

Free Cash Flow Activities and Financial Performance of Listed Pharmaceutical Firms in Nigeria

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ABSTRACT

This study aimed at evaluating the effect of **free cash flow activities on the financial performance of listed Pharmaceutical firms** in Nigeria. The specific objectives of this study were to evaluate the effect of operating cash flow, changes in working capital, non-cash expenses and capital expenditure on return on assets of the selected **Pharmaceutical** firms. The study adopted *an ex-post facto* design. Data were generated from the audited financial reports of the seven selected **listed Pharmaceutical firms** in Nigeria from 2010-2021. Panel multiple regression technique was employed to analyze the data using Stata 14.2. The study found that operating cash flow and changes in working capital have significant positive and negative effect on return on assets with t-statistics and (p-values) 4.93(0.000) and -5.47(0.000) respectively investment in non-current assets exerted a non-significant negative effect on return on assets with t-statistics and (p-values) -0.06(0.950) and -0.27(0.785) respectively. These results imply that only operating cash flow contributed positively to financial performance among the free cash flow activities. Therefore the study recommended efficiency in free cash flow management, particularly the management of working capital to cushion the adverse effect of financial performance of the firms.

Keywords: Free Cash Flow, Operating Cash Flow, Changes in Working Capital, Non-current Assets, Return on Assets.

INTRODUCTION

The factors affecting business performance, survival and sustainability have continued to generate concern in accounting and finance research globally. As researchers and practitioners are constantly concerned about sustainable performance and why some businesses are more successful than others, two schools of thought have emerged (Hansen & Wernerfelt, 1989 in Abughniem, *et al.* 2020). The first focuses on external economic factors where as the second was concerned with internal business characteristics (Abughniem, *et al.* 2020). These authors held that both lines of thought have identified that liquidity is a critical component in business management and as such, cash flow is very vital in assessing the competitive position of a business. They argued that a company can appear profitable on paper but not have sufficient cash to settle its immediate obligations or replenish its inventory.

In line with this thought, Fulmer *et al.* (2012) averred that business owners are in the dilemma to think that securing commercial financing is an alternative to spur growth. But the reality is that lenders expect regular repayments on the financing, and the current and future cash flow projections are critical in raising such funds. Therefore, they conclude that cash flow provides a better sense of the financial situation of the firms. To achieve the objectives of their businesses, firms must keep track of their financial health and performance. The analysis of cash flow suggests the firm's ability to generate cash in the future as well as its ability to pay short-term or long-term obligations (Suciani & Setyawan, 2022). Cash is the most critical factor that can affect the profitability and survival of a business (Amah *et al.*, 2016). Analysis of the cash

flow statement is useful for evaluating the company's position and operations by comparing previous years so that it can be determined whether or not the company's performance in carrying out their operations is good (Murtianingsih & Hastuti, 2020 in Suciani & Setyawan, 2022). It provides information about the company's ability to obtain cash and cash equivalents. Therefore analysis of cash flow is extremely useful for both internal and external stakeholders in an organization.

The pharmaceutical sector is highly capital-intensive and requires huge start-up costs and operates in a high-risk industry. This is because of the expensive lead time in research and development as well as the reasonably long time to secure regulatory approval for products. This industry has had a history of weak trends in managing working capital performance compared to other industries (Insight-software, 2020) and the challenges of inefficiency cash flow management cannot be overruled. In Nigeria, Pharmaceutical firms are confronted with congressional and regulatory pressure to improve the standard, maintain quality, cut costs and lower prices, while also struggling with aligned with innovative models and declining profitability. They face radical healthcare reforms that affect drug trials, sales, pricing, and manufacturing. Improving cash flow management can ease these pressures and support innovation, leading to sustained profitability. Hence, to be sustainable, pharmaceutical firms are expected to pay special attention to their cash cycle and make sure to cover the cash gap between receivables and payables.

Notably, cash flow is reported in three segments in the financial statement of firms namely; cash from operating, investing, and financing activities. The results of this statement are a net increase or decrease in these activities as well as the cash and cash equivalent of the company for the period (Amah *et al.*, 2016). Apart from revealing the changes in cash flow activities, there are critical analytical issues linked to idle cash or large free cash flow which could create conflicts within the organizations between the managers and the owners, thereby impacting their performance negatively (Jensen, 1986 in Hau, 2017). Unfortunately, this aspect is not part of the disclosure requirement. Free cash flow (FCF) is an important financial metric because it represents the actual amount of cash at a company's disposal. FCF shows the amount of cash generated per annum that is free and clear of all external and internal obligations. In other words, it represents the company's cash which can be safely invested, distributed to investors or a combination of both.

Effective FCF management requires sound capital, investment, cash flow management and dividend payment policies. Divergence trends in the FCF could suggest that the firm is investing in non-current assets to grow the business. Again divergence changes in inventory can signify faltering demand, stockpiling and poor cash management. Similarly, fluctuations in working capital items (inventory, accounts payable and receivable) could either positively or negatively affect FCF and profitability. Therefore, managers and business owners are continuously seeking to understand the fundamentals of FCF activities which will inform effective decisions at all times. Specifically, poor management of FCF activities could have severe consequences. For instance, negative or low FCF could force a firm to embark on costly fundraising to remain solvent. In the same way, when a firm has sufficient FCF to sustain its operation but little or nothing for investment, the firm will inevitably lag behind its competitors. Therefore, understanding the fundamentals of FCF activities as an important financial metric is very crucial for business sustainability and improved performance. In line with this thought, it is logical to subject the effect of FCF activities to empirical examination, hence this study.

Based on extant empirical studies, the link between cash flow, FCF and financial performance is still a subject of investigation. Most empirical studies that studied the connection between FCF and financial performance yielded mixed results. In Nigeria, empirical research on the relationship between free cash flow and firm performance is still limited. To our knowledge, most of the studies in cash flow concentrated on the component of cash flow (operating, investing, and financing activities) as represented in the financial statement. The current study deviated from the previous ones to examine the effect of FCF activities on the

financial performance of listed Pharmaceutical firms in Nigeria.

The specific objectives are to:

1. Examine the effect of operating cash flow on the return on assets of listed Pharmaceutical firms in Nigeria.
2. Ascertain the effect of changes in working capital on the return on assets of listed Pharmaceutical firms in Nigeria.
3. Investigate the effect of investment on non-current assets on the return on assets of listed Pharmaceutical firms in Nigeria.

LITERATURE REVIEW

Conceptual Review

Free Cash Flow

According to Hau (2017), the concepts of free cash flow (FCF) or idle cash flow can be traced to Jensen (1986). FCF is the cash a firm generates through its operations after considering the outflows for future sustenance of the business such as investment in noncurrent assets (property, plant and equipment). Put simply, FCF is the balance of cash after operating expenses and capital expenditures have been taken care of. FCF is the net operating income before depreciation expenses, fewer tax expenses, interest expenses, and stock dividends, scaled by net sales (Lehn & Poulsen, 1989). According to Dechow and Ge (2006), FCF is the cash flow from operational activities plus the cash flow from financial investments. Hence, the basic components of FCF are operating cash flow, changes in working capital and capital expenditure or investment non-current assets.

From an analytical perspective, FCF shows the ability of the firms to produce cash above their operating and investing needs. It is fundamentally a financial metric to measure the firm's cash disposition to pay its creditors and equity investors through debt repayments, dividends and share buybacks after meeting its operational and capital expenses. For instance, free cash flow to the firm (FCFF) is a useful tool to examine the quality of cash flows available for additional borrowing. When the firm's debt payments are deducted from the FCFF, it will assist the lenders to make informed decisions. Similarly, FCF helps equity holders to determine the potential stability of future dividend payments by deducting the interest payment from the free cash flows of the firm.

Operating Cash flow

Operating cash flow (OCF) is the cash flow generated from the normal/business operation of a company (Abughniem, 2020). The business operation also known as profitable firm activities is the activities a business undertakes in its core business model which generates cash flows such as extending credits and collecting money from customers, investing in inventory, receiving credit and settlement of suppliers and so on (Suciani & Setyanan, 2022). OCF is a critical component of free cash flow and a very important financial metric because it reflects the amount that a firm produced solely from its core operation. As a financial metric, OCF showcases the health and value of a firm. For instance, a negative OCF is an indication that the firm cannot generate sufficient revenue from its core business to meet its operational expenses therefore more cash flow needs to be generated from either financial or investing activities. When this condition persisted, the business cannot remain solvent in the long run.

Mathematically, OCF is calculated by adding profit before interest and tax, non-cash expenses (depreciation and amortization) and changes in working capital.

Changes in Working Capital

A firm's working capital is an integral part of operational findings. Changes in working capital are a critical component of operating cash flow as well as free cash flow. As a financial metric, changes in working capital are a singular yardstick that reflects the soundness of the overall working capital management decisions of a firm at a glance (Asadzaman & Chowdhary, 2014; Hoang-Tan *et al.*, 2018). However, it's important to analyze both the working capital and the cash flow of a company to determine whether the financial activity is a short-term or long-term event.

For instance, a low cash flow can be a result of poor inventory management. If too many resources are tied up in storing unsold goods, the firm might experience faltering demand. Likewise, a shift in accounts payable or receivable can have severe consequences on cash flow. For example, a company that is struggling to generate sales might choose to extend its payment period, but if the suppliers did not extend its credit period, the cash flow of the firm will be negatively affected. These divergences between these fundamental trends were apparent in FCF analysis.

Investment in Non-current Assets

Capital investment decisions are among the most important decisions taken by firms because they affect shareholders' wealth, the long-term perspective of the firm's survival, competitive advantage and also the overall economic welfare of society (Taipi & Ballkoci, 2017). Investments in non-current assets are the category of assets that generally indicate the most important use of a company's resources. Investments in fixed assets such as buildings, equipment and machinery increase the firm's production capacity to increase the long-term profitability of the company.

Financial Performance

Financial performance also called corporate performance measures the proficiency with which a reporting entity succeeds through the economic acquisition of resources and their efficient and effective deployment in achieving set objectives. Eitan and Khalid (2019) stated that financial performance is used as a general measure of a company's overall financial wealth over a period which can be used to compare similar companies in the same industry and also to compare industries or sectors against each other.

There are many proxies for financial performance such as return on asset (ROA), return on equity (ROE), earnings per share (EPS), net interest margin (NIM) and return on capital employed. However, in this study, we shall proxy financial performance using ROA. ROA is the annual profit after tax of a business scaled by the total assets of the business. It measures the ability of the business to generate income with the assets base of the company.

Theoretical Framework

This study is anchored on the Free Cash Flow Theory and supported by Working Capital Management Theory and Pecking Order Theory.

Free Cash Flow Theory

Michael Jensen proposed the free cash flow theory in 1986. According to Jensen (1986), free cash flows, also known as cash flows beyond what a business requires for capital expenditures, had a favourable impact on net present value. Jensen argued that having large free cash flow creates conflicts within the firm, i.e. between the interests of managers and shareholders, thereby negatively affecting its performance. The theory assumes a tradeoff between amounts of cash flow to be invested in capital expenses or distribution to shareholders as dividends.

Jensen (1986) argues that the motives of managers are typically not aligned with those of shareholders and if managers have plenty of cash at their disposal, they use these assets to gain personal benefits rather than raise the worth of the company. Therefore, in the model managers have an agenda of accumulating assets to gain discretionary control over the firm's investment decisions (Jensen & Meckling, 1976). The argument is predicated on the idea that the management of companies with significant free cash flows is more inclined to take on initiatives that would lower the firm's value. Therefore, utilizing free cash flow management would cut down on wasteful expenses for the business. The goal of business expansion is to maximize profits at the expense of cash management. Cost increases are predicted by cash flow models to lead to positive growth.

Theory of Working Capital Management (WCMT)

The concept of working capital has evolved over time (Darun *et al.*, 2015). Bhattacharya (2009) cited in Nuhui and Dermaku (2017) declared that the theory was introduced by Karl Marx in 1914 and extended by David Ricardo in 1931. Darun *et al.* (2015) believed that the theory was proposed by Mann, (1918). According to the working capital management theory, there must be an appropriate level and mix of investment in working capital components for businesses to adapt to the challenges of the ever-changing business environment. Hence, the theory assumes four different philosophies of financing investment in current assets exist:

1. The conservative “play-it-safe” philosophy is characterized by the management of large current assets for the day to day running of the business and financing non-current assets or seasonal demands with a long term financing
2. An aggressive philosophy postulates that minimum investment in current assets relies grossly on short-term financing (Gitman, 1997; Mc Menamin, 2005). With this approach, working capital should be reduced to the barest minimum.
3. The moderate approach is a trade-off philosophy of aggressive and conservative approaches. According to Bhattacharya (2009), the approach held that temporary short-term assets are financed with short-term financing while non-current assets and current assets of permanent nature will be financed by long-term finance.
4. The aggregate approach suggests the components of working capital should not only be managed individually but as a whole to improve the investment and financing decision (Schilling, 1996).

As a result of these philosophies, different approaches, mixes, and methodologies of managing working capital are adopted by businesses that function in different market sectors or industries, in addition to having differing cash flow amounts, turnovers, and timing. In this regard, this theory is very relevant to this study because changes in working capital is said to be the lifeblood of a business. It signifies funds required for the day-to-day operation of the firm. Hence, the working capital policy of the firms will significantly affect the earnings of the firm.

Pecking Order Theory

Pecking Order Theory Pecking order theory was first suggested by Donaldson in 1961 and it was modified by Stewart C. Myers and Nicolas Majluf in 1984. Pecking order theory states that firms prefer to finance new investment, first internally with retained earnings, then with debt, and finally with an issue of new equity (Odesa & Ekezie, 2015). The Pecking Order Theory is very relevant to this work based on the premise that it discusses the movement of cash flow in organizations where most profitable organizations use internal financing firstly with retained earnings, then with debt, and finally with an issue of new equity.

Empirical Review

Amah, *et al.* (2016) examined the relationship between cash flow and the financial performance of listed

banks in Nigeria. The specific objectives of the study were; to assess the relationship between cash flow from operations and profit after tax of banks, determine the relationship between cash flow from investing activities and profit after tax and ascertain the relationship between cash flow from financing activities and profit after tax of banks in Nigeria. The study sampled four banks listed in the Nigeria Stock Exchange (NSE) for the period of 9 years (2005 – 2013) and adopted an ex-post facto research design. Data collected were subjected to statistical analysis using correlation. Net profit as a performance proxy was used and the study revealed that cash flow from operating activities has a significant and strong relationship while cash flow from investing and financing activities has a negative and weak relationship with the performance of the sampled banks. Soet, *et al.* (2018) examined the nexus between operating cash flow management and the financial performance of mutual funds companies in Kenya from 2011-2016. The independent variable was operating cash flow as deflated by total assets whereas the return on assets and return on equity were the dependent variables and proxies for financial performance. Multiple regression analysis techniques were employed using E-view software. The study found that operating cash flow management had a positive significant effect on return on assets and a positive non-significant effect on return on equity.

Odhowa (2022) assessed the connection between cash flow management activities on the financial performance of listed manufacturing firms in the Nairobi securities exchange (NSE), Kenya from 2017 to 2021. Eight manufacturing firms are listed at the NSE, Kenya. Panel data multiple regression analysis techniques were adopted for data analysis. The result revealed that cash flow management from operating and investing activities has a statistically non-significant effect on financial performance. The impact of working capital management on firm performance was positive in several studies. One of them is Asaduzzaman and Chowdhury (2014) in Bangladesh, an empirical study which was built upon the data from Bangladeshi Textiles firms. The authors found a significant relationship between working capital management and profitability, using four measures, Days of Inventory Outstanding (DIO), Days of Sales Outstanding (DSO), Cash Conversion Cycle (CCC), and Days of Payables Outstanding (DPO) to represent working capital management. While DPO showed a negative impact on profitability, the rest indicated a positive correlation with firms' profitability.

Hoang-Lan, *et al.* (2018) investigated the impact of working capital management on the financial performance of firms listed on the Ho Chi Minh Stock Exchange (HOSE) from 2014 to 2016. The independent variable of the study is the cash conversion cycle (CCC). Liquidity, risk, leverage, growth and cash flow were also considered. The dependent variables were return on assets (ROA), return on equity (ROE), and return on sales (ROS). Results revealed that working capital management has a significant positive impact on the financial performance of the sampled firms. Akomeah and Frimpong (2019) investigated the effect of working capital management on the profitability of listed manufacturing companies in Ghana using (7) manufacturing firms listed on the Ghana Stock Exchange for ten years (2005-2014) period. Data collected was analyzed using the Fixed-Effects model of the Panel data regression. The result revealed that account receivables period (ARP) and inventory conversion period (ICP) days had a statistically significant negative impact on profitability while account payables period (APP) days had insignificant positive effects on profitability. Furthermore, cash conversion cycle (CCC), current ratio (CR), and firm size (LOS) had a significant positive impact on profitability.

Taipi and Ballkoci (2017) examined the connection between the capital expenditures and firm performance of 30 Albanian construction firms from 2008 to 2015. Capital expenditure on fixed assets was the explanatory variable whereas firm size and leverage were the control variables. Return on assets was used as a proxy for financial performance. Data were analyzed using the panel multiple regression techniques. The result revealed a statistically significant positive relationship between capital expenditure and the financial performance of the sampled firms. Pandya (2017) investigated the impact of capital expenditure on the firm's financial performance of select infrastructure companies in India between 2010 and 2016. Return on assets (ROA) return on net worth (RONW) and market value of assets (MVA) are proxies for financial

performance. Data was generated from the Centre for Monitoring Indian Economy's PROWESS database.

Using a step-wise regression method the results revealed that capital expenditure has a positive impact on the firm's financial performance. Kim, *et al.* (2020) examined the nexus between capital expenditure and earnings performance of all manufacturing firms in the Compustat database between 2005 and 2015 generating a total of 24030 firm-year observations. The study classified the firms into profit-making and loss-making organizations. The study adopted a lead-lag multiple regression model in data analysis. Results revealed a positive association between capital expenditure and earnings performance for profit-making firms but not for loss-making firms.

METHODOLOGY

The researcher adopted an *ex-post facto* research design. The geographical area of study is Nigeria. The research focused on the effect of free cash flow activities on the financial performance of listed pharmaceutical firms in Nigeria. The researchers used secondary data collected from the audited financial reports of the selected pharmaceutical firms in Nigeria. The population of this study comprises the 10 pharmaceutical firms listed in the Nigerian exchange group (NGX) as of 31st December 2021 out of which seven (*Ekocorp Plc, Fidson Pharmaceutical Plc, Glaxo Smithkline Consumer Nigeria Plc, May & Baker Nigeria Plc, Morison Industries Plc, Neimeth International Pharmaceuticals Plc, and Pharma-Deko Plc*) were purposively selected.

Model Specification

We adopted and modified the model as used in Inyama and Ezeugwu (2016). The model is as stated below.

$$ROA_{it} = \beta_{0it} + \beta_1 OCF_{it} + \beta_2 CWC_{it} + \beta_3 CapExp_{it} + u_{it} \quad \text{Equation 1}$$

Where:

ROA = Return on Assets

OCF = Operating Cash Flow

CWC = Changes in Working Capital

INCA = Investment in Non-current Assets

Introducing firm size using the normalized value of total assets as a control variable, the model takes the following form:

$$ROA_{it} = \beta_{0it} + \beta_1 OCF_{it} + \beta_2 CWC_{it} + \beta_3 CapExp_{it} + \beta_4 FSize_{it} \quad \text{Equation 2}$$

The data for all explanatory variables were normalized using the *standardized* data normalization technique as follows:

$$X_{new} = \frac{X_{old} - Mean}{d}$$

Where: X_{new} is the Normalized Value; X_{old} is the Non-normalized value; *Mean* is the arithmetic average value of the series and *d* is the standard deviation of the series.

DATA ANALYSES

The study employed descriptive statistics, normality tests, pairwise correlations and panel-corrected standard errors (PCSEs) regression. It also conducted statistical and diagnostic tests such as unit roots tests, heteroskedasticity, multi collinearity and serial autocorrelation. Stata 14.2 was used for the analysis.

The decision was based on the assertion of Gujarati *et al.* (2009) that decision rule involves accepting the alternate hypothesis (H_1) if the coefficient for operating cash flow is either positive or negative, the modulus of the t-Statistic > 2.0 and the P-value of the t-Statistic < 0.05 . Otherwise, accept H_0 and reject H_1 .

Summary Statistics and Normality Test

Table 4.1: Summary Statistics and Normality Tests of Variables for the Pharmaceutical Firms in Nigeria

Variable	Obs	Summary Statistics				Normality Tests				
		Mean	Std. Dev.	Min	Max	Pr(Skewness)	Pr(Kurtosis)	joint		Shapiro-Wilk W test
							adj. chi2(2)	Prob>chi2	Prob>z	
roa	79	0.0600	0.9290	-3.4887	7.2647	0.0000	0.0000	.	0.0000	0.0000
ocf	79	0.0409	0.9657	-2.3161	2.4331	0.9570	0.3725	0.82	0.6647	0.4646
cwc	79	0.0000	0.9608	-2.5588	2.6997	0.6608	0.0939	3.11	0.2115	0.2372
inca	79	0.0000	0.9608	-1.5243	2.2339	0.0015	0.8713	8.75	0.0126	0.0000
fsize	79	0.0000	0.9608	-1.8109	3.109	0.0099	0.1792	7.58	0.0226	0.0172

Source: Author’s STATA 14.2 Outputs, 2023

Table 4.1 depicts the results of summary statistics and normality tests conducted on the data. The normalized mean of three variables changes in working capital (cwc), investment in non-current assets (inca) and total assets almost equates to zero implying that the average free cash flow activities on these indicators over the 12 years for the pharmaceutical firms in Nigeria is next to nothing. But the means of the dependent variable (return on asset [roa]) and operating cash flow (ocf) are 0.0600 and 0.0409 respectively. However, the standard deviation which shows dispersion from the mean and volatility of the indicators suggests all the variables are similarly dispersed with the range of 0.9290 for return and 0.9657 for changes in working capital. This outcome was anticipated because of the size difference of sampled firms though drawn from the same industry.

Skewness/Kurtosis validated by the Shapiro-Wilk W’ tests at 5% shows that operating cash flow and changes in working capital are normally distributed with p-values above 5% while other variables are not.

Pairwise Correlations

Table 4.2: Correlation Matrix of the roa, ocf, cwc, nce, capexp and f size

	roa	Ocf	cwc	inca	fsize
roa	1				
ocf	0.0367	1			
	0.7479				
cwc	-0.0838	0.6042*	1		
	0.4630	0.0000			
inca	-0.0372	0.0366	-0.0103	1	
	0.7449	0.7487	0.9283		
fsize	-0.1042	0.0772	-0.2676*	0.2063	1
	0.3607	0.4990	0.0171	0.0681	

Source: Author’s STATA 14.2 Outputs, 2023

Table 4.2 presents the Pearson correlation coefficients which measure the degree of relationship between the different variables. It portrays a non-significant connection of four (4) predictor variables; operating cash flow, changes in working capital, investment in non-current assets and firm size on return on assets of the Pharmaceutical firms in Nigeria. However, it also shows some significant association among the predictor variables.

Diagnostic Tests

The Diagnostic Tests revealed as follows:

1. Breusch-Pagan/Cook-Weisberg test result shows a $Prob > chi^2 = 0.0000$ which signifies the presence of a heteroskedasticity problem on the dataset and may lead to biased standard errors. If this is not corrected (Montgomery & Peck, 2007).
2. Ramsey Reset test shows $F(3, 70) = 14.91$ with a P-value (0.0000) which implies that the model is not over-specified.
3. Augmented Dickey-Fuller test of unit roots results revealed that at least one of the panels is stationary for firm size and all panels are stationary for other predictors and dependent variables with p-values less than 0.05 at lag 1. We, therefore, conclude that all the variables are stationary.
4. The variance inflation factor, a Multi-collinearity diagnostic test shows the results that range from 1.05 to 1.96 with a mean of 1.50., indicating the absence of multi-collinearity in the dataset.
5. The Breusch and Pagan Lagrangian Multiplier test that doubles as the test for the presence of panel heteroskedasticity and test to facilitate the decision between the *Random Effects Model (REM)* and the *Pooled Ordinary Least Square (POLS)* revealed $chi^2(1) = 0$ and $Prob > chibar^2 = 1.0000$ indicating that there is no statistically significant difference across the firms (no panel effect); therefore we decide that the *pooled Ordinary Least Square (POLS)* is better and has no heteroskedasticity problems.
6. The Hausman test which facilitates a choice between the *Fixed Effects Model (FEM)* and the *Random Effects Model (REM)* results show $chi^2(8) = 1.08$ and $Prob > chi^2 = 0.9489$ which suggests that the fixed effect model is not appropriate therefore strengthens the decision that the *pooled Ordinary Least Square (POLS)* is the most appropriate model for the panel dataset.

However due to the presence of a heteroskedasticity problem on the dataset a robust model “*Linear Regression with panel-correlated standard error adjusted for heteroskedasticity and Durbin-Watson*” was used for the test of hypothesis.

Test of Hypotheses

Table 4.3: Panel Regression Results of Free Cash Flow Activities, Control Variable and Return on Assets of Listed Pharmaceutical firms in Nigeria

roa	Fixed Effect Model			Random Effect Model			PCSEs [Preferred Model]			Multi-colinearity	
	P> t	t	Coef.	P> z	z	Coef.	P> z	Z	Coef.	VIF	1/VIF
ocf	0.227	1.22	0.19146	0.186	1.32	0.20188	0.0000	4.93	0.20188	1.96	0.510692
cwc	0.127	-1.55	-0.24539	0.102	-1.63	-0.25244	0.0000	-5.47	-0.25244	1.94	0.516271
inca	0.948	-0.07	-0.00765	0.941	-0.07	-0.00834	0.785	-0.27	-0.00834	1.25	0.797316
fsize	0.212	-1.26	-0.16450	0.151	-1.44	-0.18150	0.0000	-4.48	-0.18150	1.05	0.954523
_cons	0.603	0.52	0.05688	0.624	0.49	0.05197	0.009	2.60	0.05197		
										Mean	1.5
R-Squared	0.0464			0.0447					0.0494		
F-Statistic (Prob)	0.65 (0.6604)			3.80 (0.5790)					39.86 (0.0000)		
Hausman test			1.08 (0.9489)								
Poolability Test (Breusch-Pagan LM)						0.00 (1.0000)					

Source: Authors' STATA 14.2 Outputs, 2023

Therefore the **Regression Equation for the All-inclusive Model** is represented as:

$$\text{roa} = 0.05197 + 0.20188(\text{ocf}) - 0.25244(\text{cwc}) - 0.00834(\text{inca}) - 0.1815(\text{f size})$$

Hypothesis 1

Operating cash flow has no significant effect on the return on assets of listed *Pharmaceutical* firms in Nigeria.

Operating cash flow has a statistical positive significant influence on return on assets of listed *Pharmaceutical* firms in Nigeria with the *coefficient* = 0.20188, *the z-statistics of 4.94 > 2 and p-value of 0.00 < 0.05* which is very significant at 5% significance level.

Hypothesis 2

Changes in working capital have no significant effect on the return on assets of the listed *Pharmaceutical* firms in Nigeria.

Changes in working capital have a significant negative effect on the return on assets of the listed *Pharmaceutical* firms in Nigeria with the *coefficient* = -0.25244, *the z-statistics of -5.47 > 2 and the p-value of 0.000 < 0.05* which is significant at a 5% significance level.

Hypothesis 3

Investment in non-current assets has no significant effect on the return on assets of the listed *Pharmaceutical* firms in Nigeria.

Investment in non-current assets has a non-significant negative effect on the return on assets of the listed *Pharmaceutical* firms in Nigeria. The test of this hypothesis shows the coefficient of investment in non-current assets = -0.00834 , the *z*-statistics of $-0.27 < 2$ and the *p*-value of $0.785 > 0.05$ which is insignificant at a 5% significance level.

DISCUSSION OF FINDINGS

This study “free cash flow and financial performance of listed *Pharmaceutical* firms in Nigeria” examined the effect of operating cash flow, changes in working capital and non-current assets on return on assets (a proxy of financial performance). As regards hypothesis one, operating cash flow exhibited a very strong positive effect on the return on assets of listed *Pharmaceutical* firms in Nigeria with a *p*-value = 0.000 and coefficient (?) 4.50. This result aligned with the outcome of previous studies conducted by Ghodrati and Abyak (2014), and Soet *et al.* (2018) that found a significant positive effect of operating cash flow on profitability. This result also negates the outcome of the study conducted by Oduwa (2022) which reported a non-significant effect of operating cash flow on profitability.

Changes in working capital have a coefficient (-0.25244) and *p*-value: of 0.0000. Ideally, this variable constitutes a major segment of a company’s current assets; good working capital management practice must foster growth and profitability to sustain the business as a going concern. Therefore we expect that this variable will have a significant positive effect on profitability. Surprisingly, the outcome of this (-0.25244) coefficient and (0.0000) *p*-value shows that this variable exhibited a strong negative influence on the return on assets of the listed *Pharmaceutical* firms in Nigeria. The finding suggests inefficiency in the management of the working capital of the listed *Pharmaceutical* firms in Nigeria.

Investment displayed a non-significant negative effect on the return on assets of the listed *Pharmaceutical* firms in Nigeria with *p*-values 0.950 and 0.785, and coefficients -0.06 and -0.27 respectively. Albeit insignificant, this result shows that the non-cash expenses and annual investment in non-current assets affect profitability as a ratio to the total assets of the firm negatively.

CONCLUSION AND RECOMMENDATION

Conclusion

This study “the effect of free cash flow activities on financial performance of listed *Pharmaceutical* firms in Nigeria” investigated the effect of operating cash flow, changes in working capital, and investment in non-current assets from 2010 – 2021. The study employed panel least squares estimation and fathomed that about 4.94% of the variations in financial performance (proxies by return on assets) are explained by the predictors modelled in this study. Specifically, the study found that operating cash flow has a positive significant effect on return on assets; changes in working capital have a negative significant effect on return on assets; while investment in non-current assets has a non-significant negative effect on return on assets.

Recommendation

These recommendations are derived from the findings.

1. Pharmaceutical firms in Nigeria should pay close attention to operating cash flow management because it is very critical to improving profitability. An efficient collection period aligns the receivable turnover ratio with the payment period and turnover.
2. The significant negative influence of changes in working capital on return on assets is a pointer to the existing inefficiency in managing the working capital. Therefore, Pharmaceutical firms in Nigeria must as a matter of urgency review their working capital management policies for better performance to sustain their business as a going concern.
3. Investment in non-current assets ought to have improved the operational efficiency of the listed Pharmaceutical firms in Nigeria, but the negative non-significant outcome of this study indicates that the level of annual investment in non-current assets has not been able to increase the profitability of the firms. Hence, Pharmaceutical firms have to increase their investment in non-current assets to spur the expansion of the industry.

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