4255)	-0.069938 (-0.4915)
ASI	-0.028683 (-0.8863)	-0.033955 (-1.1278)	-0.032684 (-1.0913)	-0.007310 (-0.2494)	-0.010943 (-0.3675)	-0.019848 (-0.8078)	-0.018567 (-0.7287)	-0.017077 (-0.5877)	-0.019732 (-0.8244)
GB	-0.385611 (-0.6287)	-0.550499 (-1.0602)	-0.137182 (-0.2296)	-0.184836 (-0.3328)	-0.203657 (-0.3905)	-0.174012 (-1.4976)	0.173178 (0.3586)	0.184319 (0.4071)	0.158496 (0.3164)
GDPG	0.229337 (0.5260)	0.323494 (0.8788)	0.052617 (0.1240)	0.108248 (0.2742)	0.097552 (0.2667)	0.019011 (0.0952)	-0.255106 (-0.7432)	-0.261298 (-0.8275)	-0.255681 (-0.7135)
Observations	800	800	800	800	800	800	800	800	800
Adjusted R^2	0.372918	0.372729	0.368232	0.469567	0.469455	0.460052	0.392486	0.392478	0.392300
Durbin-Watson stat	2.041588	2.040825	2.041703	1.994951	1.993721	1.992568	1.945081	1.945162	1.945352

Notes: * indicates significance at 1%, ** indicates significance at 5%, *** indicates significance at 10%; t statistics are in parentheses

The results are sensitive to the measures of leverage. Firm-specific risks are represented by the following variables with the accompanying parameter signs in parentheses namely: non-debt tax shield (+ve), asset tangibility (-ve), growth opportunities (-ve), size (+ve), volatility of earnings (+ve), profitability (-ve), quick assets as measure of liquidity (-ve), research and development and other intangible assets as indicators of assets riskiness (+ve), uniqueness of assets (+ve), financing deficit (+ve), dividend payout (-ve), age (+ve), target debt variable DDTA (-ve), relationship-specific investments (+ve), unionization ratio as measure of employee bargaining power (-ve), staff costs as measure of human capital investment (-ve) and rating index as indicator of debt market access (+ve). The results are robust across alternative estimation methods.

Macroeconomic risks are represented by expected inflation (-ve), unemployment rate (+ve, GARCH only), monetary policy rate (+ve), credit to private sector (+ve), term spread (+ve), all-share index (-ve), government borrowing to GDP (-ve) and economic growth (+ve).

In relation to macroeconomic conditions, leverage increases with debt market access by approximately 7 percent. Book leverage declines with equity market conditions, term spread and growth in GDP but increases with the monetary policy rate. Market leverage behaves pro-cyclically as debt usage is an increasing function of credit to private sector – which is a vital measure of the supply side of capital – as well as term spread and growth in GDP. The negative relation between book leverage and GDP growth is consistent with firms' greater use of internally generated equity (retained earnings) during periods of economic prosperity relative to their use of (external) debt finance. The positive relationship between book leverage and monetary policy rate can be interpreted as the weakness of monetary policy in providing signal for the direction of credit in an environment of fiscal dominance. It could also imply that banks do not respond to monetary policy easing when their prudential ratios are out-of-tune with regulatory guidelines in periods of high macroeconomic risk. For instance, a bank that has exceeded its prudential non-performing loan ratio of total loans will seek to work down on its portfolio of past due obligations through aggressive recovery efforts while exercising greater caution before granting further loans and advances, notwithstanding a decline in interest rates or any form of quantitative easing from the monetary authorities.
Taken together, macroeconomic factors improve the understanding of the determinants of capital structure of Nigerian quoted firms. The positive impact of debt market access is consistent with the results obtained by Demirguc-Kunt, *et al* (2020), and Machokoto, Areneke & Ibrahim (2020).

4.0. Discussion of Findings

This study's approach allows identification of the impact of macroeconomic conditions on corporate debt policy without requiring explicit measures of firms' aversion to macroeconomic risks. Profitable firms with financial surpluses (or negative financing deficit) and above-target debt ratios are likely to reduce their borrowings more quickly toward their target when macroeconomic risk is high but firm-specific risk is low. This observation suggests that a profitable firm that has abundant liquid assets with its borrowing exceeding its target readjusts its capital structure continuously and this adjustment effect is more pronounced in periods of high macroeconomic risk (high inflation, high unemployment rate, expansionary monetary policy regime, low or negative term spread, stock market boom that is inconsistent with financial and economic fundamentals (excessive rise in all-share index and equity market capitalization), contractionary fiscal policy represented by lower government spending and conservative government borrowing in periods of low or negative growth in output such as during recessions.

The relations between leverage and the macroeconomic variables are consistent with the pecking order model, which in itself is an outcome of the asymmetric information problem. Specifically, those firms with financial surpluses (represented by negative financing deficits) and above-target debt ratios are likely to reduce their borrowings more quickly toward their target when macroeconomic risk is high but firm-specific risk is low. This observation suggests that a profitable firm that has abundant liquid assets, albeit its borrowing exceeds its target, quickly readjusts its capital structure in periods of high macroeconomic risk (high inflation, high unemployment, low 'growth in output'/GDP, contractionary fiscal and monetary policies, falling stock prices/indices). In contrast, firms with abundant liquid assets or financial surpluses and below-target debt ratios do not strive to achieve their target debt ratio, but rather maintain their current state. It can be argued that in a risky environment, managers of firms with abundant liquid assets utilize their *option to wait* rather than inadvertently increasing their firms' debt ratios. The inverse relation between leverage and growth opportunities is robust to capture this debt conservatism effect.

In addition, firms that experience financial deficits with above-target debt ratios are more likely to issue equity to achieve their target capital structure, particularly in times of low macroeconomic risk as good macroeconomic prospects are positively related to the all-share index or the market value of stocks. Firms generally issue new equity during such periods consistent with market timing and window of opportunity arguments. For such firms, given the level of macroeconomic risk, an increase in firm-specific risk accelerates the capital structure adjustment process.

Next, the empirical results suggest that firms that have financing deficits with below-target borrowing are more likely to adjust their capital structure when both firm-specific and macroeconomic risks are relatively low. An increase in either type of risk retards their adjustment process in line with empirical findings such as DeAngelo & Roll (2015) and Hall, Yu & Zechner (2016).

The unemployed population in Nigeria constitutes a growing proportion of the population. Prior work has demonstrated that the youth population faces even a relatively higher level of unemployment than their prime age counterparts (Onwioduokit, 2006). From the empirical result of this study, there is an inverse relation between leverage and unemployment rate which could serve as the proxy for absence of unemployment (or social security) benefits. Since leverage increases the financing risk of firms and bankruptcy probability increases with unfavourable macroeconomic conditions, then a firm that uses debt aggressively increases the exposure of its employees (human capital) to unemployment which would result if the firm faces bankruptcy as a result of failure to meet contractual (debt interest and principal repayment) obligations as they fall due.

Further, bankruptcy could pose significant externalities including loss of jobs for employees with unique skills, all other things being equal, the higher the unemployment rate, the less levered firms should be. Debt conservatism is more pronounced in industries with production technologies characterized by greater labour intensity and industries that experience seasonal and frequent layoffs such as construction. This finding is consistent with recent results such as Brown & Matsa (2016), Maes, Dewaelheyns, Fuss & Van Hulle (2019), Manikas, Patel & Oghazi (2019), Cohn, Titman & Twite (2020) and Ferres, Ormazabal, Povel & Sertsios (2020).

Moreover, the impact of human capital investment on corporate debt policy when debt policy is measured as financial debt to total capital is positive. This implies possible greater employee bargaining power with increase in corporate borrowing. However, this cannot be a general result across all sectors since an industry-by-industry analysis of the relative impact

of human capital on debt ratios was not conducted. Firms that face greater financing constraints are the most prone to cost cutting through frequent employee lay-offs (Cohn & Wardlaw, 2016).

Overall, the decline in corporate borrowing as a result of increase in employee bargaining is marginal and more concentrated in unique and unstable industries (such as aviation, chemical and paints, computer, construction, engineering technology and oil and gas) characterized with earnings volatilities. Generally, these results buttress the pecking order arguments of greater use of leverage as a signaling device to less-informed contractual parties of brighter future prospects for the organization.

5.0. Conclusion

This paper investigates the impact of macroeconomic conditions on the borrowing behavior or capital structure of Nigerian quoted firms. Overall, the study provides clear evidence that the type of risk (firm-specific versus macroeconomic) and the extent of risk which firms are exposed to matter for their corporate borrowing behavior. This research shows that risk exerts asymmetric effects on the firm's capital structure adjustment process. It also shows that the effect of adverse macroeconomic conditions on corporate debt policy is not evenly distributed across the selected industries for this study.

Countercyclical industries will exhibit less shocks in performance relative to macroeconomic conditions and this effect could transmit to more stable capital structures. The industries where macroeconomic effects are most concentrated include aviation, chemical and paints, computer, construction (affected also by seasonal unemployment), engineering technology and oil and gas. For instance, the volatility of earnings of these industries will combine with macroeconomic shocks (e.g., arising from commodity price shocks and supply chain disruptions) to expose employees with unique skills (human capital) to the risk of job loss.

In addition, rising term premium on debt securities leads to a pre-dominance of short-term borrowing in the finance of corporate capital expenditures despite the risk of finance mismatch. These observations are important in understanding managers' actions given the increased risks associated with Nigerian economy's vulnerability to commodity price shocks. Further, investor apathy towards common stock investment as observable from trading statistics of the equity market segment of the securities market leads to firms' frequent use of debt financing, especially bank borrowing, to finance real investments thereby increasing the financial risk and fragility of such firms and potential transmission to the larger economy. Nonetheless, prudent use of debt and debt maturity should continue to be embraced by firms in order to manage overall risk.

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