EFFECT OF CASH CONVERSION CYCLE ON CAPITAL STRUCTURE OF QUOTED MANUFACTURING FIRMS IN NIGERIA

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Abstract: This study ascertained the effect of cash conversion cycle on capital structure of quoted manufacturing firms in Nigeria from 2008-2020. Specifically, this study determined the effect of inventory turnover period, average collection period and average payment period on debt-to-equity ratio. Panel data were used in this study, which were obtained from the annual reports and accounts of fifteen (15) manufacturing firms for a thirteen year period spanning from 2008-2020. *Ex-Post Facto* research design was employed. Inferential statistics using Pearson correlation coefficient, Heteroskedasticity test and Panel least square regression analysis were applied to test the hypotheses of the study. The results showed that inventory turnover period, average collection period and average payment period have a significant but negative effect on debt-to-equity ratio at 5% level of significance respectively. The study recommended inter alia that firms should maintain average payable days as low as possible as this can keep suppliers happy and might also allow the firm to take advantage of any trade discounts, thereby reducing the debt ratio and making the company to have more money which is good for working capital and available cash flows.

Keywords: Inventory Turnover Period, Average Collection Period, Average Payment Period, Debt-To-Equity Ratio

Background to the Study

The ongoing squeeze on cash and credit threatens the survival of enterprises world-wide bearing in mind that they are the sources of the companies' working assets and liabilities which are collectively captioned as "working capital". The cardinal objective of managing working capital efficiently is understandingly to ensure that the firm is capable of continuing to function with sufficient cash flow. The latter enables it to pay maturing short-term debts and defray operational expenses. This involves taking important decisions on aspects like managing accounts receivable and payables, preserving a required level of inventories, as well as the investment of surplus cash. A very important component of corporate finance is working capital management. Efficiency of working capital management is based on the principle of speeding up cash collections as quickly as possible and slowing down cash disbursements as slowly as possible.

Liquidity management is viewed as one of the most crucial financial management concerns because it involves some intense trade-offs between risks and return which are associated with the management of short term assets and liabilities (Amahalu, Obi, Abiahu & Ezechukwu, 2017).), Every organization, whether profit-oriented or not, and, irrespective of size and nature of its business, needs some measure of working capital. This is so because working capital constitutes the life-giving force for every economic unit.. The cash conversion cycle is used in many manufacturing companies as a measure of the risks and returns associated with the management of liquidity. Amahalu and Ezechukwu (2017) pointed out that the cash conversion cycle is the sum of days average collection period and the inventory period minus the average repayment period for receivables payable. Cash conversion cycle is cash gap, which is the period of time between the actual expenses for production and actual cash received by a sale of goods or services. Financing decisions result in a given capital structure and suboptimal financing decisions can lead to corporate failure. It is on this ground that the trade-off between profitability and liquidity remains contestable among economic experts and scholars. Manufacturing firms in Nigeria are facing huge debt problems with their collection and payment policies as well as not paying attention to inventory levels. These have affected profitability of manufacturing firms and in turn affected the value of the companies.

Various studies have been carried out on the effect of cash conversion cycle on financial performance of manufacturing firms, but with divergent postulations ranging from positive to negative, significant to non-significant. For instance, Obeidata, Almomania and Almomania (2021); Okoye, Amahalu, Nweze and Obi 2016 revealed a positive relationship between cash conversion cycle and profitability, while Anh-Huyen and The-Dong (2021) found a negative relationship between cash conversion cycle and financial performance. On the other hand Ali Idamoyibo, Abner, Akpan, Orugun, Emmanuel and Udo (2021) found a non-significant relationship between cash conversion cycle and profitability, In the light of the foregoing, the inconsistencies and contradictory findings of the prior anecdotal studies is an evidence of a clear gap in literature, which this study sought to fill.

Objectives of the Study

The main objective is to ascertain the effect of Cash Conversion Cycle on Capital Structure of quoted manufacturing firms in Nigeria.

The specific objectives of this study are to:
   i.   Determine the effect of Inventory Turnover Period on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.
   ii.   Ascertain the effect of Average Collection Period on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.
   iii. Evaluate the effect of Average Payment Period on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.

Research Hypotheses

The key null hypotheses to be investigated by this study are as follows:
Ho1: Inventory Turnover Period has no significant effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.
Ho2: Average Collection Period has no significant effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.
Ho3: Average Payment Period has no significant effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.

Conceptual Review

Cash Conversion Cycle

The cash conversion cycle (CCC) is a metric that expresses the length of time (in days) that it takes for a company to convert its investments in inventory and other resources into cash flows from sales. Also called the Net Operating Cycle or simply Cash Cycle, CCC attempts to measure the duration of time for which each net input dollar (cash) is tied up in the production and sales process before it gets converted into cash received through sales made to customers. This metric takes into account the duration of time it requires to sell its inventory, the duration of time required to collect receivables, and the duration of time the company is allowed to pay its bills without incurring any penalties (Abiahu, Egbunike, Udeh, Egbunike & Amahalu, 2019).

Inventory Turnover Period

Inventory turnover is a measure of the number of times inventory is sold or used in a time period such as a year. Inventory turnover is a ratio showing how many times a company has sold and replaced inventory during a given period. A company can then divide the days in the period by the inventory turnover formula to calculate the days it takes to sell the inventory on hand. Calculating inventory turnover can help businesses make better decisions on pricing, manufacturing runs, how to leverage promotions to move excess inventory, and how and when to purchase new inventory (Amahalu, Ezechukwu, Egolum & Obi, 2018). Inventory turnover measures how fast a company sells inventory and how analysts compare it to industry averages. Low turnover implies weak sales and possibly excess inventory, also known as overstocking. It may indicate a problem with the goods being offered for sale or be a result of too little marketing. A high ratio implies either strong sales or insufficient inventory, which leads to lost business.

Average Collection Period

The average collection period is the average number of days between 1) the date that a credit sale is made, and 2) the date that the money is received from the customer. The average collection period is also referred to as the *days' sales in* _accounts receivable_. The average collection period is the average number of days required to collect invoiced amounts from _customers_. The measure is used to determine the effectiveness of a company's _credit granting policies_ and collection efforts (Yao, Percy & Hu, 2015). The average collection period ratio, often shortened to "average collection period" is also referred to as the "ratio of days to sales outstanding." It is the average number of days it takes a company to collect its accounts receivable.

Average Payment Period

Average payment period means the average period taken by the company in making payments to its creditors. The average payment period (APP) is defined as the number of days a company takes to pay off credit purchases. As the average payment period increases, cash should increase as well, but working capital remains the same. Most companies try to decrease the average payment period to keep their larger suppliers happy and possibly take advantage of trade discounts. The average time (in months and days) it takes a business to make payments to its creditors is known as the average payment period, or days payable outstanding (DPO) (Mbonu & Amahalu, 2021a).

Capital Structure

The capital structure is how a firm _finances_ its overall operations and growth by using different sources of funds. Debt comes in the form of bond issues or long-term notes payable, while equity is classified as _common stock_, _preferred stock_ or _retained earnings_.. _Short-term debt_ such as working _capital requirements_ is also considered to be part of the capital structure (Amahalu, Abiahu, Okika & Obi, 2016). Capital structure can be a mixture of a firm's long-term debt, short-term debt, common equity and preferred equity. A company's proportion of short- and _long-term debt_ is considered when analyzing capital structure. When analysts refer to capital structure, they are most likely referring to a firm's debt-to-equity (D/E) ratio, which provides insight into how risky a company is. Usually, a company that is heavily financed by debt has a more aggressive capital structure and therefore poses greater risk to investors. This risk, however, may be the primary source of the firm's growth (Omabu, Okoye & Amahalu, 2021).

Debt-to Equity Ratio

The _debt-to-equity ratio_ shows the proportion of equity and debt a company is using to finance its assets and the extent to which shareholder's equity can fulfill obligations to _creditors_ in the event of a business decline (Mbonu & Amahalu, 2021b). A low debt-to-equity ratio indicates a lower amount of financing by debt via lenders versus funding through equity via shareholders. A higher ratio indicates the company is getting more of their financing from borrowing which may pose a risk to the company if debt levels are too high. A greater degree to which operations are funded by borrowed money means a greater risk of bankruptcy if business declines. Minimum payments on loans and other debts must still be met even if, due to an economic downturn or competition, a company does not earn enough profit to meet its obligations. For a _highly leveraged_ company, sustained earnings declines could lead to financial distress or _bankruptcy_ (Okegbe, Eneh & Amahalu, 2019).
Debt to Equity ratio = Total liabilities/Total shareholders' equity

Cash Conversion Cycle and Capital Structure

Inventories have generally been the most difficult asset to be managed both for merchandising and manufacturing firms. Inventory management incorporates purchasing, financing and selling policies. The implementation of these diverse policies comprises conflicting functional objectives; e.g. the financial manager's effort to minimize the inventory level is contradictory to the goal of minimizing the probability of inventory shortage as marketing manager desires. Inventory management deals, on one hand, by specifying, retaining and controlling the desirable inventory level, and on the other, by minimizing the total inventory cost. In other words, the problem of managing inventories is an optimization problem between overstocking and under stocking cost (Eneh, Okegbe & Amahalu, 2019). Empirical estimates have shown that inventory turnover ratio is negatively correlated with gross

margin and positively correlated with capital intensity (Blackstone & Cox, 2015). Egolum, Amahalu and Obi (2019). found empirical evidence that firms operating with higher gross margins have higher inventory levels, thus lower inventory turns. Furthermore, inventory turnover can be indirectly related to gross margin because of the impact of other factors like price, product variety and length of the product life cycle (Raza, Bashir, Latif & Shah, 2015). In relation to the length of the product life cycle, short length implies rapid and repeated changes in product characteristics with a view to fulfilling the consumer's preferences (Amahalu & Ezechukwu, 2017)) which justifies higher price level and thus increasing gross margin.

Theoretical Review

Baumol Model of Cash Management

Baumol model of cash management helps in determining a firm's optimum cash balance under certainty. It is extensively used and highly useful for the purpose of cash management. In 1952, William J. Baumol developed a model (The transactions Demand for Cash: An Inventory Theoretic Approach) which is usually used in Inventory management & cash management. Baumol model of cash management trades off between opportunity cost or carrying cost or holding cost & the transaction cost. As such firm attempts to minimize the sum of the holding cash & the cost of converting marketable securities to cash. The Baumol model enables companies to find out their desirable level of cash balance under certainty. The Baumol model of cash management theory relies on the trade off between the liquidity provided by holding money (the ability to carry out transactions) and the interest foregone by holding one's assets in the form of non-interest bearing money (Ndulue, Okoye & Amahalu, 2021).

Empirical Review

Amahalu, Egolum, Ezechukwu and Obi (2018) ascertained the relationship between inventory management and financial performance of brewery firms on Nigeria stock exchange for a seven (7) year period from 2010-2016. Financial performance was surrogated by return on asset, firm growth and return on equity while inventory conversion period was used as a parameter for measuring inventory management. The study used panel data that was sourced from publications of Nigeria stock exchange, fact books, annual reports and account of the listed brewery firms from 2010 – 2016. Correlation co-efficient and ordinary least square (OLS) regression method with the aid of STATA 13 statistical package was used to analyse the data. The findings revealed a significant positive relationship between return on assets, firm growth and inventory conversion period at 5% significant level; a positive and non-significant relationship between return on equity and inventory conversion period. The study recommended amongst others that brewery firms' management should emphasis on the proper inventory management techniques and measuring of efficiency deviations to identify weaknesses in the process of managing inventories.

Idamoyibo, Abner, Akpan, Orugun, Emmanuel and Udo (2021) focused on 13 quoted non-financial sectors in Nigeria firms from 1999-2020. The study determined the effect of cash conversion cycle on profitability. Liquidity proxy by the current ratio significantly influences ROE and non-significantly on ROE when proxy by the cash flow ratio. Findings from the linear regression analysis also divulged a bidirectional nexus between current ratio, cash flow ratio, and ROE and a non-causal nexus with debt-to-equity ratio.

Anh-Huyen and The-Dong (2021) examined the impact of capital structure, working capital, and governance quality on the financial performance of small and medium-sized enterprises in Taiwan using a sample of more than 2000 firms from the Taiwan Economic Journal (TEJ) during the 24-year period of 1995–2018. Panel data were used to create statistics for the regression model. The result showed that a firm's capital structure, represented by the debt ratio, has a significantly negative impact on the firm's financial measures (return on assets (ROA) and return on equity (ROE)), where the working capital, represented by the cash conversion cycle (CCC), has a negative impact and governance quality, represented by the board size, cash dividend distribution, and the percentage of directors.

Obeidata, Almomania and Almomania (2021) investigated whether the cash conversion cycle has an impact on the financial performance of listed chemical firms in Amman Stock Exchange. The study covered the period 2010-2019 of 5 among a total of 6 listed chemical firms. Return on equity and earnings per share were used as indicators for financial performance in a separate form. The study involved two hypotheses, and both hypotheses were

tested under the 95 percent level of confidence. Descriptive statistics including the mean and variance, in addition to correlation, were used in data analysis. Using both of the multiple and single regression models, the study showed that the cash conversion cycle had a significant impact on the financial performance of firms.

Methodology

Research design

This research work focused on the effect of cash conversion cycle on capital structure of quoted manufacturing companies in Nigeria. The *ex-post facto* research design was used because it involves events that have already taken place in the past.

Population of the Study

The population of this study comprised of all the fifty-nine (59) quoted manufacturing companies trading on the floor of the Nigeria stock exchange as at 31st December 2020 (see appendix 1).

Sample Size and Sampling Technique

Purposive sampling method was employed to select fifteen (15) manufacturing firms (see appendix I). The sample size was dependent on balanced data availability for the study period; firms whose stocks have consistently subsist on the floor of Nigerian stock exchange for the study period (2008-2020).

Source of Data

This study primarily relied on secondary data. The secondary data were extracted from the annual reports and accounts of the quoted manufacturing companies.

Table 1 Operationalisation of Variables

Variables	Definitions
Dependent Variable (Capital Structure)	
Debt-to-Equity ratio (DER)	Total Debt/Shareholders' Equity
Independent Variables	
Cash Conversion Cycle	(Inventory turnover + Average collection)-Average payment
Inventory Turnover Period (ITP)	Inventory *365/Cost of Sales
Average Collection Period (ACP)	Account Receivables *365/Sales
Average Payment Period (APP)	Accounts Payables *365/Credit Purchases
Control Variables	
Asset tangibility (TANG)	Non-Current Assets divided by Total Assets (NCA/TA)
Non-debt tax shields (NDTS)	Depreciation divided by total assets (Dep/TA)

Model Specification

This study adapted the model of Amahalu, Egolum, Ezechukwu a Obi (2018):
$ROA = \beta_0 + \beta_1 DIO + \beta_2 DSO + \beta_3 DPO + €$
ROA = Return on Assets
DIO = average number of days inventory outstanding.
DSO = average number of days sales outstanding
DPO = average number of days payables outstanding.

Thus, this study attempts to study the effect of cash conversion cycle on capital structure. Therefore, functional multiple regression model is:

$Y = f(X) + £$

The function of capital structure can be written and rearranged as follows:

$DER_{it} = \beta_0 + \beta_1 ITP_{it} + \beta_2 TANG_{it} + \beta_3 NDTS_{it} + £_{it}$ -   -   - Ho_1

$DER_{it} = \beta_0 + \beta_1 ACP_{it} + \beta_2 TANG_{it} + \beta_3 NDTS_{it} + £_{it}$ -   -   - Ho_2

$DER_{it} = \beta_0 + \beta_1 APP_{it} + \beta_2 TANG_{it} + \beta_3 NDTS_{it} + £_{it}$ -   -   - Ho_3

Where:

Y	=	Dependent Variable (Capital Structure)
X	=	Independent Variable (Cash Conversion Cycle)
β_0	=	Constant term (intercepts)
$\beta_1, \beta_2, \beta_3$	=	Coefficients of the explanatory variable
$£_{it}$	=	Error term/Stochastic term
DER_{it}	=	Debt-to-Equity ratio for firm i in period t
ITP_{it}	=	Inventory Turnover Period for firm i in period t
ACP_{it}	=	Average Collection Period for firm i in period t
APP_{it}	=	Average Payment Period for firm i in period t
$TANG_{it}$	=	Asset tangibility for firm i in period t
$NDTS_{it}$	=	Non-debt tax shields (NDTS) for firm i in period t

Data Presentation and Analysis

Table 2: Pearson Correlation Matrix

	DER	ITP	ACP	APP	TANG	NDTS
DER	1.00000					
ITP	0.01508	1.00000				
ACP	-0.08037	0.55663	1.00000			
APP	0.37687	0.26634	0.18280	1.00000		
TANG	0.29127	-0.45875	-0.07648	0.30810	1.00000	
NDTS	-0.17890	0.48262	-0.33395	-0.32666	-0.53132	1.00000

Source: E-Views 10, Pearson correlation output, 2021

Interpretation on Pearson Correlation Matrix

From the findings on the correlation analysis in table 2, the study found that there is a positive correlation coefficient between ITP, APP and TANG at coefficient values of 0.01508, 0.37687 and 0.29127 while the coefficients of -0.08037, and -0.17890, indicates that ACP and NDTS negatively correlate with DER.

Pre-Estimation Test

Table 3 Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.268077	Prob. F(5,7)	0.9168
Obs*R-squared	2.089232	Prob. Chi-Square(5)	0.8367
Scaled explained SS	2.077221	Prob. Chi-Square(5)	0.8384

Test Equation:
Dependent Variable: RESID^2

Method: Least Squares
Date: 10/10/21   Time: 17:26
Sample: 2008 2020
Included observations: 13

White-Hinkley (HC1) heteroskedasticity consistent standard errors and
    Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.476476	6.154568	-0.889823	0.4031
ITP	-12.40882	12.80922	-0.968741	0.3649
ACP	13.50166	14.44353	0.934790	0.3810
APP	6.607090	6.538169	1.010541	0.3459
TANG	-3.657751	3.910032	-0.935479	0.3807
NDTS	42.11088	43.75622	0.962398	0.3679

R-squared	0.160710	Mean dependent var	0.659254	
Adjusted R-squared	-0.438783	S.D. dependent var	1.796977	
S.E. of regression	2.155460	Akaike info criterion	4.677923	
Sum squared resid	32.52206	Schwarz criterion	4.938669	
Log likelihood	-24.40650	Hannan-Quinn criter.	4.624328	
F-statistic	0.268077	Durbin-Watson stat	1.365117	
Prob(F-statistic)	0.916829			

Source: E-Views 10.0 Regression Output, 2021

Heteroscedasticity is present if the test statistic has a p-value below an appropriate threshold of 5% (e.g. $p < 0.05$) then the null hypothesis of homoskedasticity is rejected and heteroskedasticity assumed. With a p-value of 0.916829 in table 3 which is greater than 5% (0.05), thus, we fail to reject the null hypothesis (that variance of residuals is constant) and therefore infer that their residuals are homoscedastic, thus, the problem of heteroscedsticity is solved.

Test of Hypothesis I

Ho_1: Inventory Turnover Period has no significant effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.
H_1: Inventory Turnover Period has significant effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.

Table 4 Panel Least Square Regression analysis showing the effect ITP on DER

Dependent Variable: DER
Method: Panel Least Squares
Date: 10/10/21   Time: 17:29
Sample: 2008 2020
Periods included: 13
Cross-sections included: 15
Total panel (balanced) observations: 195

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.149417	0.170330	0.877222	0.3815
ITP	-0.855713	0.133628	-6.403703	0.0000
TANG	1.009246	0.257671	3.916794	0.0001
NDTS	0.207379	0.590123	0.351417	0.7257

R-squared	0.221740	Mean dependent var	1.109176
Adjusted R-squared	0.209516	S.D. dependent var	1.051192
S.E. of regression	0.934606	Akaike info criterion	2.722916
Sum squared resid	166.8363	Schwarz criterion	2.790055
Log likelihood	-261.4844	Hannan-Quinn criter.	2.750100
F-statistic	18.13980	Durbin-Watson stat	1.555026
Prob(F-statistic)	0.000000		

Source: E-Views 10.0 Regression Output, 2021

Interpretation of Regression Coefficient Result

The following regression equation was obtained from table 4:

DER = 0.149417 - 0.855713 ITP +1.009246 TANG+ 0.207379NDTS

Holding all other factors constant, an increase in one unit of the ITP results into 85.57% reduction of DER, while a unit increase in TANG will lead to 1.009246 units corresponding increase of DER, and a unit increase in NDTS will result to 0.207379 units increase of DER. The Beta coefficient for ITP (β_1= -0.855713) showed that inventory turnover period relates negatively with DER, with a t-statistic of -6.403703 and associated P-value of 0.0000 < 0.05. This implies that inventory turnover period has a significant but negative relationship with DER at 5% level of significance. Results in table 4 indicated that the adjusted R-squared for the model is 0.2095, meaning that the regression model used for this study is a good predictor. The independent variables (ITP, TANG and NDTS) explained 20.95% of the variation in DER of quoted manufacturing firms. Only 79.05% of variation in DER of quoted manufacturing firms is not explained by the regression model. From the test of coefficients result in table 4, the probability value of the F-statistics = 0.0000 implies that the regression model is significant in predicting the effect of inventory turnover period on debt-to-equity ratio. The significance between the variables is less than α=0.05. This result indicates that the overall regression model is statistically significant and is useful for prediction purposes at 5% significance level.

Decision

Going by the rule of thumb, since the Prob(F-statistic) of the test = 0.000000 is less than the α-value value of 0.05; therefore H$_1$ is accepted, which upholds that Inventory Turnover Period has a significant and positive effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria at 5% level of significance.

Test of Hypothesis II

Ho$_2$: Average Collection Period has no significant effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.

H$_2$: Average Collection Period has significant effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.

Table 5 Panel Least Square Regression analysis showing the effect ACP on DER

Dependent Variable: DER
Method: Panel Least Squares
Date: 10/10/21   Time: 17:31
Sample: 2008 2020
Periods included: 13
Cross-sections included: 15
Total panel (balanced) observations: 195

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	0.595928	0.240187	2.481094	0.0140
ACP	-0.321710	0.145541	-2.210446	0.0279
TANG	0.930665	0.284328	3.273204	0.0013
NDTS	0.522027	0.654520	0.797572	0.4261

R-squared	0.226667	Mean dependent var		1.109176
Adjusted R-squared	0.201850	S.D. dependent var		1.051192
S.E. of regression	1.028961	Akaike info criterion		2.915275
Sum squared resid	202.2232	Schwarz criterion		2.982414
Log likelihood	-280.2393	Hannan-Quinn criter.		2.942459
F-statistic	6.890942	Durbin-Watson stat		1.546997
Prob(F-statistic)	0.001197			

Source: E-Views 10.0 Regression Output, 2021

Interpretation of Regressed Result

Table 5 showed the results of regression model of DER. The coefficients of ACP (β_1= -0.321710) has a t – statistic equal to -2.210446 and a p – value equal to 0.0279; the Beta coefficient of TANG (β_2= 0.930665) has a t – statistic equal to 3.273204 and a p – value equal to 0.0013; the Beta coefficient of NDTS (β_3= 0.522027) has a t – statistic equal to 0.797572 and a p – value equal to 0.4261. This implies that ACP negatively but significantly relate with DER; TANG positively and significantly relate with DER, while a non-significant but positive relationship exists between NDTS and DER. The R-squared statistic measures the success of the regression in predicting the values of the dependent variable. The adjusted R–squared of the DER model is equal to 0.201850, which indicates that 20.193% of the variation in DER is explained by the regression variables (ACP, TANG and NDTS). Hence, the explanatory variables included in this regression are good predictors of DER. The Durbin-Watson value of 1.546997 is an indication of the absence of auto-correlation problem in the model of this study. The value for the F-statistic at 6.890942 with a significant p-value of 0.001197 endorses the validity and stability of the model relevant for this study.

Decision

Based on Prob(F-statistic) value of 0.001197, which is less than the critical significance value of 5%, this invariably means that Average Collection Period has a significant and negative effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria at 5% level of significance.

Test of Hypothesis III

Ho$_3$: Average Payment Period has no significant effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.
H$_3$: Average Payment Period has a significant effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria.

Table 6 Panel Least Square Regression analysis showing the effect APP on DER

Dependent Variable: DER
Method: Panel Least Squares
Date: 10/10/21   Time: 17:32
Sample: 2008 2020
Periods included: 13
Cross-sections included: 15
Total panel (balanced) observations: 195

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.601434	0.245784	2.447002	0.0153

APP	-0.905944	0.087594	-10.34253	0.0000
TANG	0.947183	0.288705	3.280803	0.0012
NDTS	0.459748	0.648355	0.709099	0.4791

R-squared	0.256334	Mean dependent var	1.109176
Adjusted R-squared	0.241512	S.D. dependent var	1.051192
S.E. of regression	1.029143	Akaike info criterion	2.915628
Sum squared resid	202.2947	Schwarz criterion	2.982767
Log likelihood	-280.2738	Hannan-Quinn criter.	2.942812
F-statistic	13.80712	Durbin-Watson stat	1.635273
Prob(F-statistic)	0.000000		

Source: E-Views 10.0 Regression Output, 2021

Interpretation of Regression Result

Table 6 proves that the functional relationship between the dependent and independent variables is:

DER = 0.601434 - 0.905944 APP + 0.947183 TANG + 0.459748NDTS

The implication of the regression model is that a unit increase in APP will exert 91% reduction in DER, while a unit increase in TANG and NDTS will cause DER to increase by 95% and 46% respectively. The regression result revealed that APP is negatively but significantly correlated with the DER of quoted manufacturing firms in Nigeria. The beta coefficient of the variables; β_1 is -0.905944; β_2 = 0.947183; β_3 = 0.459748. The slope coefficients indicate that X_1 = 0.0000 < 0.05; X_2 = 0.0012 < 0.05; X_3 = 0.4791 > 0.05. Holding other factors constant, the regression equation reveals that a significant but negative relationship exists between APP and DER; a positive and significant relationship exists between TANG and DER, while a positive but non-significant relationship exists between NDTS and DER. As evident in table 4.6, the adjusted R^2 is 0.241512. This means that approximately 24.15% of the variations in the sampled firms' DER can be explained jointly by APP, TANG and NDTS. The overall regression result with a P-Value = 0.000000 evidenced that APP exhibits a significant negative relationship with DER.

Decision

The regression result with P-value = 0.000000 provides a basis for accepting the alternative hypothesis, which states that there is a significant but negative effect of Average Payment Period on Debt-to-Equity Ratio of quoted manufacturing firms in Nigeria at 5% level of significance.

Findings, Conclusion and Recommendations

Findings

Based on the analysis of data, the following findings emerged:

i.   Inventory Turnover Period has a significant and positive effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria at 5% level of significance.
ii.   Average Collection Period has a significant but negative effect on Debt-to-Equity ratio of quoted manufacturing firms in Nigeria at 5% level of significance.
iii. Average Payment Period has a significant but negative effect of on Debt-to-Equity Ratio of quoted manufacturing firms in Nigeria at 5% level of significance.

Conclusion

This study assessed the effect of cash conversion cycle on capital structure of quoted manufacturing firms in Nigeria. This study obtained data from annual reports and account and publications from Nigeria Stock Exchange for the manufacturing firms that operated during 2008-2020. In addition, the effect of specific cash conversion cycle variables, such as inventory turnover period, average collection period and average payment period. To determine the relationship that exists amongst the variables and the effect thereof, Pearson correlation coefficient, Heteroscedasticity test and Panel Least Square regression estimate were employed. This study revealed that cash conversion cycle components (inventory turnover period, average collection period and average payment period) have a statistically significant negative effect on debt-to-equity ratio at 5% level of significance.

Recommendations

Consequent upon the findings and conclusions drawn from this work, the following recommendations were made:

i. Based on the negative relationship between inventory turnover period and debt-to-equity ratio, firms should continue investing in inventories while calculating the inventory turnover which can help businesses make better decisions on pricing and to leverage on promotions to move excess inventory thereby bolstering profitability and reducing the debt ratio.

ii. Since a negative relationship exists between average collection period and debt-to-equity ratio, there should be continuous monitoring of the average collection period for a sustained company's cash flow and its ability to meet its obligations when they come due.

iii. Firms should continuously keeping the average payable days as low as possible as this can keep suppliers happy and might also allow the firm to take advantage of any trade discounts, thereby reducing the debt ratio and making the company to have more money which is good for working capital and available cash flows

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APPENDIX I

NIGERIA STOCK EXCHANGE LISTED MANUFACTURING FIRMS

A. Population of the Study

1. Consumer Goods

i.   DN Tyre & Rubber Plc
ii.   Champion Breweries Plc
iii.   Golden Guinea Breweries Plc
iv.   Nigerian Breweries Plc
v.   Guinness Nigeria Plc
vi.   International Breweries Plc
vii.   Jos International Breweries Plc
viii.   Premier Breweries Plc

ix.   7-Up Bottling Company Plc
x.   Tiger Branded Consumer Goods Plc
xi.   Dangote Sugar Refinery Plc
xii.   Flour Mills of Nigeria Plc
xiii.   Honeywell Flour Mills Plc
xiv.   P.S Mandrides Plc
xv.   Multi-Trex Integrated Foods Plc
xvi.   Nascon Allied Industries Plc
xvii.   Northern Nigeria Flour Mills Plc
xviii.   Union Dicon Salt Plc
xix.   UTC Nigeria Plc
xx.   Cadbury Nigeria Plc
xxi.   Nestle Nigeria Plc
xxii.   Nigerian Enamelware Plc
xxiii.   Vitafoam Nigeria Plc
xxiv.   Vono products Plc
xxv.   PZ Cussons Nigeria Plc
xxvi.   Unilever Nigeria Plc

2. Health Care

i.   Ekocorp Plc
ii.   Union Diagnostic and Clinical Services Plc
iii.   Morison Industries Plc
iv.   Evans Medical Plc
v.   Fidson Healthcare Plc
vi.   GlaxoSmithKline Consumer Nigeria Plc
vii.   May & Baker Nigeria plc
viii.   Neimeth International Pharmaceuticals Plc
ix.   Nigerian German Chemicals
x.   Pharma-Deko Plc

3. Industrial Goods

i.   African Paints (Nigeria) Plc
ii.   Austin Laz & Company plc
iii.   Berger Paints Nigeria Plc
iv.   Chemical and Allied Products Plc
v.   Cement Company of Northern Nigeria
vi.   DN Meyer Plc
vii.   IPWA Plc
viii.   Paints and Coatings Manufacturers Nigeria Plc
ix.   Portland Paints and Products Nigeria Plc
x.   Premier Paints Plc
xi.   Lafarge Africa Plc
xii.   Smart Products Plc
xiii.   Cutix plc
xiv.   Beta Glass plc
xv.   Avon Crowncaps and Containers (Nig) Plc
xvi.   Grief Nigeria Plc
xvii.   West African Glass Industry Plc
xviii.   Nigerian Ropes Plc

4. **AGRICULTURE**

i　　　FTN Cocoa Processors Plc
ii.　　Okomo Oil Farm Plc
iii.　　Presco Plc
iv.　　Ellahlakes Plc
v.　　Livestock Feeds Plc

Sample Size of the Study

i.　　Okomo Oil Farm Company Plc
ii.　　Presco Plc
iii.　　Unilever Nigeria Plc
iv.　　UTC Nigeria Plc
v.　　Flour Mills of Nigeria Plc
vi.　　Nigerian Breweries Plc
vii.　　Guinness Nigeria Plc
viii.　　May & Baker Nigeria Plc
ix.　　Evans Medical Plc
x.　　Glaxosmithkline Consumer Nigeria Plc
xi.　　Neimeth International Pharmaceutical Plc
xii.　　Berger Paints Nigeria Plc
xiii.　　Vitafoam Nigeria Plc
xiv.　　Ashaka Cement Plc
xv.　　CAP Plc