



# CASHFLOW Management and Investment Performance: A Panel Data Analysis OF QUOTED Industrial Goods Firms in Nigeria

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## ABSTRACT

Concerns have been raised about the detrimental effects of inadequate cash flow on investment performance and long-term financial viability in Nigeria's industrial goods sector, due to fluctuating cash flows. In view of this, this study examined the relationship between cash flow management and investment performance of quoted industrial goods firms in Nigeria. The specific objectives were to determine the relationship between cash conversion cycle and return on assets of quoted industrial goods firms in Nigeria, to ascertain the relationship between current ratio and return on assets of quoted industrial goods firms in Nigeria and to assess the relationship between of cash ratio and return assets of quoted industrial goods firms in Nigeria. The study covered ten (10)-year period (2014-2023) with panel data comprising of one hundred and twenty (120) pooled observations gathered from twelve (12) industrial goods firms quoted on the Nigerian Exchange Group. The study however adopted an *ex-post facto* research design and utilized standardized regression (Ordinary Least Square-OLS) technique to analyze data via E-views 10.0 statistical package. The study findings revealed that cash conversion cycle has a significant negative relationship (Coeff. = -0.0027 {0.0123}) with the return on assets of quoted industrial goods firms in Nigeria while current ratio has an insignificant positive relationship (Coeff. = 0.0009{0.1510}) with return on assets of quoted industrial goods firms in Nigeria. It also revealed that cash ratio has a significant positive relationship (Coeff. =

0.1709{0.0001}) with return on assets of quoted industrial goods firms in Nigeria. The study underscores the critical importance of effective cash flow management in driving investment performance and profitability. It was thus concluded that proficient cash flow management is essential for maximizing investment performance and profitability. The recommendations made, included that, industrial goods firms in Nigeria should prioritize reducing their cash conversion cycle (CCC) to improve investment performance. This can be achieved by implementing efficient inventory management, accounts receivable and payable management, and streamlining operations to minimize unnecessary working capital requirements at all times.

**Keywords:** *Cashflow management, Cash conversion cycle, Current ratio, Cash ratio, investment performance, return on assets*

## I. INTRODUCTION

Optimal cash management is the backbone of business success, as it directly impacts profitability and viability. Ugo and Egbuhuzor (2022) aptly described cash as the "lifeblood" of enterprises, highlighting its critical importance in maintaining financial health and driving growth. To ensure its optimal level, cash must be carefully planned for, managed, and invested, and any excess funds should be wisely invested. Maintaining inventory, receivables, and marketable instruments all depend on it as the common denominator to



which all current assets can be reduced. According to Nanghah, Ofor, and Onuorah (2020), effective cash flow management practices include keeping an eye on, compiling, and making use of net cash payments and receipts in order to reduce outlays and costs. Since cash is used in most transactions, effective cash management is essential to maintaining liquidity and fulfilling deadlines (Musah & Kong, 2019). To effectively make decisions about borrowing and investing, the financial management must find a balance between organizational liquidity and investment returns (Musah & 2019). Making educated decisions and optimizing the advantages of few cash resources requires competent cash management and precise cash forecasting (Nwaobia, Kwarbai & Ogundajo, 2016). Businesses can meet liquidity requirements and make appropriate returns from their cash reserves by acquiring and using cash effectively (Nwaobia, Kwarbai & Ogundajo, 2016). On the other hand, ineffective cash management techniques can result in cash flow issues, making it more difficult to meet financial commitments, make profitable investments with idle money, and seize expansion opportunities (Egwu, Orugun & Adekahun, 2021). Globally, investors aim to maximize their wealth and increase their returns on investments while also anticipating steady financial growth, profitability, room for expansion, and strong returns (Olugbenga et al., 2014). Managers encounter difficulties in achieving these targeted financial performance and investment returns, particularly in the face of adverse economic policies, regional instability, and unstable economies (Olugbenga, et al., 2014). These issues are not specific to Nigeria; they are common to other emerging nations dealing with political upheaval and terrorist activity (Appah, Awuji & Anuogwu, 2021).

Industrial goods firms in Nigeria face numerous challenges, including high financial requirements, capital deficiencies, and cash flow constraints, which hinder their overall performance and expected returns (Appah, Awuji & Anuogwu, 2021). Nevertheless, implementing effective cash management strategies will help mitigate these risks and improve financial outcomes. Strategic cash management enables firms to navigate economic uncertainties, optimize cash resources, and achieve superior investment returns. To succeed, however, firms must tailor their cash management approaches to address unique organizational challenges and respond to dynamic market conditions. Effective cash management is crucial for business success, enabling entities to leverage their cash resources for

financial stability, profitability, and sustainable growth. By prioritizing sound cash practices, Nigerian industrial goods firms tend to optimize investment performance, overcome challenges, and attract investors seeking higher returns. As Ugo and Egbuhuzor (2022) emphasize, resourceful liquidity management is vital for the sector's growth. The significance of cash flows on investment performance cannot be overstated. However, holding cash comes with a trade-off: while it offers advantages, it also incurs opportunity costs, foregone profits that could be earned through alternative investments (Soet, Muturi & Oluoch, 2018; Aluya & John, 2024). Achieving optimal investment returns demands exceptional competence and efficiency in managing cash and liquid assets. Conversely, subpar cash management renders businesses vulnerable to illiquidity and insufficiency, compromising their ability to meet daily financial obligations (Musah & Kong, 2019). Adequate cash flow is crucial for timely fulfillment of financial commitments, ultimately ensuring a firm's survival. In essence, cash flow serves as a company's lifeblood, and any disruption poses an existential threat.

The existing literature on cash flow management and corporate performance lacks consensus, yielding mixed findings. Studies have reported significant positive relationships (Obiora et al., 2022; Egwu et al., 2021), insignificant positive relationships (Liman & Mohammed, 2018; Soet et al., 2018), and significant negative relationships (Ugo & Egbuhuzor, 2022; Omiete & Wobo, 2020), with studies outside Nigeria (Adnan & Kamran, 2019; Musah & Kong, 2019) also showing varying outcomes. Taking cognizance of these inconsistencies, the main objective of this study was to examine the relationship between cash flow management and investment performance of quoted industrial goods firms in Nigeria. The specific objectives were to:

1. Determine the relationship between cash conversion cycle and return on assets of quoted industrial goods firms in Nigeria.
2. Ascertain the relationship between current ratio and return on assets of quoted industrial goods firms in Nigeria.
3. Assess the relationship between of cash ratio and return assets of quoted industrial goods firms in Nigeria.



## II. RELATED LITERATURE

### 2.1 Conceptual review

#### 2.1.1 Concept of cash flow management

Cash flow management is a critical process that involves monitoring, analyzing, and optimizing the net cash receipts and expenses of a business, as noted by Ogbonnaya, Ekwa, and Uzoma (2016). Effective cash flow management ensures financial health by addressing liquidity issues through frequent cash flow analysis. It encompasses planning, organizing, and controlling cash inflows and outflows over a specific period, ultimately influencing an organization's financial performance (Ejike & Agha, 2018). As Akumu (2017) emphasizes, cash is the lifeblood of any corporate entity, essential for acquiring assets, generating goods and services, and maximizing shareholder wealth. Liman and Mohammed (2018) confirmed that corporate investment performance of any given entity depends on the ability of such a firm to generate sufficient cash flows from their various activities. Therefore, insufficient cash flow will have a negative effect on the corporate financial performance by reducing the level of cash inflow and improving the cash outflow. A substantial number of extant studies (for instance Ghanbari, Haidari, Nazarzadeh & Abasi, 2015; Tariverdi, Amanolahi & Faal, 2014, Gheshlaghi, Ahmadzadeh & Faal, 2014; Velnampy & Kajanathan, 2013; Bingilar & Oyardonghan, 2014; Nwanyanwu, 2015, Amah, Michael & Ihedinihu, 2016; Nangih, Ofor & Onuorah, 2020; Liman & Mohammed, 2018; Abughniem, AlAishat & Hamdam, 2020; Appah, Awuji & Anuogwo, 2021) have been conducted on the subject matter. Cash conversion cycle, current ratio and cash ratio were however adopted as proxies for cashflow management in the course of this study.

#### 2.1.2 Cash conversion cycle

Cash Conversion Cycle refers to the extent of time in days between manufacturers' payment for trade payables and collections from trade receivables. Richards and Laughlin (1980) proposed the cash conversion cycle measure, herein referred to as the Cash-to-Cash Cycle. The days of sales outstanding and days of inventory outstanding correlates with the firm's cash inflow. As posited by Nwaiwu and Oluka (2017), inventory and account receivables are often considered as short-term assets and positive figures while days of payables outstanding correlates with the firm's cash outflow. The incorporation of cash conversion cycle to traditional indicators leads to more thorough scrutiny of the firm's liquidity status (Boubker &

Hicham, 2021). Ideally, trade receivables are affected by the credit collection policies and rate of recurrence of the conversion of receivables into cash. Where there is a policy within the organization to grant customers a more liberal period, profitability may increase but at the expense of liquid assets (Kirmomdo, Irungu & Obanda, 2016). Efficient management of the cash conversion cycle supports cash flow forecasting and enables better long-term funding and investment decisions, a reduced risk of bad debts, improved liquidity and hence stronger performance ratios (and from this, increases credit worthiness). There are practical, operational and commercial limitations on how cash flow levels can fall without adversely affecting firm's investment performance. As a result, the management of cash flows has an unwavering impact on performance indicators such as return on assets, return on capital employed, return on assets, cash value added etc.

#### 2.1.3 Current ratio

The current ratio is a comprehensive indicator of a company's liquidity and financial health, measuring its ability to cover short-term debts with assets convertible to cash within a corresponding timeframe. As noted by Nangih, Ofor, and Onuorah (2020), this ratio provides insight into a company's working capital adequacy and capacity to meet daily payment obligations. It also serves as a measure of management's margin of safety to mitigate uneven cash flow fluctuations through current assets and liabilities (Oseifuah & Gyekye, 2017). As the most widely used financial ratio, the current ratio offers a holistic view of a company's liquidity position. According to Nwaiwu and Oluka (2017), current ratio is a relative measure of liquidity which can be used for the purpose of inter-firm comparison. Thus, this ratio is generally recognized as the patriarch among ratios. In this study, current ratio is a cash flow explanatory variable. It indicates the availability of current assets (cash inclusive) for every current liability. In general terms, it compares assets that will become liquid in approximately twelve months with liabilities that will be due for payment in the same period. It shows the extent to which claims of short-term creditors are covered by assets that will be converted into cash soon. The higher the ratio, the greater the margin of safety for short term creditors. A normal industry average for current ratio is 2:1. However, it depends on the industry concerned and the type of activities undertaken by the company, and such may not be the case in most situations. In the Industrial goods sector, companies are very



sensitive to a shortage of cash which is a component of current ratio.

#### 2.1.4 Cash ratio

The cash ratio, a crucial liquidity metric, assesses a company's ability to settle short-term debts using its most liquid assets, specifically cash and cash equivalents. This conservative measure excludes inventory and accounts receivable, providing a stringent evaluation of a company's capacity to meet urgent financial obligations. A cash ratio below 1 may indicate financial distress, signaling potential difficulties in paying short-term debts; however, it can also reflect a deliberate strategy of maintaining low cash reserves, as noted by Akenga (2017). While useful in gauging liquidity during crisis situations, the cash ratio may be overly cautious if receivables can be quickly converted to cash or if inventory is highly liquid, as highlighted by Boubker and Hicham (2021). Nonetheless, the cash ratio remains a vital tool for evaluating a company's financial resilience and ability to navigate short-term financial challenges. This ratio is particularly valuable for creditors and investors seeking reassurance of a company's financial stability and capacity to stay in business, with a ratio of 1 or higher indicating sufficient liquidity to cover current liabilities.

#### 2.1.5 Investment performance

The evaluation of investment performance encompasses various dimensions, including earnings quality, financial performance, stock growth, market share price, return on assets (ROA), return on equity (ROE), and other key metrics (Liman & Mohammed, 2018). Shareholders' wealth maximization model in pursuance of the main corporate objective might be expressed as a motivator for the financial objective of the public corporation, such as wealth maximization as well as profit maximization at the same time. The commonly used financial objectives are to maximize shareholders' wealth, profitability, and growth in earnings per share. From the perspective of growth in earnings per share, a growth in earnings per share would mean more profit to pay out in dividend per share, or there will be more retained profits to reinvest with the intention of increasing earnings per share even more in the future (Soet, Muturi & Oluch, 2018). This study had considered investment returns from the perspective of return on assets (ROA) in the midst of other surrogates as seen in extant literature.

#### 2.1.6 Return on assets

Return on assets shows the relative profitability of the business. The ratio is similar to return on capital employed except that total assets are used in the denomination instead of capital employed. The ratio of return on assets compares the profit for the period with the total assets employed by the company in generating the profit during the same period. That is, it measures the amount of return earned on every one naira invested in assets by the companies. Guda (2013) stated that return on assets (ROA) is a measure of the effective and efficient utilization of the company's assets to generate revenue. In the analysis of financial statements, this ratio is most often highlighted, because it is able to indicate company success to create profits. Total assets comprise of both non-current and current assets and majority of non-current assets of industrial goods firms are items of property, plant and equipment. IAS 16 provides a comprehensive framework for the recognition, measurement, and disclosure of property, plant and equipment as highlighted by Aluya and John (2024). Gheshlaghi, Ahmadzadeh and Faal (2014) opined that a high return on assets ratio shows firm's ability to generate supernormal profits from past events and such position can as well be used to predict future operations. Assets in question are overall company properties, obtained from the capital itself or from foreign capital that has been converted into company assets used for corporate sustainability. Higher ROA value indicates better company performance, because of higher return on investment rate. This value reflects the company's return on all assets (or funding) provided to the company (Ugo & Egbuhuzor, 2022).

#### 2.1.7 Cash flow management and investment performance

##### 2.1.7.1 Cash conversion cycle and return on assets

The cash conversion cycle (CCC) and return on assets (ROA) are closely linked, as efficient management of working capital significantly impacts company's profitability. The CCC measures the time it takes for a company to sell its inventory, collect accounts receivable, and pay its accounts payable. A shorter CCC enables companies to quickly convert their assets into cash, reducing the need for working capital and increasing profitability, which is reflected in higher ROA. This highlights the importance of efficient working capital management in driving profitability. Extant studies by Agugoom (2020), Musah and Kong (2019), Omiete and Wobo (2020), Ugo and



Egbuhuzor (2022), and Appah, Awuji, and Anuogwu (2021) support the positive relationship between efficient CCC management and ROA. Specifically, Agugom (2020) found a positive and significant effect of cash flow optimality on ROA, while Musah and Kong (2019) revealed that cash flows positively and significantly affect ROA. Similarly, Omiete and Wobo (2020) showed that cash conversion cycle is positive and significant with ROE, implying that longer CCC reduces profitability. The below hypothesis was however proposed for this present study regarding cash conversion cycle and return on assets.

*H<sub>01</sub>: Cash conversion cycle has no significant relationship with return on assets of quoted industrial goods firms in Nigeria.*

#### 2.1.7.2 Current ratio and return on assets

The current ratio, a key metric for assessing liquidity, has a significant impact on return on assets (ROA). A higher current ratio indicates a company's ability to meet its short-term obligations, reducing the risk of liquidity crises and enabling it to focus on long-term profitability. Conversely, a lower current ratio may signal liquidity issues, potentially harming profitability and ROA. Efficient management of current assets and liabilities is crucial for maintaining a healthy current ratio and driving ROA. Studies by Appah, Awuji, and Anuogwu (2021), Idamoyibo et al. (2021), Omiete and Wobo (2020), and Ugo and Egbuhuzor (2022) support the positive relationship between current ratio and ROA. Specifically, Appah, Awuji, and Anuogwu (2021) found a positive and significant relationship between current ratio and profit after tax. Idamoyibo et al. (2021) revealed a bidirectional nexus between current ratio and ROE. Omiete and Wobo (2020) showed that current ratio is negative and insignificant with ROE, implying room for improvement in liquidity management. Ugo and Egbuhuzor (2022) found a positive and insignificant effect of operating activities on liquidity. These findings highlight the importance of effective liquidity management in driving profitability and ROA. The below hypothesis was however proposed for this present study regarding current ratio and return on assets.

*H<sub>02</sub>: Current ratio has no significant relationship with return on assets of quoted industrial goods firms in Nigeria.*

#### 2.1.7.3 Cash ratio and return on assets

The cash ratio, a stringent measure of liquidity, plays a crucial role in determining a company's return on assets (ROA). The cash ratio,

calculated as cash and cash equivalents divided by current liabilities, indicates a company's ability to settle its short-term obligations immediately. A higher cash ratio suggests financial stability, reduced risk, and increased flexibility to invest in profitable opportunities, ultimately enhancing ROA. Conversely, a lower cash ratio may indicate liquidity issues, increased risk, and reduced profitability. Studies by Omiete and Wobo (2020), Appah, Awuji, and Anuogwu (2021), and Ugo and Egbuhuzor (2022) support the positive relationship between cash ratio and ROA. Specifically, Omiete and Wobo (2020) found a positive and significant relationship between cash conversion cycle (inversely related to cash ratio) and ROE. Appah, Awuji, and Anuogwu (2021) revealed a positive and significant relationship between cash flow from operations and profit after tax. Ugo and Egbuhuzor (2022) found a negative and significant effect of financing activities on liquidity, highlighting the importance of cash management. Although direct studies on cash ratio and ROA are scarce, these findings suggest that effective cash management and liquidity are essential for driving profitability and ROA. The below hypothesis was however proposed for this present study regarding cash ratio and return on assets.

*H<sub>03</sub>: Cash ratio has no significant relationship with return on assets of quoted industrial goods firms in Nigeria.*

## 2.2 Theoretical framework

The nexus between cash flow management and investment performance cannot be established without reference to theoretical underpinnings. In the course of the study, trade-off theory and Agency theory were reviewed. However, the study anchored on Trade-off theory.

### 2.2.1 The Trade-off theory by Kraus and Litzenberger (1973)

Kraus and Litzenberger (1973) proposed the Trade-off theory. The trade-off theory postulates that the optimal cash level of a firm is maintained at the breakeven point where the marginal cost and benefit of holding cash are equal. The benefits of holding cash are derived from two vital motives: Precautionary and transaction motive. Sufficient cash outflow out-weighting inflow signifies weak liquidity control, debt, bad inventory, feeble investment skills, and financial managers' incompetence to critically engage in optimal financing decisions. Resourceful management of cash flow, short-term assets and equivalent payables is a question of life and death for firms and has



much to do with its sustained corporate existence and reputation. The trade-off theory holds that to maximize shareholders' wealth, a firm must maintain an ideal cash flow level at the breakeven point where the marginal cost and benefit of cash handling are equal (Orshi, 2016). According to Al-Abass (2017), a firm's cash or liquidity position and performance status are two economic expressions with unidirectional movement to one point inevitably implying a departure from the other.

The Trade-off Theory suggests that cash flow and investment performance have conflicting goals, requiring a balance between benefits and costs. Achieving optimal leverage involves weighing interest payment benefits against debt costs (John, Aluya, and Ogbuigwe, 2024). This theory proposes a cost-benefit analysis of debt financing to attain an optimal capital structure, balancing tax benefits and financial distress costs (Kraus & Litzenberger, 1973). The equilibrium stance ensures a firm's liquidity and viability. The liquidity trade-off hypothesis advocates for an ideal liquidity level, symmetrizing costs and benefits of cash handling. While holding cash offers benefits like buffering unexpected losses, minimizing external capital costs, and reducing asset sale risks (Abughniem, Al-Aishat & Handam, 2020). It also incurs costs, such as liquidity premiums, tax obligations, and agency costs (Boubker and Hicham, 2021). High-leverage firms face increased costs meeting obligations, compromising financial viability and to maintain a balanced liquid-performance nexus, firms must manage liquid resources appropriately.

### **2.2.2 Agency theory by Jensen and Meckling (1976)**

Agency theory was developed by Jensen and Meckling (1976) who defined the agency relationship as a form of contract between a company's owners and its managers, where the owners appoint an agent (the managers) to manage the company on their behalf. Eton, Uwonda, Mwosi, Ogwel and Obote (2019) suggested that agency problem arises in a situation where the principal (owners, shareholders) employs the agent (board/management) to undertake number duties on behalf of the owners for a reward. Olugbenga, Olusola, Zacchaeus and Oluwagbemiga (2014) stated that agency theory depicts the application of game theory to the explanation of the circumstances in which a person (the agent) acts on behalf of the principal for the advancement of the principal's objectives. According to Augustine and Jacob (2017), agency theory is a unit of finance and

accounting that explains the conflicts of interest between stakeholders with diverse interests in the same asset. Agency theory explains that companies with better cash flows provide an increase in companies' cash holdings. Kirmondo, Irungu and Obanda (2016) concluded that firms with excess cash and poor governance lead to occurring of wasteful investments.

Velnampy and Kajanantham (2013) asserted that value-destroying acquisitions due to excess cash are significantly less likely when firms raise cash from financing sources such as debt issuance. Agency theory provides that agency conflicts arise from the possible difference between the interest of the owners and that of the managers of organizations. Therefore, the basic responsibility of managers is to manage the organization in such a way that it generates returns to owners thereby improving the investment performance and cash flows (Egwu, Orugun & Adekaku, 2021). As cited in Appa, Awuji and Anuogwu (2021), agency costs can be examined in different ways such as taking advantageous behavior from a number of managers who focus on increasing their own power or position, extra consuming from the obtained incomes, ineffective investment decisions and mismanagement in accounting or frauds in firm's business contracts. Negative consequences of these actions emerge as destroying stock holders' assets and properties and also the performance. Agency theory therefore examines how management's behavior could be directed at owner's interest by decreasing agency cost in other to improve corporate investment performance.

### **2.3 Empirical Review**

Alexander (2024) investigated the relationship between credit management, cash flow management, and financial performance in Uganda's petroleum sector. The study aimed to assess the relationships between credit management, cash flow management, and financial performance, and to identify potential predictors of financial performance. The study's findings revealed a strong, statistically significant positive correlation between credit management and financial performance, and a moderate, significant positive correlation between cash flow management and financial performance. Furthermore, both credit and cash flow management emerged as significant predictors of financial performance. These insights were gleaned from a cross-sectional quantitative study involving 156 petroleum company staff in Uganda, using close-ended questionnaires and SPSS analysis.



John, Aluya and Ogbuigwe (2024) examined the moderating effect of firm size on the nexus between financing decisions and financial stability of listed industrial goods firms in Nigeria. The study employed Altman's Z-score in evaluating the financial stability of listed industrial goods firms in Nigeria and a combination of debt-equity ratio, interest coverage ratio, and total debt ratio as key predictors. The study employed descriptive statistics tools, Pearson correlation analysis and Fixed effects regression technique via Eviews 10.0 statistical package in analyzing the data. The study findings revealed that with the moderating effect of firm size, debt equity ratio has an insignificant negative relationship {(Coeff. = -0.000247 (0.6571))} with financial stability of listed industrial goods firms in Nigeria while interest coverage ratio has a significant positive relationship {Coeff. = 2.322405 (0.0173)} with financial stability of listed industrial goods firms in Nigeria. It also revealed that total-debt ratio has an insignificant negative relationship {Coeff. = -0.002365 (0.4236)} with financial stability of listed industrial goods firms in Nigeria.

Jonah, Aaron and Jack (2023) examined the relationship between cash management practices and financial performance of listed Breweries in Nigeria. The study adopted the use of secondary panel data of 4 Breweries in the Nigeria Stock Exchange for a period of ten years (2012-2021). The study used ex-post facto research design. The study was anchored on the cost trade-off theory of liquidity. The analysis was done using least square regression aided by Statistical Package for Social Sciences (SPSS) Version 22.0. The results revealed a positive relationship between the cash conversion cycle and financial performance variables (NPM and ROCE) in listed Breweries in Nigeria. The study also found that creditor's payment period had a negative significant relationship with net profit margin and no relationship with return on capital employed.

Ugo and Egbuhuzor (2022) examined the effect of cash flow management on financial performance: Evidence from the pharmaceutical industry in Nigeria. The ex post facto research design was adopted for the study with a population of ten (10) listed pharmaceutical companies in Nigeria as listed by the Nigerian Exchange Group in 2021. Data were retrieved from the annual reports of the selected listed pharmaceutical companies for the period 2011 to 2020. Multiple regression analysis and the Pairwise Granger Causality tests were used to analyze the data gathered with the aid of E-Views10 statistical software. The study revealed a positive and insignificant effect of operating

activities on liquidity. Also, it revealed a positive and insignificant effect of investing activities on liquidity. And finally, it revealed a negative but significant effect of financing activities on the liquidity of listed pharmaceutical companies in Nigeria.

Obiora, Onuora and Okolie (2022) empirically investigated the relationship which exists between cash flow management and tax aggressiveness of quoted non-financial firms in Nigeria. Three hypotheses were formulated to guide the investigation and the statistical test of parameter estimates was conducted using OLS regression model operated with STATA V.15. Ex Post Facto design was adopted and data for the study were obtained from the published annual financial reports of the entire ICT firms, health care firms and oil & gas firms quoted on Nigerian Exchange Group (NGX) spanning from 2016-2020. The findings of the study generally indicate that operating activities (OA), financing activities (FA) and investing activities (FA) have significant and positive influence on firms' tax aggressiveness measured by effective tax rate (ETR) at 1-5% significant level respectively. Thus, the study concludes that cash flow management determines tax aggressiveness of the quoted firms.

Kantudu and Umar (2021) investigated the relationship between free cash flow and investment efficiency of quoted manufacturing companies in Nigeria. An accounting-based model developed by Richardson (2006) was employed to measure investment efficiency and free cash flow. The population of the study consist of all the listed manufacturing companies in Nigeria. Similarly, the purposive sampling technique was employed to arrive at forty-eight companies for 2008-2018. The results of the study confirm the agency theory of free cash flow. Hence, it established that there is a positive and robust relationship between free cash flow and investment efficiency.

Idamoyibo, *et al.* (2021) employed a regression model to examine the relationship between cash flow management and industrial firms' performance in Nigeria. This study focuses on 13 quoted non-financial sectors in Nigeria firms from 1999-2020. The preliminary test was conducted to determine the best fit model. The study findings revealed that current ratio significantly influences ROE and non-significantly on ROE when proxy by the cash flow ratio. Findings also divulged a bidirectional nexus between current ratio, cash flow ratio, and ROE and a non-causal nexus with other variables.



Appah, Awuji and Anuogwu (2021) investigated the effects of cash flow accounting on corporate financial performance of listed consumer goods firms in Nigeria for the period 2015 to 2019. The study employed *ex-post facto* and correlational research designs. The population of the study comprised of twenty-six firm and Taro Yamene formula was utilized for the determination of sample size of twenty-three firms. The data for the study was collected from the annual reports of sampled companies listed on the Nigerian Stock Exchange and descriptive, bivariate and multivariate analysis was employed for the purpose of data analysis. The result from the data analysis revealed a positive and significant relationship between operating cash flow, financing cash flow and firm size to profit after tax of listed consumer goods manufacturing companies while investing activities and financial leverage revealed a negative and significant relationship.

Nangih, Ofor and Onuorah (2020) conducted a study on cash flow management and corporate financial performance of oil and gas companies listed on the Nigerian Stock Exchange for the period 2013 to 2018. The study employed judgmental research designs and data for this study was collected the published financial statement of the sampled five oil and gas companies. The data obtained from the annual reports were analyzed using descriptive statistics, correlational matrix and random effect regression analysis. The random effect results revealed a negative and insignificant association between cash flow from operating and investing activities on corporate financial performance while cash from financing activities suggested a positive and significant association on corporate financial performance.

Omiere and Wobo (2020) investigated the effect of cash flow, liquidity, and capital structure on the profitability of firms in Nigeria from 2010-2019. Secondary series were secured from the annual reports of twenty quoted firms; and is devoid of bias. The variables employed are return on equity (ROE), cash conversion ratio (CCO), current assets-current liabilities ratio (CURA) and debt-equity ratio (DER). The Panel Unit root, Kao and Pedroni cointegration, and Generalized Method of Moments (GMM) techniques were utilized for the study at the 95% confidence interval. The panel unit root test indicates that all the variables were integrated at order. Kao and Pedroni cointegration test revealed the absence of long-run form. The GMM outcome showed that cash conversion cycle is positive and significant with ROE; meaning that cash is tied up for longer periods. Liquidity ratio is negative and

insignificant with return on equity, thus demonstrating the inability of firms to meet up with short-term obligations when they fall due.

Agugom (2020) investigated the effect of cash flow optimality on investment returns in selected listed manufacturing companies in Nigeria. The population consisted of listed 66 manufacturing companies on the Nigerian Stock Exchange. 25 of these manufacturing companies were purposively selected for a period of 10 years (2010-2019). The study employed data obtained from the published financial statement of the selected manufacturing companies. Panel data analysis was employed while diagnostic tests were carried out and an application of the Hausman test provided the criteria for choosing between Random Effect Models and Fixed Effect Models. JarqueBera Normality, Breusch, and Pagan Lagrangian multiplier tests were conducted to confirm the Hausman test results in order to decide between Random Effects and Pooled OLS. The study found that cash flow optimality has a positive statistically significant effect on return on assets. Furthermore, the study revealed that cash flow optimality exhibits a positive statistical effect on Tobin's Q.

### III. METHODOLOGY

This study adopted an *ex-post facto* research design. This design is very appropriate where it is not possible for the researcher to directly manipulate the independent variable (Onyeizugbe, 2013). The population of this study comprised of 13 industrial goods firms quoted on the floor of the Nigerian Stock Exchange as at the end of year 2023. The sample comprised of twelve (12) industrial goods firms listed on the floor of the Nigerian stock exchange. This sample size was purposively chosen and however subjected to a validity test using Tabachnick and Fidell (2007) formula. Purposive sampling technique was used in selecting the required sample. However, availability of data served as the yardstick for selection. The technique enhances the selection of industrial goods firms that were continuously listed by Nigeria stock exchange during the period (2014-2023) and whose financial statements and reports are available and have been consistently submitted to Nigerian Exchange Group for the period under study.

The study adopted Ordinary Least Square (OLS) regression to analyze data via Eviews 10.0. The decision was based on 5% level of significance. Accept null hypothesis ( $H_0$ ) if probability value (i.e. P-value or Sig.) is greater than or equals to ( $\geq$ ) stated 5% level of significance ( $\alpha$ ); otherwise, reject and accept alternate hypothesis ( $H_1$ ), if p-value or



sig calculated is less than 5% level of significance. The model for this study was adapted from Idamoyibo, et al. (2021) and modified to suit the context of this study. This is as presented below;  
 $ROA_{it} = \beta_0 + \beta_1 CCC_{it} + \beta_2 CUR_{it} + \beta_3 CAR_{it} + \mu_{it}$ ..... (I)  
 Where;  
 ROA = Return on assets of quoted industrial goods firms in Nigeria

CCC = Cash conversion cycle of quoted industrial goods firms in Nigeria  
 CUR = Current ratio of quoted industrial goods firms in Nigeria  
 CAR = Cash ratio of quoted industrial goods firms in Nigeria  
 $\beta_0$  = Intercept or regression constant  
 $\beta_1, \beta_2, \beta_3$  = Regression coefficients  
 $\mu$  = stochastic error term

**Table 3.1: Measurement of variables**

Variables	Measurement	Source(s)
Return on assets (Dependent variable)	It is measured by dividing profit after tax by the total assets employed in any fiscal year	Aguguom (2020), Adnan and Kamran (2019).
Cash conversion cycle (Independent variable)	It is measured by subtracting the average trade payables payment period from the addition of average days of inventory and average trade receivables collection period.	Omiete and Wobo (2020), Aguguom (2020).
Current ratio (Independent variable)	It is measured by dividing current assets (cash inclusive) by current liabilities	Aguguom (2020), Idamoyibo, et al. (2021),
Cash ratio (Independent ratio)	It is measured by dividing total cash and cash equivalents by total current liabilities.	Idamoyibo, et al. (2021).

Source: Researcher’s compilation, 2024

**IV. DATA ANALYSIS AND DISCUSSION OF FINDINGS**

The data comprise a panel data of one hundred and twenty (120) pooled observations across twelve (12) quoted industrial goods firms in Nigeria for ten (10)-year period (2014-2023). The data include the dependent variable –Return on assets of quoted industrial goods firms and the independent variables which were cash conversion cycle (CCC), current

ratio (CUR) and cash ratio (CAR) of quoted industrial goods firms in Nigeria.

**4.1 Data analysis**

**4.1.1 Descriptive statistics**

This was conducted to understand the behaviour of the data using various statistics including mean, standard deviation, skewness, and kurtosis. The result for the descriptive statistics analysis is as presented in Table 4.1 below;

**Table 4.1 Descriptive statistics results**

	ROA	CCC	CUR	CAR
Mean	0.054899	25.52325	2.101377	1.323650
Median	0.061251	22.61000	1.245524	1.187556
Maximum	1.088969	86.42000	14.41061	6.960145
Minimum	-1.799173	4.724360	1.245232	-1.062664
Std. Dev.	0.242030	12.68608	4.392252	1.493700
Skewness	-3.094472	1.399150	5.863491	1.727478
Kurtosis	32.84027	7.130530	41.67587	9.657944
Jarque-Bera	4643.725	124.4588	8166.726	281.3247
Probability	0.000000	0.000000	0.000000	0.000000
Sum	6.587928	3062.790	252.1652	38.83795
Sum Sq. Dev.	6.970861	19151.47	2295.734	29.00500
Observations	120	120	120	120

Source: Researcher’s computation (2024)



The descriptive statistics for quoted industrial goods firms in Nigeria from 2014 to 2023 as shown in table 4.1 above reveal key insights into their financial performance and liquidity. The mean scores indicate central values for Return on Assets (ROA) at 5%, Cash Conversion Cycle (CCC) at 25 days, Current Ratio (CUR) at 2.10, and Cash Ratio (CAR) at 1.32, providing baseline performance measures for the industry. The median values show slightly different central tendencies, with Return on Assets at 6%, Cash Conversion Cycle at 22 days, Current Ratio at 1.24, and Cash Ratio at 1.187. These metrics offer a comprehensive understanding of the industry's performance, liquidity, and cash management efficiency. The standard deviations reveal variability levels, with Return on Assets at 0.24, Cash Conversion Cycle at 12.68, Current Ratio at 4.39, and Cash Ratio at 1.49, indicating significant fluctuations in Cash Conversion Cycle.

The skewness values measure distribution asymmetry, with Return on Assets at -3.09, Cash

Conversion Cycle at 1.39, Current Ratio at 5.86, and Cash Ratio at 1.72, suggesting non-normal distributions. Furthermore, the kurtosis values assess distribution shapes, with Return on Assets at 32, Cash Conversion Cycle at 7, Current Ratio at 41, and Cash Ratio at 10, all indicating leptokurtic distributions with outliers present. This shows that the data were not normally distributed. These statistics provide valuable insights into the financial health and liquidity of quoted industrial goods firms in Nigeria. Return on Assets measures profitability, indicating the effectiveness of asset utilization. Cash Conversion Cycle evaluates liquidity and cash management efficiency, reflecting the time taken to convert inventory and receivables into cash. Current Ratio assesses short-term liquidity, measuring the ability to meet current obligations, while Cash Ratio evaluates cash availability, indicating the ability to meet immediate financial obligations.

#### 4.1.2 Model Evaluation

##### 4.1.2.1 Normality test

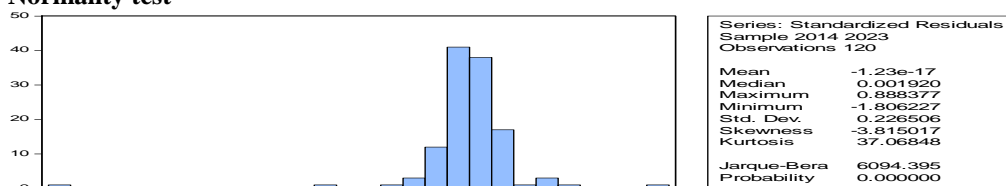


Fig. 4.1 Jarque-Bera Normality test results

Source: E-views 10.0 Output (2024)

A significant Jarque-Bera test result implies that the data do not follow a normal distribution. On the other hand, a non-significant result indicates that there is insufficient evidence to reject the assumption of normality. If the p-value associated with the Jarque-Bera test is below a predetermined significance level

( $p < 0.05$ ), then we reject the null hypothesis and conclude that the data do not follow a normal distribution. With a p-value of 0.0000, there is sufficient evidence to conclude that the data were not normally distributed.

##### 4.1.2.2 Multicollinearity Test

Table 4.2 Variance inflation factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.002597	5.921657	NA
CCC	2.76E-06	5.107275	1.005014
CUR	2.31E-05	1.239714	1.007229
CAR	0.001820	1.437969	1.003209

Source: E-views 10.0 Output (2024)



The VIF measures the extent to which the variance of the estimated regression coefficients is increased due to multicollinearity. A high VIF indicates a strong correlation between the predictor variables, suggesting multicollinearity. VIF value of less than 10.0 signifies that no severe

multicollinearity exists in the model. With a centered variance inflation factor value of 1.005014, 1.007229 and 1.003209, there is sufficient evidence to conclude that the predictor variables were not highly correlated with each other.

#### 4.1.2.3 Heteroscedasticity Test

**Table 4.3 Cross-section dependence/ Heteroscedasticity test**

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	86.18479	66	0.1484
Pesaran scaled LM	0.712395		0.4762
Pesaran CD	1.241505		0.2144

Source: E-views 10.0 Output (2024)

The statistics and probability value associated with the Breusch-Pagan LM test otherwise known as the Breusch-Pagan Godfrey test help determine whether there is evidence of heteroscedasticity in the regression model. A low p-value ( $p < 0.05$ ) suggests evidence against the null hypothesis in favour of the alternate hypothesis which indicates the presence of heteroscedasticity in the regression model. With a p-value of 0.1484,

there is sufficient evidence accept the null hypothesis, thus, conclude that the predictor variables were homoscedastic.

#### 4.2 Regression Analysis

The study utilized ordinary least squares (OLS) regression to analyze the linkages between the dependent variable and independent variables, as well as to evaluate the formulated hypotheses.

**Table 4.4 Regression analysis result**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.018812	0.050963	-4.369140	0.0000
CCC	-0.002721	0.004805	-2.566285	0.0123
CUR	0.000944	0.001662	0.568208	0.1510
CAR	0.170951	0.042666	4.006720	0.0001
R-squared	0.765284	Mean dependent var		0.054899
Adjusted R-squared	0.757849	S.D. dependent var		0.242030
S.E. of regression	0.229416	Akaike info criterion		-0.073795
Sum squared resid	6.105272	Schwarz criterion		0.019121
Log likelihood	8.427725	Hannan-Quinn criter.		-0.036062
F-statistic	12.48060	Durbin-Watson stat		2.077029
Prob(F-statistic)	0.001473			

Source: Researcher's computation (2024) using Eviews 10.0

Based on the regression output, the linear regression line is as given as:

$$ROA = -0.0188124801614 - 0.00272120952122 * CCC + 0.000944313151858 * CUR + 0.170951023418 * CAR$$

Considering the regression result above, when the independent variables i.e Cash conversion cycle, current ratio and cash ratio are held constant (equal zero), the dependent variable –Return on assets of quoted industrial goods firms decreased at a constant average rate of approximately 0.018%. In addition

to the above, a one percent rise in cash conversion cycle decreased return on assets by an average rate of approximately 0.0027% while similar variation in current ratio and cash ratio increased return on assets by approximately 0.0009% and 0.1709%. R-squared and Adj. R-squared of 0.765284 and



0.757849 indicate that the model accounts for approximately 76-77% of the variations in return on assets while variables not included accounted for 13-14% respectively.

### 4.3 Test of Hypotheses

**H<sub>01</sub>:** *Cash conversion cycle has no significant relationship with return on assets of quoted industrial goods firms in Nigeria.*

In order to test whether the variations in Return on assets (ROA) caused by cash conversion cycle (CCC) is significant. The T-test was carried out at .05 significance level with T<sub>tab</sub> of 1.9806 given at T<sub>0.05,12</sub>. From the result above, the T<sub>cal</sub> of 2.5662 is greater than T<sub>tab</sub> given at T<sub>0.05,12</sub>. Hence, the null hypothesis which states cash conversion cycle has no significant relationship with return on assets of quoted industrial goods firms in Nigeria fails to hold, thus rejected, and the alternative hypothesis accepted. The null hypothesis is further rejected given that at T<sub>0.05,12</sub>, its probability value (p-value = 0.0123) is less than 0.05.

**H<sub>02</sub>:** *Current ratio has no significant relationship with return on assets of quoted industrial goods firms in Nigeria.*

With regards to current ratio, the T<sub>cal</sub> of 0.5682 is less than T<sub>tab</sub> given at T<sub>0.05,12</sub>. Hence, the null hypothesis which states that current ratio has no significant relationship with return on assets of quoted industrial goods firms in Nigeria holds, thus accepted, and the alternative hypothesis is rejected. The null hypothesis is further accepted given that at T<sub>0.05,12</sub>, its probability value (p-value = 0.1510) is greater than 0.05.

**H<sub>03</sub>:** *Cash ratio has no significant relationship with return on assets of quoted industrial goods firms in Nigeria.*

In the same vein, in testing whether the variations in Return on assets (ROA) caused by cash ratio (CAR) was significant. The T-test was carried out at .05 significance level with T<sub>tab</sub> of 1.9806 given at T<sub>0.05,12</sub>. As shown in table 4.4 above, T<sub>cal</sub> of 4.0067 is greater than T<sub>tab</sub> given at T<sub>0.05,12</sub>. Hence, the null hypothesis which states that cash ratio has no significant relationship with return on assets of quoted industrial goods firms in Nigeria fails to hold, thus rejected, and the alternative hypothesis is accepted. The null hypothesis is further rejected given that at T<sub>0.05,12</sub>, its probability value (p-value = 0.0001) is less than 0.05.

### 4.4 Discussion of Findings

Notably, the cash conversion cycle (CCC) exhibited a significant negative relationship with return on assets (ROA), indicating that shorter CCC

is associated with higher ROA. This suggests that efficient management of working capital, particularly accounts receivable, inventory, and accounts payable, enhances profitability. Firms with shorter CCC tend to have better liquidity, reduced financing costs, and improved ability to invest in profitable opportunities. Extant studies such as include Musah and Kong (2019), Aguguom (2020), and Kantudu and Umar (2021). Musah and Kong found a positive and significant relationship between cash flows and return on assets, while Aguguom revealed that cash flow optimality has a statistically significant effect on return on assets. Similarly, Kantudu and Umar confirmed a positive and robust relationship between free cash flow and investment efficiency. In contrast, the current ratio showed an insignificant positive relationship with ROA, implying that liquidity, as measured by current assets relative to current liabilities, does not significantly impact investment performance. This finding may indicate that maintaining an optimal current ratio is crucial, as excessively high or low ratios can lead to inefficient resource allocation. Ugo and Egbuhuzor (2022), Nangih, Ofor, and Onuorah (2020), and Liman and Mohammed (2018). Ugo and Egbuhuzor found an insignificant effect of operating and investing activities on liquidity. Nangih, Ofor, and Onuorah revealed a negative and insignificant association between cash flow from operating and investing activities on corporate financial performance. Additionally, Liman and Mohammed showed a positive insignificant relationship between operating cash flow and corporate financial performance.

On the other hand, the cash ratio demonstrated a significant positive relationship with ROA, suggesting that holding sufficient cash reserves enhances profitability. This may be attributed to the ability to seize investment opportunities, meet unexpected expenses, or negotiate better terms with suppliers. Soet, Muturi, and Oluoch (2018), Obiora, Onuora, and Okolie (2022), and Appah, Awuji, and Anuogwu (2021). Soet, Muturi, and Oluoch found that operating cash flow management has a significant and positive effect on return on assets. Obiora, Onuora, and Okolie revealed that cash flow management determines tax aggressiveness of quoted firms. Furthermore, Appah, Awuji, and Anuogwu showed a positive and significant relationship between operating cash flow, financing cash flow, and firm size to profit after tax. The practical implications of these findings are profound, emphasizing the importance of efficient cash flow management for industrial goods firms in Nigeria. By optimizing



their working capital cycles and maintaining adequate cash reserves, firms tend to significantly enhance their investment performance and profitability. This can be achieved by streamlining inventory management to minimize unnecessary holdings, negotiating favorable payment terms with suppliers to improve cash inflows, and implementing robust accounts receivable management to reduce bad debts. Effective cash flow management also enables firms to maintain a cash buffer, allowing them to capitalize on unexpected investment opportunities, meet unforeseen expenses, and negotiate better terms with suppliers. This strategic financial positioning will as well lead to improved profitability, increased competitiveness, and enhanced shareholder value.

## V. CONCLUSION AND RECOMMENDATIONS

This present study examined the relationship between cash flow management and investment performance of quoted industrial goods firms in Nigeria. The study covered ten (10)-year period with particular emphasis on cash conversion cycle, current ratio and cash ratio as well as return on assets. The results indicate a significant negative relationship between cash conversion cycle and return on assets, an insignificant positive relationship with current ratio, and a significant positive relationship with cash ratio. The study underscores the critical importance of effective cash flow management in driving investment performance and profitability. Industrial goods firms in Nigeria should prioritize reducing their cash conversion cycle (CCC) to improve investment performance. This can be achieved by implementing efficient inventory management, accounts receivable and payable management, and streamlining operations to minimize unnecessary working capital requirements. Also, firms should strive to maintain an optimal current ratio, avoiding excessively high or low ratios that may lead to inefficient resource allocation. Regular monitoring and adjustment of liquidity levels will enable firms to respond effectively to changing business conditions. In addition, Industrial goods firms in Nigeria should aim at maintaining sufficient cash reserves to take advantage of investment opportunities, weather financial uncertainty, and enhance financial performance. This can be achieved by implementing cash conservation strategies, diversifying revenue streams, and prioritizing cash flow generation. This study contributes to the existing literature on cash flow management and investment performance,

providing valuable insights for stakeholders and guiding future research.

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